WMHP

WORLD MEDICAL & HEALTH POLICY

VOL 16. NO. 3 SEPTEMBER 2024

CONTRIBUTIONS

(Contents continued on page 530)

WILEY

PSO

World Medical & Health Policy

Editor
Daniel Skinner, Ph.D, *Ohio University, Dublin, Ohio, USA*

Associate Editors
Gabriel Benavidez, MPH, *University of South Carolina, Columbia, USA*
Daniel Marthey, Ph.D, *Texas A&M, College Station, USA*
Tyler Prochnow, Ph.D, *Texas A&M, College Station, USA*

Managing Editor
Prathana Dodia, *Ohio University, Athens, USA*

Editorial Board
Devaraj Acharya, Ph.D, *Tribhuvan University, Kathmandu, Nepal*
Mohammad Al-Bsheish, Ph.D, *Batterjee Medical College, Jeddah, Saudi Arabia*
Sharon Attipoe-Dorcoo, Ph.D, MPH, *Tersha LLC, Alpharetta, USA*
Bolaji Samson Aregbeshola, MScPH, *The University of Newcastl, New South Wales, Callaghan, Australia*
Felipe Agudelo-Hernández, *University of Manizales, Colombia*
Eva Baumann Ph.D, *Hanover Center for Health Communication Research, Hannover, Germany*
Flavia Beccia, *Università Cattolica del Sacro Cuore, Italy*
Kim Bullock, MD, *Georgetown University, Washington, D.C., USA*
Aslihan Çatiker, Ph.D, *Ordu University, Ordu, Turkey*
Thierry J. Chaussalet, Ph.D, *University of Westminster, London, United Kingdom*
Barry Clendenin Ph.D, MA, *George Mason University, Fairfax, USA*
Heidi P. Cordi MD, *Albany Medical Center, Albany, USA*
Sara Davies, Ph.D, *Griffith University, Queensland, Australia*
Charles Doarn, MBA, *University of Cincinnati, Cincinnati, USA*
Helga Judit Feith, Ph.D., *Semmelweis University, Budapest, Hungary*
Timothy Fung, Ph.D., *Hong Kong Baptist University, Kowloon Tong, Hong Kong SAR*
Irene Gabutti, Ph.D, *Università Cattolica del Sacro Cuore, Milan, Italy*
Nino Ghonghadze, Ph.D, *Georgian Institute of Public Affairs, Tbilisi, Georgia*
Michael Gusmano, Ph.D, *Rutgers University and The Hastings Center, New Brunswick, USA*
Salim Habayeb, MD, MPH, *World Bank, Washington, D.C., USA*
Simon F. Haeder, Ph.D, MPA, *Texas A&M University, College Station, USA*
Kathryn H. Jacobsen, Ph.D, MPH, *University of Richmond, Richmond, USA*
Karen M. Kedrowski, Ph.D, *Iowa State University, Ames, USA*
Do Kyun David Kim, Ph.D., *University of Louisiana, Lafayette, USA*
Gregory Koblentz, Ph.D, *George Mason University, Fairfax, USA*
Gary Kreps, Ph.D, *George Mason University, Fairfax, USA*
Chandrakant Lahariya, MD, *World Health Organization, Delhi, India*
Miriam Laugesen, Ph.D, *Columbia University, New York City, USA*
Ka Yiu Lee, Ph.D, *Mid Sweden University, Ostersund, Sweden*
Neil Lunt, Ph.D, *University of York, United Kingdom*
Sithokozile Maposa, Ph.D, RN, *University of Saskatchewan, Saskatoon, Canada*
Elize Massard da Fonseca, Ph.D, *São Paulo School of Business Administration, São Paulo, Brazil*
Vineeth Mathoor, *NSS Hindu College, India*
Edward Alan Miller, Ph.D, MPA, *University of Massachusetts-Boston, Boston, USA*
James Morone, Ph.D, *Brown University, Providence, USA*
Yuri V. Natochin, Ph.D, *Russian Academy of Sciences, Moscow, Russia*
Ole Norheim, MD, *Bergen University, Bergen, Norway*
Olabayo Ojeleke, MSc, *Maastricht University, Maastricht, The Netherlands*
Amit Patel, MD, *University of Massachusetts-Boston, Boston, USA*
Donna A. Patterson, Ph.D, *Delaware State University, Dover, USA*
Dana Patton, Ph.D, *University of Alabama, Tuscaloosa, USA*
Gabor Porzse, MD, PhD, *Semmelweis University and Corvinus University, Budapest, Hungary*
Ana M. Progovac, Ph.D, *Harvard Medical School and Cambridge Health Alliance, Cambridge, USA*
Sinimole k R., *Rajagiri Business School, India*
Sarah E. Rubin, Ph.D, MSc, *Ohio University, Athens, USA*
Goleen Samari, Ph.D, MPH, *Columbia University Mailman School of Public Health, New York, USA*
Patricia Stapleton, Ph.D, *RAND Corporation, Santa Monica, USA*
Tashi Tenzin, MBA, *Jigme Dorji Wangchuk National Referral Hospital, Thimphu, Bhutan*
Kevin 'Kip' Thomas, Ph.D, MBA, *Boston University, Boston, USA*
Julia van Weert, Ph.D, *University of Amsterdam, Amsterdam, The Netherlands*
Ya Yang, Ph.D, *Beijing Normal University of China, Beijing, China*
Arnob Zahid, *University of Waikato, New Zealand*

Past Editors
Arnauld Nicogossian, *George Mason University, Schar School of Policy and Government, Fairfax, USA*
Bonnie Stabile, *George Mason University, Schar School of Policy and Government, Fairfax, USA*

19484682, 2024, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/wmh3.574 by Cornell University E-Resources & Serials Department, Wiley Online Library on [19/02/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Aims and Scope

World Medical & Health Policy is a quarterly, peer-reviewed journal that considers the many factors shaping global health. We publish articles employing overlapping disciplines that include health policy and politics, political science, health economics, medical ethics, and public health. The journal's approach is unified by a thoroughgoing concern with critically examining the contexts within which policy is made, as well as more traditional considerations of processes, outcomes, and influences.

In converting empirical evidence into policy, ***World Medical & Health Policy*** helps policymakers design and promote programs that improve health outcomes, particularly for vulnerable populations. By bringing a global policy perspective to medical practice, the journal navigates the often-tangled world of global economic imperatives, international diplomacy, international agreements, the law, natural and humanmade disasters, humanitarian interventions, the social determinants of health, and local and international standards of care. The journal is committed to publishing practitioners' opinions and case studies alongside academic research articles.

Copyright and Copying (In Any Format)

© 2024 Policy Studies Organization. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to copy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organization (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, USA (www.copyright.com), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Special requests should be addressed to permissions@wiley.com.

Disclaimer

The Publisher, Policy Studies Organization, and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, Policy Studies Organization, and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, Policy Studies Organization, and Editors of the products advertised.

Proceedings of the Policy Studies Organization are available online at http://www.psocommons.org/proceedings.

19484682, 2024, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/wmh3.574 by Cornell University E-Resources & Serials Department, Wiley Online Library on [19/02/2025]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

About the Policy Studies Organization

The Policy Studies Organization (PSO) is a publisher of academic journals and books, sponsor of conferences, and producer of programs. It seeks to disseminate scholarship and information to serve those making and evaluating policy. It was founded to serve those in a variety of fields who were interested in how public policy and organizational policy were being studied and discussed.

The PSO includes senior executives, undergraduate and graduate students, state legislators, architects, judges, military officers, environmentalists who want to "green" decision making, NGO executives who worry about the future of volunteerism, professors who are working on curriculum revision, government officials in numerous agencies — in short, PSO is for intellectually active people of all persuasions.

For more information: ipsonet.org

PSO

1527 New Hampshire Ave NW
Washington, DC 20036

Received: 27 November 2023 | Revised: 17 January 2024 | Accepted: 18 February 2024

DOI: 10.1002/wmh3.606

THEORETICAL ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Ante-factum legislative general vaccination mandates as a solution to legal hypocrisy in pandemics

Ciprian N. Radavoi

University of Southern Queensland, School of Law and Justice, Toowoomba, Australia

Correspondence
Ciprian N. Radavoi, University of Southern Queensland, School of Law and Justice, Toowoomba, Australia.
Email: Ciprian.radavoi@unisq.edu.au

Abstract

With the next pandemic likely not far off, the debate over the suitability of a broad, general vaccination mandate (GVM) goes on. This essay proposes a novel argument in favor of GVM—one based on the reality that left to its own devices, executive power, from governments to the local administration and even corporations, tends anyway to impose on the nonvaccinated restrictions of such harshness that vaccination becomes *de facto* mandatory. The most coercive measure was banning the nonvaccinated from the workplace, which was done—despite the fundamental importance of the right to work to the human being—without any genuine examination of the elements of balancing (necessity, proportionality) required whenever a right is limited by the authorities. Mandating vaccination *de jure*, by parliaments, before the next pandemic strikes would have the merits of avoiding legal hypocrisy and would be achieved following national public debate and a thorough process of balancing the rights at stake.

KEYWORDS

balancing, general mandatory vaccination, health and human rights, legal hypocrisy, pandemic, proportionality, right to work, rule of law

Key points

- “No jab, no job” policies adopted by executive power in pandemics make vaccination *de facto* mandatory.
- These policies are highly coercive, as joblessness is an unreasonable alternative to vaccination.
- *De facto* mandatory vaccination eludes the requirement of proportionality and rights balancing.

- Especially the use by private executive power (business) of such coercion is unacceptable.
- *De facto* mandatory vaccination is a case of legal hypocrisy.
- Legal hypocrisy is harmful to democracy and the rule of law, and erodes trust in legal and political institutions.
- General *de jure* mandatory vaccination, adopted before the pandemic by parliaments, is therefore preferable.

INTRODUCTION

This paper is part of the conversation ongoing in the medicine, law, and governance literature regarding the suitability of mandating vaccination for the entire population in times of pandemics. The debate reached the peak during the COVID-19 pandemic, especially on compulsory immunization of health care workers (e.g., Gordon et al., 2022; Khunti et al., 2021; Maltezou et al., 2019). In parallel, numerous authors tackled the subject from a wider angle, assessing the merits and drawbacks of general mandatory vaccination (GMV) rather than vaccination of a specific professional group (e.g., Franco, 2021; Giubilini, 2020; King et al., 2022). Not surprisingly given the ideological underpinnings of either position—a utilitarian focus on the common good for GMV supporters, and a rights-based focus on autonomy in the case of opponents—the debate did not have a clear winner.

The diversity of arguments in favor of GMV is impressive. To justify recourse to the utilitarian account and the corresponding dimming of individual freedom of choice, various analogies have been proposed in the literature. Imposing a GMV has been for example analogised to imposing taxes (Giubilini, 2020) and to mandating the use of seat belts (Giubilini & Savulescu, 2019)—both, policies that killed personal choice for the benefit of the individual and the community. The risk-avoidance element present in the seat belt analogy is even more poignant in a study arguing that prohibiting vaccine refusal is similar to prohibiting celebratory gunfire (Flanigan, 2014). Further, in an application of the self-defense doctrine, it has been argued that the majority has a right to defend itself against the virus, a “serial killer,” and against those opposing vaccination (Beatty, 2022).

Not all pro-GMV arguments have been built on common good and justificatory analogies. A creative argument blending consequentialism and positivism was that, if we admit that reaching herd immunity is the objective, then paradoxically, less restrictive policies can be more discriminatory than GMV (Horák & Dienstbier, 2023). Finally, there have been arguments anchored in normative rather than consequentialist foundations. Examples are a study building its argument around the universal value of solidarity (Yeh, 2022), and one arguing that people who refuse vaccinations violate the moral principle of clean hands, which prohibits people from participating in the imposition of unjust harm (Brennan, 2018).

With such a display of academic creativity, it may appear that there is nothing to add in support of the GMV cause. Yet this article proposes a new argument: authorities should make vaccination mandatory because vaccination is already mandatory, just not in a government-sanctioned, *de jure* form.

Accordingly, the main purpose of this article is to show that preventing healthy people from coming to work if unvaccinated amounts to *de facto* general mandatory vaccination. While one may live for a few weeks or even months without meeting their friends or attending their church, the impact of losing one's job is a much more devastating experience, which means that for most people, there is no real choice there; vaccination is *de facto* mandatory when employment depends on it.

The article goes beyond this intuitive assertion and puts the argument on theoretical foundations built around the unique traits of the right to work. Placing restrictions to such an essential right in the shadow of the law, rather than within the ambit of law, should be avoided, as it limits the opportunities for public contestation of rights and obligations that should characterize a democratic society. Making a rule mandatory while claiming it is not amounts to legal hypocrisy, with toxic effects on public trust in legitimacy of institutions and in the power of law. Ultimately, legal hypocrisy corrodes the foundations of the rule of law.

DE FACTO GENERAL VACCINATION MANDATES IN PANDEMICS

Public policy is any course of action taken by the government to attain goals and objectives for the resolution of a certain problem, or matter of concern to society (Anderson, 1975, p. 3). When the problem is a pandemic, the goal is the protection of population, with objectives which, especially in the initial (pre-vaccine) stage, are centered around “interrupting chains of viral transmission, preventing morbidity and mortality, protecting at-risk populations and preserving the capacity of acute health care systems or other critical infrastructure the reduction of transmission” (World Health Organisation, 2022, p. 2). Lockdowns are the most common policy tool aimEd at fulfilling these objectives. Later, once reliable vaccines become available, the main objective becomes attaining herd immunity by having a high enough percentage of the population vaccinated (Mallory et al., 2018). How to get people to the vaccination centres is a complex matter, requiring difficult public policy choices along the continuum from no action to fully coercive action. Indeed,

> … [w]hen we face a public problem, there are really only four sorts of things that we can do about it. (…) Which we will decide to employ depends largely on how much freedom and how much compulsion we think as appropriate in the particular situations.
>
> 1. Market mechanisms. We can let the outcome depend on what individuals decide to do, without any interference or direction from government.
> 2. Structured options. We can create government programs… that individuals are free to use or not as they see fit.
> 3. Biased options. We can devise incentives and deterrents, so that individuals will be guided, voluntarily, toward the desired ends of public policy.
> 4. Regulation. We can directly control, setting up constraints and imperatives for individual action, backed by the coercive powers of government. (Anderson, 1975, p. 56).

This general taxonomy is further fine-tuned when the goal of public policy is to protect public health. As public health is one of the areas of governance most prone to conflicts between the common good and individual rights, public policy must be guided by the principle of least infringement on individual rights (Childress et al., 2002, p. 173). This has been operationalised via the so-called “intervention ladder”: ranking possible public health measures according to their degree of restrictiveness of individual autonomy. According to the intervention ladder proposed by the Nuffield Council (2007), possible action for public health purposes is as follows, from least to most coercive measures: do nothing or simply monitor the current situation ⇨ provide information ⇨ enable choice ⇨ guide choices through changing the default policy ⇨ guide choices through incentives ⇨ guide choice through disincentives ⇨ restrict choice ⇨ eliminate choice. A later list, based on the Nuffield

Council's, was conceptualized as comprising persuasion ⇨ nudging ⇨ financial incentives ⇨ disincentives ⇨ outright compulsion (Giubilini, 2019). Ideally, public policy tools employed should be on the lower rungs, but only under the condition that they are effective as well. As far as vaccination in pandemics is concerned, the highest rung (eliminate choice/outright compulsion) is not used in democracies, where citizens are not vaccinated by force.

Somewhere in the middle-high segment of the ladder is the most common form of vaccination mandate used in democratic countries during the COVID-19 pandemic: that imposed on healthcare workers (e.g., Italy, Greece, Australia, USA). This is a type of selective mandate, with selection based on profession; some countries mandated vaccination for educators as well, some for all the public sector employees, and so forth. In its most radical forms, job-related mandatory vaccination was imposed in only a few jurisdictions, for instance Western Australia and the Northern Territory of Australia, were workers in *all* sectors were required to vaccinate. Selective mandates based on criteria other than profession were usually related to age. General (as opposed to selective) mandatory vaccination (GMV)—legal imposition of vaccination on every citizen, absent a medical exception—was avoided in democratic countries, with very few exceptions.

At least, officially avoided. An examination of the definition of mandatory vaccination against the policy tools used to get people vaccinated suggests that, while political leaders kept reassuring the population that GMV will not be imposed, the executive power (public and private) imposed restrictions of such harshness that vaccination became *de facto* mandatory.

Mandates are a tool of coercion in the hands of the government. Coercion is about pressuring someone to do something that they would not otherwise do (Nozick, 1969), with pressure generally understood in governance theory as involving “a threat, or an expression of some undesired consequence to be brought about if, but only if, the addressee fails to do as commanded” (Edmundson, 2012, p. 452). Translated in the area of vaccination policy, this means (e.g., King et al., 2022; Leigh, 2023; WHO, 2022) that vaccination can be made mandatory via two distinct policy tools: either by the imposition of a direct penalty for failure to vaccinate (like the fines imposed by Austria in their mandatory vaccination statute), or by prohibiting the nonvaccinated from attending certain public places like restaurants, buses, or the workplace. Importantly, the latter can be imposed either by the state directly, or by private actors, at the state's command or with its permission.

The former are clear-cut: if there is a public authority requirement to vaccinate backed with a sanction, this is a mandate. The latter requires some unpacking, because mandates limit individual choice by threat of an inconvenient repercussion, but so do disincentives, another form of interference affecting individual freedom. It is a matter of the degree of pressure, combined with the degree of undesired-ness of the consequence of acting as directed. On the ladder of intervention, the highest rung is forcible vaccination, deemed unacceptable in democratic countries. Below this level of intensity, coercion in the name of public health is permitted, and the question is what is the precise threshold above which we can talk about a vaccination mandate. The answer, according to King et al. (2022, p. 220), is that vaccination is mandatory when it cannot be “avoided without undue burden.” This is consistent with definitions of coercion as proposals that prevent the subject from “exercising free will and judgment,” leaving “no reasonable choice,” or “no acceptable alternative” (Wertheimer, 1989, p. 30).

So something is a mandate if the authorities use coercion, and coercion occurs when the subject has no genuine alternative but to choose the line of action required by the authorities, even though in theory, the choice remains. In the COVID-19 pandemic, people were banned from a variety of activities and places, as making vaccine costly or inconvenient was at the heart of provaccination policies. But an element of reasonable choice remained for most of these: the pubgoer had the option to drink at home, the churchgoer could dispense with the priest's service for a while and speak to the Divinity directly, the shopper could shop online or ask a friend to shop for them, and so on. When it came to “no job, no jab” policies, however, things were more nuanced. It is this paper's contention that some limitations (periodic testing, or even temporary unpaid no-fault suspension) may have still been acceptable, however dismissal as an alternative was not. There was no real choice there, despite contrary views of the US automotive industry, representatives of which stated that “[w]ork relationships are free-market exchanges voluntary agreements to meet certain obligations in exchange for money and other benefits. If one of the parties changes the terms of the deal, the other party is free to accept the change or to reject it and part ways” (Automotive News, 2021, p. 12).

It is fair, under these circumstances, to say that those who accepted vaccination under the threat of permanent joblessness (and would have not taken the vaccine, absent this threat) were coerced, threatened with an undue burden. This means that all the employers who banned the unvaccinated from the workplace made vaccination mandatory. In countries where this was widespread, the sum of (selective) mandates of this sort amounted to general mandatory vaccination. The other condition, that the state imposes or condones the measure, was fulfilled as well, usually in the form of condoning, in fact even encouraging.

To exemplify, in France, President Macron said that his vaccination strategy is to “piss off” people who have not had coronavirus jabs by continuing to make daily life more and more difficult for them (Henley, 2022). In Canada, Prime Minister Trudeau praised the mandatory vaccination rules for federal employers, together with the travel restrictions, as being “some of the strongest in the world” (Scherer & Gordon, 2021), while in Australia, Prime Minister Morrison vowed to make vaccination “as mandatory as you can make it” (Oliveri, 2020).

In the absence of statutes or regulations making vaccination mandatory for the entire population, the summative effect of all the selective mandates, encouraged by political power and mass media to be as severe as possible, amounted to *de facto* general mandatory vaccination. While arguably efficient in combating the pandemic, this strategy should be still avoided in the future, for the two reasons explained in the next section: first, *de facto* policies are hypocritical and affect democracy and the rule of law, and second, leaving a too important role to private executive power leads to an improper (if any) rights-balancing exercise.

THE PROBLEMS WITH *DE FACTO* MANDATORY VACCINATION

It affects democracy and the rule of law

Claiming that something mandatory is not mandatory is a case of legal hypocrisy. Hypocritical uses of the law to accomplish illicit ends, such as the *de facto* segregation of African Americans in the United States in the first half of the last century, have already been exposed and criticized. It has been shown in this context that legal hypocrisy is harmful to the rule of law, with the harm extending to both the victims of hypocrisy—since a *de facto* practice is more difficult to challenge—and the hypocrite authorities, whose foundation of trust and authority are weakened when hypocrisy is exposed (Yankah, 2019, p. 4).

Legal hypocrisy is often meant to shield legal wrongs from public scrutiny, such as denying that institutionally sanctioned torture is practised in American prisons. As such, the already negative semantic load of the noun “hypocrisy” gets an even darker shade with the addition of the evil motive underlying the practice and its denial. But legal hypocrisy is toxic even when its causes are not evil. A study exposing legal hypocrisy in the WTO system of dispute resolution, where the Appellate Body panels rely on precedents although officially the doctrine of precedent does not apply, found the causes to be benign: "(1) an express link in the ITO Charter to the ICJ, (2) the influence of 19th century commercial arbitral practice and of the civil law, and (3) the international legal culture" (Bhala, 2000, p. 976).

Similarly, in the case of GMV there is no illicit, or at least no evil end. The claimed and laudable reason behind the avoidance of GMV is the noble desire of the authorities to abide by the principle of proportionality and avoid the upper rungs of the intervention ladder. Additionally, and less laudably, democratic governments could also be hesitant in imposing a measure that is rejected by a significant proportion of their electorate (Saunders, 2022). Nothing evil here either, but the effects of legal hypocrisy are still pernicious, with negative impacts on the rule of law in liberal societies.

Indeed, in the absence of a legal mandate for vaccination, the climate of "everything goes" sanctioned with candor and good intentions by political leaders cited in this article is conducive to overzealous action at executive level, both public (national agencies, local administration) and private (employers). This political muscle flexing is in contradiction with the quintessential requirement of the rule of law, that citizens cannot be subjected to state power except on the basis of law. The terror unleashed by bureaucracies and corporations left to their own devices, invited by leaders like those cited above to take the most drastic measures, and the risk of a slippery slope toward tyranny it creates, are aptly described in a recent study on vaccination policies:

> If current policies are to continue, public health associated bureaucracies and society will have to increase coercion to address current and future resistance and, in the process, come to leverage strategies more consistent with policing than public health. We may also see political forces double down and use people who have chosen not to get vaccinated as a collective, psychological and political tool to scapegoat and reinforce a false notion of safety among vaccinated people as they yearn to resume social and economic life (Bardosh et al., 2022, p. 10).

Studying legal hypocrisy in the context of WTO, Bhala (2000, p. 978) found the following benefits of renouncing hypocrisy:

> If we admit the hypocrisy (…) and if we move to a *de jure stare decisis* regime, we might well enhance the certainty, predictability, and fairness of WTO adjudication. We might lower the transactions costs, and increase the transparency, of this adjudication. We might increase the harmonization of world trade law at the international level, and avoid problems with customary international law as a source of obligation. (…) We might bolster the legitimacy of the WTO. We might even ensure the long-term viability of international trade law (…)

All of the benefits of renouncing legal hypocrisy, mentioned in the quote above, apply to the case at hand. Fairness of adjudication for example is impossible to achieve with *de facto* vaccination mandates, since de *facto* practices are hard to challenge: "by obscuring the harm inflicted on certain persons and communities, legal hypocrisy robs its victims of their voice, rendering their complaints unrecognizable" (Yankah, 2019, p. 14). Institutional legitimacy is also relevant to the case at hand, as legal hypocrisy cannot be concealed, and ends up eroding the citizenry trust in the major institutions of the state. How can the citizen believe in a system that publicly honors the fundamental liberal value of personal autonomy, while at the same time dismisses it in practice?

It avoids a proper rights-balancing exercise

To protect public health in pandemics, governments must make difficult choices between a variety of individual and collective rights in conflict. The international human rights law acknowledges the imperative of action in the interest of the common good and the inevitable consequent sacrifice of individual rights, but prescribes that the process of derogating from individual rights must be done following a process of balancing, and respect the rule of proportionality. If balancing is the act of "assessing whether and when the government may override the rights" (Gardbaum, 2006, p. fn67), proportionality is the test, the analytical principle ensuring that the balancing act is not conducted arbitrarily, and that limitations to rights are themselves limited. To be useful in its role of preserving the substance and meaning of human rights, proportionality requires a precise application, which most of the authors see as a series of steps culminating with the four-part proportionality test comprising legitimacy, suitability, necessity, and proportionality *stricto sensu*. The latter is also referred to as the Law of Balancing, enunciated as follows by one of the main voices in proportionality theory: "The greater the degree of nonsatisfaction of, or detriment to, one principle, the greater must be the importance of satisfying the other" (Alexy, 2014, p. 55).

The right to work is recognized internationally since the nineteenth century, with the creation in 1889 of the International Association for the Protection of Workers. The human right to work was given explicit recognition in the Universal Declaration on Human Rights in 1948 ("Everyone has the right to work, to free choice of employment, to just and favorable conditions of work, and to protection against unemployment") and was later on enshrined in the International Covenant on Economic, Social and Cultural Rights (ICESCR), Article 6 of which reads, in its first paragraph: "The States Parties to the present Covenant recognize the right to work, which includes the right of everyone to the opportunity to gain his living by work which he freely chooses or accepts, and will take appropriate steps to safeguard this right." Numerous international instruments, mostly at the United Nations and European Union level, clarify the contours and importance of this fundamental right.

The detriment to the right to work, in pandemics, is massive at both prevaccine and postvaccine stage, albeit differently: quantitative as an effect of lockdowns, in the initial stages, and qualitative after the vaccine becomes available, with the "no job, no jab" policies meant to increase vaccination rates. Indeed, the right to work is multifaceted, having both a quantitative dimension, referred to as the right *to* work (guaranteeing sufficient jobs for as many as possible in society) and a qualitative one, or rights *at* work (decent wages and working conditions, nondiscrimination, the right to join trade unions, protection from unfair dismissal). Correspondingly, when referring to the nature of the obligations of states in relation to various socioeconomic rights, the ICESCR employs three different levels of undertaking, situated along a continuum: respect, recognize (or fulfill), and ensure (or guarantee). The most common obligation laid down in the ICESCR is the quantitative one: to fulfill a right, which has to be read in conjunction with ICESCR Article 2(1), saying that each state party undertakes "to take steps … to the maximum of its available resources, with a view to achieving progressively the full realization of the [economic, social and cultural] rights." The undertaking to take steps for the progressive realization of rights has exposed the ICESCR to much criticism for its vagueness and aspirational character, but even so, post-COVID-19 human rights literature (e.g., Radavoi & Quirico, 2022) indicated that COVID-19 lockdowns amounted to a breach of the right to work in its quantitative dimension. The argument was that, while aspirational and vague as to the obligation to take positive steps, the ICESCR is clear in its prohibition of retrogressive measures—steps back, which the lockdowns were, as far as the right to work is concerned. Indeed, the governments' restrictions in response to the initial COVID-19 panic reduced the job market worldwide by one-third in 2020, with the most dramatic impacts in the Global South: according to surveys by Gallup, the percentages of people who lost their jobs or businesses ranged from over 60% in the Philippines, Kenya, and Zimbabwe, to a low of 3% in Switzerland (Ray, 2021).

Radavoi and Quirico's (2022) argument was mostly meant to shed light on hidden impacts of lockdowns, rather than to challenge them. Given the need for timely action under high urgency and uncertainty, lockdowns were not questioned through the lenses of the balancing requirement, despite the serious breaches of human rights of various sorts, including the right to work; it is assumed that the danger to population and to the national health systems could be so severe that no precaution, however damaging to other human rights, is too high when what is at stake is the right to life. But the situation changes when a safe and effective vaccine becomes available.

At this stage, the state's qualitative obligations to respect and protect (Alston & Quinn, 1987, pp. 184–186) become relevant. With regard to "no jab, no job" policies, *respect* would mean refraining from interfering with the right, and *protect* would mean ensuring that no excessive action is taken by private employers. But neither occurs in practice, even when the most radical version of the policy—dismissal of the unvaccinated, without offering them alternatives—is applied. First, with regard to respect, many states interfered with the right to work of healthcare, aged care, and education workers. Even though the need to protect vulnerable categories like the ill, the elders, the children is paramount, restrictions of the workers' rights need to be proportionate. The Italian Constitutional Court found (sentence 15 of 2023) a no-fault temporary unpaid suspension imposed by government decree to be proportionate in the case of healthcare workers, based precisely on patients' vulnerability, combined with the fact that suspending the unvaccinated worker would be temporary and no-fault. But mandatory vaccination of *all* workers, irrespective of sector (as imposed, e.g., in two Australian jurisdictions, WA and NT) would be difficult to justify, especially if the consequence for the noncompliant is a direct dismissal.

In Australia, the total ban in WA and NT, in conjunction with wide yet not total work bans in other Australian jurisdictions, led to over a quarter of employers having to sack employees (Australian Human Resources Institute [AHRI], 2021). For most democratic countries however, public power refrained from touching the right to work via coercive power of this extreme sort. It exercised instead another form of power, termed normative power by Etzioni (1975, p. 5), which rests on the allocation and manipulation of symbolic rewards and deprivations. With the support of mass media, this allocation has led, in the COVID-19 pandemic, to depicting the unvaccinated as a danger to society—a danger that needs addressed despite the lack of an official GVM policy. The climate of fear and blame promoted by politicians, the executive, and mass media practically invited private power to step in, since it has been long known that

> … in complex, industrialized societies the state or the political system need not be the sole source of extensive and intensive control. (…) [D]ecisions made by private institutions, such as large business corporations and trade unions, will frequently have as constraining an effect on individual conduct as many authoritative allocations made in the political system (Siegel & Weinberg, 1977, p. 5).

Accordingly, employers rushed to sacking noncompliant employees, whether the measure was or not sanctioned by public regulation (see, for the USA, Hardy, 2022, reviewing the situation across states and industries; for Australia, Barnes, 2021, showing that employers were generally sack-happy). Rather than protecting the right to work, the state supported discretionary action by private power. In Australia, the Fair Work Commission found that employer vaccination policies, including dismissal for non-compliance, can constitute a lawful and reasonable direction even in the absence of a Public Health Order underpinning the vaccination policy (Bishop, 2002). In South Africa, decisions of the Labour Court went in the same direction (Botha, 2021). In the United States, employees fighting contract termination over vaccination refusal similarly lost their cases (Hals, 2021).

The arbitral or court judgments were generally based on employment law (common law and/or statutes, depending on the type of legal system), including the employer's obligation to provide a safe working environment, the employee's obligation to heed to reasonable directions form their managers, and the right of employers to dismiss "permanently incapacitated" workers. In the general climate of pressure and fear, it is perhaps understandable that judges did not want to sabotage concerted efforts in society to increase vaccination rates, and to further weaken an already debilitated (after extensive lockdowns) business sector. The involved courts and tribunals seem to have overlooked the fact that dismissal is a too radical solution—the unvaccinated worker is not permanently "incapacitated," for one thing. Had a general, national vaccination mandate been stipulated officially, in legislation, a real balancing exercise would have been difficult to avoid during the public debate that would have preceded the law adoption, and would have likely indicated that coercion by the threat of dismissal is unacceptable in any circumstance.

THE SOLUTION: *ANTE FACTUM* LEGISLATION MANDATING GENERAL VACCINATION

The quote in the previous section from the analysis on legal hypocrisy at WTO, indicating the benefits of moving to a *de jure* regime in that specific case, suggests the solution to our problem as well. When certainty, predictability, and transparency are the desired traits, the answer is statutory (adopted by parliaments) law. This would lead to harmonization, too, since a calm exchange of arguments is more likely in a frank national debate before the pandemic, than during the dramatic times of confronting the virus. If difficult decisions must be made, it is better, in a democracy and rule of law perspective, that they are made *ante factum* by parliaments.

This has been advocated for in 2022, precisely in the context of executive and private power overreaching in the statutory vacuum. A worldwide network of jurists adopted, towards the end of the COVID-19 pandemic, principles concerning the legality and constitutionality of mandatory vaccination. Known as the LAC19 Principles, these recommended that mandatory vaccination schemes be prescribed by statute, rather than delegated legislation such as regulations, ordinances, by-laws, and so forth (see also King et al., 2022). In other words, mandatory vaccination laws should not leave major policy decisions, like limitations of the individual right to work in the name of public health, to governments (central or local), and to corporations—which is exactly what happened in the COVID-19 pandemic. Corporate overreach, in the form of banning the unvaccinated from the workplace despite the lack of laws requiring this radical measure, is especially concerning given the increased concentration of unchecked power in private hands, in the contemporary globalized world (Barkan, 2013; Robé, 2020).

Further, the LAC19 principles recommend that statutes should be adopted following broad consultations involving subnational governments, political parties, trade unions, legal and health experts, mass-media, and the public. All major questions, including the type and level of coercion to be applied in support of the vaccination mandate, should be addressed in the Bill going through the legislature, allowing for debate and amendments. This would bring the public health response to pandemics in line with a fundamental trait of democracies: meaningful participation in decision making.

Obviously, meaningful debates are lengthy, which is why the LAC19 principles accommodate both a general legislative framework stipulating the principles of mandatory vaccination, and fast-tracked legislation responding to the specificity of each pandemic. For these reasons, adopting statutes making vaccination a priori mandatory—rather than waiting until the virus strikes, like Austria, Indonesia and a few other countries did in the COVID-19 pandemic—is preferrable. This is also the opinion of numerous experts interviewed by the authors of a recent study on "less voluntary" vaccination in Netherlands (Simons et al., 2023). Improved prior legal preparedness for pandemics had also been argued for, in the UK context, by Laurie and Hunter (2009), who show that the existing relevant framework (such as legislation for emergencies in general, for healthcare and safety, and for public health) needs updated with more specific provisions. This, as per the two arguments presented in the previous section, should include a framework for general mandatory vaccination, with provisions adaptable to the epidemiological situation in each pandemic.

Left to its own devices, the national executive will attempt on the one hand to avoid the political costs of an unpopular measure, while on the other hand adopt it nonetheless, as shown above, with the concourse of private power. If the parliament clarified the matter ante factum, the population would have time to understand and accept the necessity of hard choices, and most importantly, those choices would not be harder than needed, since a careful rights-balancing exercise would be undertaken.

As far as the right to work is concerned, the balancing exercise would start from the premise that this is one of the most important socioeconomic rights. Work is much more than the right to do a job and get a salary in return. Not only is work in itself a fundamental value in any society, but it also reflects positively on different planes of individual and societal development: as individuals we obtain an income allowing for a decent life (food, clothing, housing, medicines), but also dignity, self-esteem and social recognition (Kuykendall et al., 2020). A person who is denied the right to work is exposed to the risk of poverty, mental harm, and even suicide (see, among many others, Burgard et al., 2007; Classen & Dunn, 2012; Crayne, 2020). In a broader perspective, societies derive harmony and prosperity from the aggregated work of individuals. For all these reasons, the right to work was called, in one of the important collections on international law in the last century, "one of the most fundamental … socioeconomic rights" (Jacquart, 1991, p. 1086). Philosopher John Dewey also noted that "[t]he first great demand of a better social order … is the guarantee of the right, to every individual who is capable of it, to work" (Ratner, 1939, p. 420).

Given the importance of the right to work for the bearer but also for their dependants, the Law of Balancing would require that the importance of the counterbalancing principle was similarly high. The right to health and even to life of the other employees still weigh heavy on the scales of rights balancing, but the supporters of banning the unvaccinated from working would have a hard time justifying necessity and proportionality *stricto sensu*, given the availability of periodic testing on the unvaccinated worker's expense. Admittedly, as the World Health Organisation (WHO) has noted, the vaccinate-or-test policies are not as effective as vaccination mandates that do not have a testing option, because testing may fail to identify infections because of false negatives (WHO, 2022, p. 6). But we should look at both scales in the process of balancing: vaccination itself is not a bulletproof vest, with degrees of efficiency comparable to the degree of testing accuracy (e.g., Subramanian & Kumar, 2021). This means that less restrictive alternatives like vaccinate-or-test should still be preferred to the no-jab-no-job approach, given the second's dramatic impact on the right to work, versus the first's uncertain benefits to the right to health. Further, where social distancing, reallocation of tasks, or remote work are possible, there is no reason not to apply them. And when these are not possible, there is always the more intrusive, yet arguably still reasonable for the employer unwilling to vaccinate, option of a temporary no-fault suspension until the pandemic ends.

CONCLUSION

The dubious absence of parliaments in the battle against the recent coronavirus pandemic has not escaped scholars' scrutiny. Ewing (2020, p. 24) noted, for the UK, that

> … ministerial statements in Parliament have given way to daily briefings by ministers (flanked by government experts) in an empty room with journalists, not MPs, on the receiving end remotely to ask questions. Broadcast live to the nation, the spectacle reinforces the marginalisation of Parliament. The Prime Minister … and … other ministerial colleagues speak directly to the people, the newspapers being the sole public guardians with all the problems that this entails. Absent a crisis, this would look like something straight from the populists' playbook.

However, the countries where legislatures tried to intervene were not necessarily successful. Legislating general mandatory vaccination *post factum* risks creating a strong backlash and large-scale protests, as it happened in Austria, who had to repeal its mandatory vaccination law only a few months after adopting it (Bell, 2022). Since leaving the hard choices to local authorities and to private power is also a poor choice, leading to the imposition of *de facto* mandatory vaccination as shown above, it would seem that legislating GMV before the pandemic—a framework, leaving the fine-tuning to the parliaments in charge when the pandemic strikes—is the only option. In a parliamentary debate conducted without pressure, dismissal for vaccination refusal would likely not pass the tests of necessity (since the pandemic is temporary, a temporary suspension would suffice) and proportionality (uncertain benefits in exchange for a very severe blow to a fundamental right).

Given the fundamental importance of the right to work, and the longer effect of restrictions on this than on other rights in pandemics, "vaccination or joblessness" is not a reasonable choice with which to present a worker; it is not like "no jab, no pub access," for example. Yet, in the charged climate of a pandemic, overly zealous action by public and private executive power, including dismissal of the unvaccinated, is widespread. It is better to fence this otherwise laudable zeal by simply making general vaccination *de jure* mandatory, with all the benefits deriving from this official status in terms of setting the proper balance between the rights and interests at stake. Intrusions into the right to work would be inevitable, but dismissal as a coercion tool would not be used.

ACKNOWLEDGMENTS

Open access publishing facilitated by University of Southern Queensland, as part of the Wiley - University of Southern Queensland agreement via the Council of Australian University Librarians.

ETHICS STATEMENT

No ethics approval was necessary, as the article is a theoretical one, based on secondary sources only. All the sources relied upon are properly cited, and no material requiring special permission to be reproduced was used.

ORCID

Ciprian N. Radavoi http://orcid.org/0000-0002-9538-6019

REFERENCES

Alston, P., & Quinn, G. (1987). The nature and scope of states parties' obligations under the International Covenant on Economic, Social and Cultural Rights. *Human Rights Quarterly*, *9*(2), 156–229.

Alexy, R. (2014). Constitutional rights and proportionality. *Revus Journal for Constitutional Theory and Philosophy of Law/Revija za ustavno teorijo in filozofijo prava*, *22*, 51–65.

Anderson, J. E. (1975). *Public policy-making*. Pranger.

Australian Human Resources Institute (AHRI). (2021). November 2021 headline findings. *AHRI Pulse*. https://www.ahri.com.au/wp-content/uploads/ahri-pulse-nov2021-headline-findings.pdf

Automotive News. (2021). 'No jab, no job' must be new industry policy. *Automotive News*, *95*(6996), 12.

Bardosh, K., De Figueiredo, A., Gur-Arie, R., Jamrozik, E., Doidge, J., Lemmens, T., Keshavjee, S., Graham, J. E., & Baral, S. (2022). The unintended consequences of COVID-19 vaccine policy: Why mandates, passports and restrictions may cause more harm than good. *BMJ Global Health*, *7*(5), e008684.

Barkan, J. (2013). *Corporate sovereignty: Law and government under capitalism*. University of Minnesota Press.

Barnes, T. (2021). *Are companies sack-happy over vaccination status*? Spectator. https://www.spectator.com.au/2021/12/are-companies-sack-happy-over-vaccination-status/

Beatty, D. M. (2022, April). COVID, courts, communists and common sense. *Constitutional Forum Constitutionnel*. *31*(1), 1–6.

Bell, B. (2022). Austria's COVID vaccine law comes into force amid protests. *BBC*, February 1.

Bhala, R. (2000). Power of the past: towards de jure stare decisis in WTO adjudication (part three of a trilogy). *George Washington International Law Review*, *33*, 873.

Bishop, M. (2002) Employee litigation following termination on account of vaccination status. *Mondaq*, September 22.

Botha, M. M. (2021). Mandatory vaccinations in the workplace: Lessons from COVID-19. *Industrial Law Journal (Juta)*, *42*(10), 2065–2081.

Brennan, J. (2018). A libertarian case for mandatory vaccination. *Journal of Medical Ethics*, *44*(1), 37–43.

Burgard, S. A., Brand, J. E., & House, J. S. (2007). Toward a better estimation of the effect of job loss on health. *Journal of Health and Social Behavior*, *48*(4), 369–384.

Childress, J. F., Faden, R. R., Gaare, R. D., Gostin, L. O., Kahn, J., Bonnie, R. J., Kass, N. E., Mastroianni, A. C., Moreno, J. D., & Nieburg, P. (2002). Public health ethics: Mapping the terrain. *The Journal of Law, Medicine & Ethics*, *30*(2), 170–178.

Classen, T. J., & Dunn, R. A. (2012). The effect of job loss and unemployment duration on suicide risk in the United States: A new look using mass-layoffs and unemployment duration. *Health Economics*, *21*(3), 338–350.

Crayne, M. P. (2020). The traumatic impact of job loss and job search in the aftermath of COVID-19. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(S1), S180–S182.

Edmundson, W. A. (2012). Coercion. In A. Marmor (Ed.), *The Routledge Companion to Philosophy of Law* (pp. 451–466). Routledge.

Etzioni, A. (1975). *Comparative analysis of complex organizations, rev*. Simon and Schuster.

Ewing, K. D. (2020). Covid-19: Government by Decree. *King's Law Journal*, *31*(1), 1–24.

Flanigan, J. (2014). A defense of compulsory vaccination. *HEC forum*, *26*(1), 5–25.

Franco, J. V. A. (2021). Should COVID-19 vaccination be mandatory? *BMJ Evidence-Based Medicine*, *26*(6), 269–270.

Gardbaum, S. (2006). Limiting constitutional rights. *UCLA Law Review*, *54*, 789.

Giubilini, A. (2019). *The ethics of vaccination*. PalgravePalgrave Studies in Ethics and Public Policy.

Giubilini, A. (2020). An argument for compulsory vaccination: The taxation analogy. *Journal of Applied Philosophy*, *37*(3), 446–466.

Giubilini, A., & Savulescu, J. (2019). Vaccination, risks, and freedom: The seat belt analogy. *Public Health Ethics*, *12*(3), 237.

Gordon, A. L., Achterberg, W. P., & van Delden, J. J. M. (2022). Mandatory vaccination against COVID-19 for health and social care workers caring for older people. *Age and Ageing*, *51*(4), afac097.

Hals, T. (2021). COVID-19 and the U.S. courts: challenges to vaccine requirements. *Reuters*, August 6. https://www.reuters.com/world/us/COVID-19-us-courts-challenges-vaccine-requirements-2021-08-06/

Hardy, A. (2022). More employers have started firing workers for refusing to get vaccinated. *Money*, January 10. https://money.com/COVID-19-vaccine-mandate-workers-fired/

Henley, J. (2022). Macron declares his COVID strategy is to 'piss ff' the unvaccinated. *The Guardian*, January 5.

Horák, F., & Dienstbier, J. (2023). Dark side of the principles of non-discrimination and proportionality: The case of mandatory vaccination. *Journal of Medical Ethics*, (online ahead of print), jme-2023-108998.

Jacquart, M. (1991). Economic, cultural and social rights. In M. Bedjaoui (Ed.), *International Law: Achievements and Prospects*. Martinus Nijhoff.

Khunti, K., Kamal, A., Pareek, M., & Griffiths, A. (2021). Should vaccination for healthcare workers be mandatory? *Journal of the Royal Society of Medicine*, *114*(5), 235–236.

King, J., Ferraz, O. L. M., & Jones, A. (2022). Mandatory COVID-19 vaccination and human rights. *The Lancet*, *399*(10321), 220–222.

Kuykendall, L., Craig, L., & Tay, L. (2020). Work-contingent self-esteem: A boon or bane for worker well-being? *Journal of Organizational Behavior*, *41*(1), 1–16.

Laurie, G. T., & Hunter, K. G. (2009). Mapping, assessing and improving legal preparedness for pandemic flu in the United Kingdom. *Medical Law International*, *10*, 101–137.

Leigh, I. (2023). Vaccination, conscientious objection and human rights. *Legal Studies*, *43*, 201–220.

Mallory, M. L., Lindesmith, L. C., & Baric, R. S. (2018). Vaccination-induced herd immunity: Successes and challenges. *Journal of Allergy and Clinical Immunology*, *142*(1), 64–66.

Maltezou, H. C., Theodoridou, K., Ledda, C., Rapisarda, V., & Theodoridou, M. (2019). Vaccination of healthcare workers: Is mandatory vaccination needed? *Expert Review of Vaccines*, *18*(1), 5–13.

Nozick, R. (1969). Coercion. In S. Morgenbesser, P. Suppes, & M. White (Eds.), *Philosophy, Science, and Method: Essays in Honor of Ernest Nagel* (pp. 440–472). St. Martin's Press.

Nuffield Council on Bioethics. (2007). *Public health: Ethical issues*. Cambridge Publishers Ltd.

Oliveri, N. (2020). Coronavirus vaccine 'as mandatory as you can make it' says PM. *9News*, August 19.

Radavoi, C. N., & Quirico, O. (2022). Socioeconomic rights in the age of pandemics: COVID-19 large-scale lockdowns have exposed the weakness of the right to work. *Journal of Human Rights*, *21*(1), 73–90.

Ratner, J. (Ed.) (1939). *Intelligence in the modern world: John Dewey*'s *Philosophy*. Modern Library.

Ray, J. (2021). COVID-19 put more than 1 billion out of work. *Gallup*. https://news.gallup.com/poll/348722/COVID-put-billion-work.aspx

Robé, J.-P. (2020). *Property, power and politics: Why we need to rethink the world power system*. Bristol University Press.

Saunders, B. (2022). How mandatory can we make vaccination? *Public Health Ethics*, *15*(3), 220–232.

Scherer, S., & Gordon, J. (2021). Canada imposes COVID-19 vaccine mandate on federal workers, transportation. *Reuters*, October 6.

Siegel, L. S., & Weinberg, L. B. (1977). *Comparing public policies: United States, Soviet Union and Europe*. The Dorsey Press.

Simons, R. C., Bak, M. A. R., Legemaate, J., & Ploem, C. (2023). Towards a less voluntary vaccination policy in the Netherlands? Findings from an expert interview study. *Health Policy*, *133*, 104841.

Subramanian, S. V., & Kumar, A. (2021). Increases in COVID-19 are unrelated to levels of vaccination across 68 countries and 2947 counties in the United States. *European Journal of Epidemiology*, *36*, 1237–1240.

Wertheimer, A. (1989). *Coercion*. Princeton University Press.

World Health Organisation. (2022). COVID-19 and Mandatory Vaccination: Ethical Considerations. *Policy Brief*, May 30.

Yankah, E. N. (2019). Legal hypocrisy. *Ratio Juris*, *32*(1), 2–20.

Yeh, M. J. (2022). Solidarity in pandemics, mandatory vaccination, and public health ethics. *American Journal of Public Health*, *112*(2), 255–261.

AUTHOR BIOGRAPHY

Ciprian N. Radavoi is the author of two books and numerous articles in reputed academic journals, dealing with various aspects of law in context/law and society. Currently an associate professor of law at the University of Southern Queensland, Australia, Ciprian joined academia in 2012 with a position at the University of International Business and Economics, Beijing, China. Prior, he was a lawyer focused on human rights cases, then a diplomat, with consular positions in Asia and Africa.

How to cite this article: Radavoi, C. N. (2024). *Ante-factum* legislative general vaccination mandates, as a solution to legal hypocrisy in pandemics. *World Medical & Health Policy*, *16*, 260–272. https://doi.org/10.1002/wmh3.606

Received: 25 April 2023 | Revised: 9 November 2023 | Accepted: 29 November 2023

DOI: 10.1002/wmh3.598

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

The colocation of primary care physicians and audiologists in the Chicago metro region reinforces racial, ethnic, and class inequities in spatial access to care

Arrianna Marie Planey[1,2] | **Sharita R. Thomas**[1] | **Jodi A. Lewis**[1] | **Marah Maaita**[1]

[1]Department of Health Policy and Management, Gillings School of Global Public Health, University of North Carolina, Chapel Hill, North Carolina, USA

[2]Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

Correspondence

Arrianna Marie Planey, Department of Health Policy and Management, Gillings School of Global Public Health, McGavran-Greenberg, CB #1105C, 135 Dauer Dr, Chapel Hill, NC 27599-7411, USA.

Email: amplaney@email.unc.edu

Funding information

Robert Wood Johnson Foundation

Abstract

In primary-care-centric models of care provision, specialist co-location with primary care physicians (PCPs) can potentially improve care coordination and continuity. This study asks whether the co-location of specialists with referring PCPs can reinforce racial, ethnic, and class inequities in spatial access to care. Given a US healthcare policy context wherein audiologist services are only reimbursed if they are medical practitioner-referred, audiologists are hypothesized to co-locate with PCPs. Using spatial cluster analysis and spatial regression approaches, this study quantifies the tendency for PCPs and audiologists to co-locate and analyzes the consequences for spatial access disparities in the Chicago, Illinois metropolitan region. Audiologists and PCPs co-cluster significantly across Chicagoland. The spatial lag model confirms racial, ethnic, and class disparities in network travel distance to audiology services in the core counties of the region. The results suggest that, for audiology services, health policies and the resultant interdependence across the hierarchy of care manifest spatially, possibly reinforcing service access disparities within segregated city regions.

KEYWORDS

audiologists, exploratory spatial data analysis, health care access, hierarchy of care, K-function, primary care providers, spatial analysis, spatial regression

Key points

- Healthcare policies governing interprofessional practice have a spatial dimension.

- Provider co-location across the hierarchy of care can reinforce access disparities.
- Racial, ethnic, and class disparities in access to hearing care shape service use.

INTRODUCTION

In the United States, the fastest-growing demographic group is older adults, and the estimated prevalence of hearing loss among older adults (≥65) was 25% in 2010, rising to nearly 50% among older adults age ≥75 (US National Institute on Deafness and Other Communication Disorders, 2021). It is projected that the prevalence of hearing loss will double by 2060, affecting approximately 73 million adults. In conjunction with a growing shortage of audiologists due to attrition, clinical program closures, and falling enrollment (Windmill & Freeman, 2013), these demographic shifts potentially exacerbate the under-diagnosis and under-treatment of hearing and balance disorders in the United States, including racial and ethnic disparities in diagnosis and treatment receipt, including hearing aid use (Yi et al., 2022).

In the United States, audiologists, or specialists who treat hearing and balance disorders, are classified as nonphysician providers whose services are not covered under most public or private health insurance plans unless referred by a medical practitioner and deemed "medically necessary" (Arnold et al., 2017; Glantz, 2017). The lack of insurance coverage for audiologist services and hearing aids can be traced to the 1935 Social Security Act, section 1862(a), which specifically excluded coverage of hearing aids (Glantz et al., 2009; McNeal, 2016). This, coupled with the language in the 1965 Social Security Amendments which classified audiologists as "nonphysician" providers, precluded coverage of audiological services and treatment beyond physician-referred and ordered assessments. The persistence of the category "nonphysician provider" and its attendant limitations is an example of what Hanlon (2009) identified as path dependence in health-care policy-making, wherein, "institutional arrangements are the outcomes of historically situated negotiations amongst asymmetrically related networks of actors and groups" (51).

Health-care policy is an important contextual factor for health-care providers and services access. As Stimson (1981) noted, "provision and use of health-care services in a given geographical area needs to be studied within the context of the organizational structure of the system." In the United States, access to audiologist services is contingent upon access to primary care providers (PCPs; Pessis, 2009), because public (Medicare and Medicaid) and private insurance regulations require a primary physician referral as a precondition for reimbursement of audiology services (CMS, 2016). This coverage gap is consequential for people with hearing loss because patients with untreated communication disorders are at greater risk of adverse health care outcomes associated with lack of effective communication with health-care providers. Approximately a third of US hospitals do not provide language services (Schiaffino et al., 2016). Moreover, deaf patients, who are at elevated risk of seeking care in the Emergency Department (McKee et al., 2015), are routinely denied interpreter services in the Emergency Department (James et al., 2021). This has implications for both the quality and acceptability of care for people with hearing loss (Jacob et al., 2022).

Health-care policies are often built on referral linkages between specialists and PCPs that can have place-based implications for access to care. Many national health systems require a PCP referral for patients to obtain specialized services and treatments. In the United States, public and private health insurers often mandate an approved PCP referral as a prerequisite for reimbursement of specialist care. These referral linkages—which extend across the hierarchy of care from primary care to specialist care (Wiles & Rosenberg, 2009)—are spatialized and therefore shape inequities in access to services at the axes of race, ethnicity, and class. We argue that referral linkages embedded in health policies can promote the co-location of PCPs and linked specialist providers, resulting in inequitable geographic access to care. Further, this study extends prior inquiry into the interaction between racial segregation and disparities in health care access by asking how co-clustering of services impacts these disparities (White et al., 2012). Specifically, this paper examines the spatial dimensions of referral linkages and the implications for inequalities in access via a case study of audiology (hearing and balance specialist) services in the Chicago metropolitan region.

Co-location of health care has both positive and negative implications for spatial access to care. Post-Alma Ata, there is a growing body of work on the benefits of co-location of primary care and specialists for care coordination amid the rising prevalence of chronic conditions and multimorbidity (McDonald et al., 2017). Notably, some evidence indicates that co-location improves continuity and coordination in the management of chronic conditions (Rumball-Smith et al., 2014); however, this research has largely been undertaken in countries like the United Kingdom, Canada, and New Zealand which have national health systems that allow for more central planning toward coordination between PCPs and specialists, thus promoting care continuity. Moreover, a study of general practitioners and patients in 34 European countries showed that the benefits of co-location are contingent upon the quality of the primary care infrastructure (Bonciani et al., 2018).

Arguably, the place-specificity of health-care policies limits the generalizability of these studies to care provision in the United States, whose highly marketized healthcare "system" is anomalous among countries with similar national incomes. Indeed, as Wiles and Rosenberg (2009) wrote, "Structurally, primary healthcare (PHC) is organized through a series of decisions, rules, and policies embedded within the economic and political systems of the places in which people live" (79). This suggests a need to analyze the co-location of specialists with PCPs while attending to both (i) health-care policies that shape the distribution of health-care providers in space and (ii) the particularities of spatial data.

Moreover, few studies have examined the co-location of allied health-care providers, such as audiologists, with referring PCPs. Notable examples include Jesson and Wilson's (2003) study of pharmacy co-location with medical centers in the United Kingdom and Miller and colleagues (2014) study of behavioral health practitioner co-location with PCPs in the United States (Jesson & Wilson, 2003; Miller et al., 2014). In the latter study, the authors identified provider-level tensions in the United Kingdom. National Health Service's (NHS) push for pharmacist co-location with primary care to improve patient medication adherence, whereby pharmacists found themselves pulled between the universalism of the NHS and the pharmacies' profit-centered ownership models, which fueled the tendency to locate in areas where patients can pay more (Jesson & Wilson, 2003). In the United States context, Miller and colleagues conceptualized co-location between PCPs and behavioral health practitioners as a measure of integration, finding rural–urban gradients in the degree of co-location whereby the two sets of practitioners were more likely to be colocated in rural "frontier areas" after adjusting for PCP supply (Miller et al., 2014). Aside from these examples, most studies of health-care provider locations and accessibility focus on one set of providers, such as PCPs (Crooks & Schuurman, 2012; Cutchin, 1997; Kazanjian & Pagliccia, 1996; Laditka, 2004), pediatricians (Guagliardo, Ronzio, et al., 2004), residential nursing care providers (Andrews & Phillips, 2002), optometrists (Gibson, 2015), urologists (Yao et al., 2015), and oncologists (Muluk et al., 2022). Drawing from a body of work in health and medical geography that considers health-care policy effects on provider availability and supply in geographic and social space (e.g., Norris, 1997) prior comparative study of state licensing regulations and pharmacy locations), this study assesses the spatialized arrangements of care under health-care policies that require primary care practitioner referral as a prerequisite for reimbursement of audiology services.

In the United States, audiologists illustrate well the importance of referral linkages. The Centers for Medicare and Medicaid Services (CMS), the de facto regulator of health care in the United States, requires physician referrals as a prerequisite for reimbursement of audiology services (CMS, 2016; Givan, 2016), in part because audiologists are classified as “nonphysician providers” (Pessis, 2009). Further, given that hospitals and physician practices employ the majority of audiologists (Bureau of Labor Statistics, 2016), we expect that PCPs and audiologists will co-cluster—that is, locate nearby each other—to facilitate referrals and enhance care coordination and continuity. As such, we hypothesize that audiologists will tend to co-locate or cluster spatially with general practitioners or PCPs, so that referral networks between the two will be seamless. The research questions are as follows: (i) Given the necessity of medical practitioner referral for payment of audiologist services, do audiologists co-locate with PCPs? and (ii) Given known disparities in access to primary care, does the co-location of audiologists and PCPs reinforce socioeconomic, racial, and ethnic inequalities in spatial access to care?

Using a case study of Medicare-enrolled audiologists and the pool of Medicare-enrolled PCPs who can potentially refer patients, we combine exploratory spatial data analysis (ESDA) and spatial regression approaches to examine and map the spatial interdependencies between PCPs and audiologists. In addition, spatial regression approaches are used to assess associations between network travel distance to audiologists and sociodemographic variables to address the question of whether the observed spatial distribution of two sets of health-care providers reinforces racial, ethnic, and socioeconomic disparities in access. As the United States' population ages and hearing loss prevalence increases (Goman et al., 2017), hearing health care accessibility is becoming a key issue.

CONCEPTUALIZING ACCESS TO AUDIOLOGISTS

In this study, access is defined as a process in space and time whereby a person seeks and uses health-care services. Specifically situated within political-economic contexts, such as health-care policy and the spatial distribution of providers under market conditions, this study considers access in a context where a PCP referral is a prerequisite to specialist care access. Given that audiology services are not typically covered by private health insurance beyond physician-referred assessments, there may be a gap between insured status and actual, realized access to diagnosis and treatment of hearing loss (Glantz, 2017; Whitson & Lin, 2014). Moreover, low Medicaid reimbursements for audiology services may exacerbate the inaccessibility of services for low-income patients (McManus et al., 2010), particularly Medicaid-insured patients, who had lower odds of using audiologist services (Willink et al., 2019, 2020).

Health-care access can be understood as the interaction between people, processes, and systems—all of which have spatial contexts—to result in service use. Building on Penchansky and Thomas' (1981) formulation of access, Levesque et al. (2013) argued that a comprehensive definition of “access” must account for both the demand-side and supply-side factors, including people (patient characteristics), processes (how access is realized), and systems (e.g., location and provider availability and spatial distribution) (Levesque et al., 2013; Penchansky & Thomas, 1981). The authors identified spatial and aspatial facets of access and their corollaries including: *approachability* (ability to perceive), *acceptability* (ability to seek), *availability* and *accommodation* (ability to reach), *affordability* (ability to pay), and *appropriateness* (ability to engage) (Levesque et al., 2013).

Given the lack of public and private insurance coverage of audiology services, *affordability* is an important dimension of hearing health-care access. Cost is a commonly cited barrier to audiological service and hearing aid use among older adults in the United States (Lasser et al., 2006; McKee et al., 2019), especially among dually eligible (Medicare and Medicaid-insured) older adults (Willink et al., 2019). Due to the fact that Medicare does not cover hearing aids and other nonsurgical treatments for hearing loss, Medicare beneficiaries with diagnosed and treated hearing loss also have higher out-of-pocket costs ($325 per year) (Mahmoudi et al., 2018; Popelka et al., 1998). Relatedly, higher out-of-pocket costs are associated with dissatisfaction with health-care accessibility among Medicare beneficiaries with hearing loss (Barnett et al., 2014). In 2014, the average cost of one hearing aid was $2400 (PCAST, 2015). As most people with hearing loss need two hearing aids, the out-of-pocket cost was approximately 11.2% of the median household income for that year. Moreover, high cost of hearing loss treatment is compounded by the fact that older adults with untreated hearing loss have significantly higher health-care spending (Reed et al., 2019). From the supply-side perspective, audiologists have a strong incentive to locate in areas with high household incomes and high rates of insurance coverage, and this is reflected in their availability and supply at the county level (Planey, 2019).

Where physician referral is necessary for coverage of specialist services, it can be argued that *awareness* on the part of PCPs is important for the management of chronic conditions that require coordinated care (referral to and partnership with secondary and tertiary providers). In the process of health-care access, help-seeking begins with the recognition of need by both patients and providers, and subsequently, the provider's determination that the referred services are appropriate. Levesque and colleagues' corollary to approachability—“ability to perceive” (Levesque et al., 2013)—is a cognate to the concept of “awareness” (Saurman, 2016) as an added dimension of Penchansky and Thomas' multidimensional model of health-care access (Penchansky & Thomas, 1981).

It is instructive to extend the concept of “awareness” as a dimension of access from the patients to providers—especially PCPs, who serve a gatekeeper role within the health-care system. Treatment of hearing loss depends on primary care doctors' recognition of hearing loss as a “problem” and their subsequent referral of patients to audiologists for assessment (Arnold et al., 2017). Studies suggest that PCP awareness of audiology services is low (Mahboubi et al., 2018; Wu et al., 2013). For example, a survey of PCPs in California found that 26% were unaware that cochlear implants, surgically implanted neuro-auditory prosthetic devices that stimulate the auditory nerve, were a treatment for hearing loss, and 80% were unaware that all health insurance plans cover cochlear implants (Wu et al., 2013). Per an analysis of 2014 National Health Interview Survey (NHIS) data, approximately 20.6% of adults with self-reported hearing loss saw a primary care physician in the previous 5 years about their hearing loss, but referral rates for hearing health care were low: 32.6% for Ear Nose Throat (Otolaryngologist) doctors, and 27.3% for audiologists (Mahboubi et al., 2018).

Moreover, disparities in hearing health-care access cut across race, ethnicity, and socioeconomic status. Older adults with higher incomes had higher rates of hearing loss diagnosis, and that the proportion of non-Hispanic whites who used hearing aids was over twice that of non-Hispanic Blacks, Hispanics, and multiracial people (35.4% compared with 17.1%, $p < 0.05$) (Bainbridge & Ramachandran, 2014). Further, after adjusting for hearing loss severity, Black respondents were more likely than white respondents to report recent hearing testing (odds ratio [OR] = 1.68), but they were less likely to regularly use hearing aids (OR = 0.42) (Nieman et al., 2016). The authors also found that, among African American patients, status as a Medicaid beneficiary was negatively associated with receiving a hearing test, pointing toward the uneven coverage of audiology services among state Medicaid programs (Arnold et al., 2017). Further, even among older patients (age 65 and over) with private insurance coverage, Black and Hispanic patients have lower rates of hearing aid ownership (9.8% and 6.5%, respectively) compared with 13.6% of white patients (Mahmoudi et al., 2018).

Spatial access to health care in the United States is unevenly patterned at the axes of race and class, and this is especially true in segregated places (Anderson, 2018; Asabor et al., 2022; Caldwell et al., 2017; Hayanga et al., 2009). Racially segregated areas what are majority Black have longer travel distances to care and are more likely to experience the loss of safety net hospitals (Ko et al., 2014; White et al., 2012). Further, per the US Department of Transportation's National Household Travel Survey data, over half of Black patients' travel times for medical and dental care exceeded 30 min, compared with 25% of white respondents, suggesting racial disparities in travel impedance to medical care (Probst et al., 2007). The chilling effect of travel impedance to care on health-care service use at the axes of race and ethnicity is apparent in disparities in preventative care utilization such as cervical cancer screening receipt (Coronado et al., 2004) and childhood immunizations (Thomas et al., 2004). Moreover, travel impedance to specialist care, such as oncology care is associated with later diagnosis and delayed treatment after diagnosis—as observed among Black colon cancer patients in the city of Chicago (Jones et al., 2017). Therefore, this study builds on what is known about health-care utilization and how health-care access is conceptualized as a process with spatial and aspatial facets. We argue that the co-clustering of PCPs and tertiary care providers, such as audiologists, can be understood as a determinant of access in the treatment and management of chronic conditions.

The research question asks whether specialist co-location with PCPs reinforces disparities in spatial access to care at the axes of race, ethnicity, and class within the Chicago metro region. First, we hypothesize that Medicare-enrolled audiologists co-locate with PCPs because the CMS regulations stipulate that physician referral is a precondition for coverage of audiologist services. Given the importance of proximity to physician referral networks, as well as audiologists' tendency to work in hospitals and medical centers, we hypothesize that audiologists will tend to co-locate with PCPs.

Second, given the phenomenon of "distance decay," wherein health-care service utilization decreases with distance to a degree partially contingent upon where the provider falls within the health-care service hierarchy (Gesler & Cromartie, 1985) and the lower availability of PCPs in concentrated low-income areas, we hypothesize that audiologists' co-location with PCPs will actually reinforce racial, ethnic, and class-based inequities in spatial access to care, given known disparities in spatial access to primary care (Elesh & Schollaert, 1972). Arguably, the co-location of audiologists (tertiary providers) and referring PCPs is an important facet of hearing health-care access, which has consequences for access and care utilization. We also expect more travel impedance in areas with lower population density within Chicagoland, given prior research documenting poorer PCP accessibility in these areas (Iezzoni et al., 2006; Mobley et al., 2006). A previous study showed that audiologist availability and supply were inversely related to both the median age of the population and the share of older adults self-reporting hearing difficulty at the county level—key measures of demand for audiologist services (Planey, 2019) Moreover, the results showed that audiologist availability and supply was positively associated with household income, which corroborated earlier findings of unmet need among lower-income older adults (Agrawal et al., 2009; Van Eyken et al., 2007; Nash et al., 2013), In sum, these findings suggest an inverse care relationship (Tudor Hart, 1971) between audiologist availability and accessibility and population-level need.

MATERIALS AND METHODS

The study area is the Chicago metropolitan region, designated as the Consolidated Metropolitan Statistical Area (CMSA) which includes Cook County and nine surrounding counties (Lake, DuPage, Will, McHenry, Kane, DeKalb, Kendall, Grundy, and Kankakee counties), consistent with prior studies of the region (Luo & Wang, 2003). The census tract-level demographic and socioeconomic data for this study are derived from the US Census Bureau's American Community Survey 5-year estimates (2013–2017).

The provider location data for this study is derived from the Center for Medicare and Medicaid Services' (CMS) Physicians Compare data set (2017 data), which lists the office locations of Medicare- and Medicaid-enrolled health-care providers- or providers who accept payment from the US's public insurance programs. We selected the office addresses of practicing audiologists and PCPs within the 10-county Chicago metropolitan region. Consistent with previous studies, family practice doctors, general practitioners, and internists were counted as PCP (Cooper, 1994; Luo & Wang, 2003). These addresses were then geocoded to produce point data for both audiologists and PCPs. The CMS data set excludes health-care providers within the Veterans Administration (VA) health system, which means that it undercounts the actual supply of audiologists. However, this is advantageous for our analysis, which looks at market-based location decisions among Medicare-enrolled audiologists given Medicare regulations governing reimbursement of their services. Thus, this analysis necessarily excludes providers at federally planned Veterans Health Administration locations.

Spatial data analysis can be broadly categorized as a continuum, from visualization (mapping), to exploration (ESDA), to explanatory modeling. This study spans all three, applying kernel density estimation to visualize the overlap between PCP and audiologist locations within the Chicago metro region, applying spatial clustering analysis, and estimating spatial regression models.

SPATIAL CLUSTER ANALYSIS

To assess the spatial dependence, or degree of co-clustering or dispersion between PCPs and audiologists in the study area, we estimate a cross-*L* function in R using the *SpatStat* and *Sparr* packages (Davies et al., 2011). The cross-*L* function is a commonly used summary function that visualizes the degree of spatial dependence between two sets of events (Besag & Diggle, 1977; Ripley, 1976), Because *K* and *L* functions summarize spatial dependence between events, they are a formal way of assessing the first law of geography—“All things are related, but near things are more related than far things” (Tobler, 1970).

The *L*-function is a linearized form of the *K*-function. The *K*-function calculates the number of events (*E*) within *d* distance of a randomly chosen event divided by the intensity π (number of events in study area *A*) (Waller & Gotway, 2004). The *K*-function is cumulative, calculated as a function of increasing distance between point locations, where *n* is the total number of events in study area *A* (Loosmore & Ford, 2006).

$$K(d) = \left(\frac{1}{\lambda}\right) \times E\,\text{(or the \# events within } d \text{ of an arbitrary point)},$$

$$\hat{K}(d) = \left(\frac{A}{n^2}\right)\sum_{i=1}^{n}\sum_{j=i}^{n} w_{ij}\, I_d\,(i, j).$$

Equation 1—*K*-function Equation

The null hypothesis (H_0) is complete spatial randomness (CSR), where the value of $K(d)$ is proportional to the area of a circle with the radius d (πd^2). Moreover, under CSR, the *L*-function, the linear transformation of the *K*-function, takes the form $L(d) = d$. To analyze co-clustering between PCPs and audiologists, this study uses the cross-*L* function, a variant of the *L*-function that focuses on the distance between "marked" point patterns—in this application, health-care provider locations are "marked" as either PCP or audiologist.

To visualize the overlap between audiologist and PCP locations, we overlay audiologist point locations over the edge-corrected kernel density estimates (Carlos et al., 2010) of PCP locations in Chicago. The fixed bandwidth parameter for the kernel density map is determined based on Bailey and Gatrell (1995) formula (below), where the bandwidth (τ) is a function of the area size (A) and the number of events or locations (n):

$$\tau = 0.68 \times n^{-0.02} \times \sqrt{A}\,.$$

NETWORK ANALYSIS AND SPATIAL REGRESSION MODELING

The second portion of the analysis begins with estimating the minimum network distance to an audiologist from the population-weighted centroid of each census tract as a measure of accessibility of audiology services within the Chicago metropolitan region (Cromley & McLafferty, 2012). This approach has been used in previous studies of facility accessibility (Shannon et al., 2018). Network distance is a more accurate measure of travel distance than Euclidian (or straight-line) distance (Haynes et al., 2006) (Figure 1).

In keeping with prior research (e.g., Carlos et al., 2010), we accounted for edge effects by estimating the minimum network travel distances based on all audiologist point locations, rather than only audiologist locations within the study area. Similar approaches have been found to reduce errors in estimations of travel distance (Berke & Shi, 2009).

Thereafter, we estimate a spatial regression model to assess the associations between network distance to the nearest audiologist and sociodemographic variables at the census tract level. The covariates represent measures of race, class, and need for hearing health services: proportion of Black and Latinx population, median household income, percent insured, population density, and the proportion of adults age ≥65 reporting difficulty hearing. The outcome variable is the travel distance to the nearest audiologist from the population-weighted tract centroid. Table 1 summarizes the variables for the models.

Moreover, to model the association between audiologist accessibility and PCP availability, we included the tract-level density of PCPs per square mile in the study area as a covariate. To produce this variable, we estimated the kernel density of PCP locations within the study area, as discussed earlier and assigned the local density values to each population-weighted census tract centroid.

The study area includes diverse place environments, from the densely populated city of Chicago to suburban and exurban areas on the area's fringe. To account for this heterogeneity, the spatial regression analysis was split between the more densely populated urban counties (Cook, Lake, DuPage) and predominately suburban counties (McHenry, Kankakee, DeKalb, Kane, Grundy, Will, and Kendall). This split, based primarily on population density, mirrors the National Center for Health Statistics (NCHS) 2013 rural-urban classification scheme for counties. The model for the urban core counties comprised three counties (Cook, Lake, and DuPage) encompassing 1656 census tracts, while the suburban county model encompassed seven counties (McHenry, Kankakee, DeKalb, Kane, Grundy, Will, and Kendall) containing 356 census tracts.

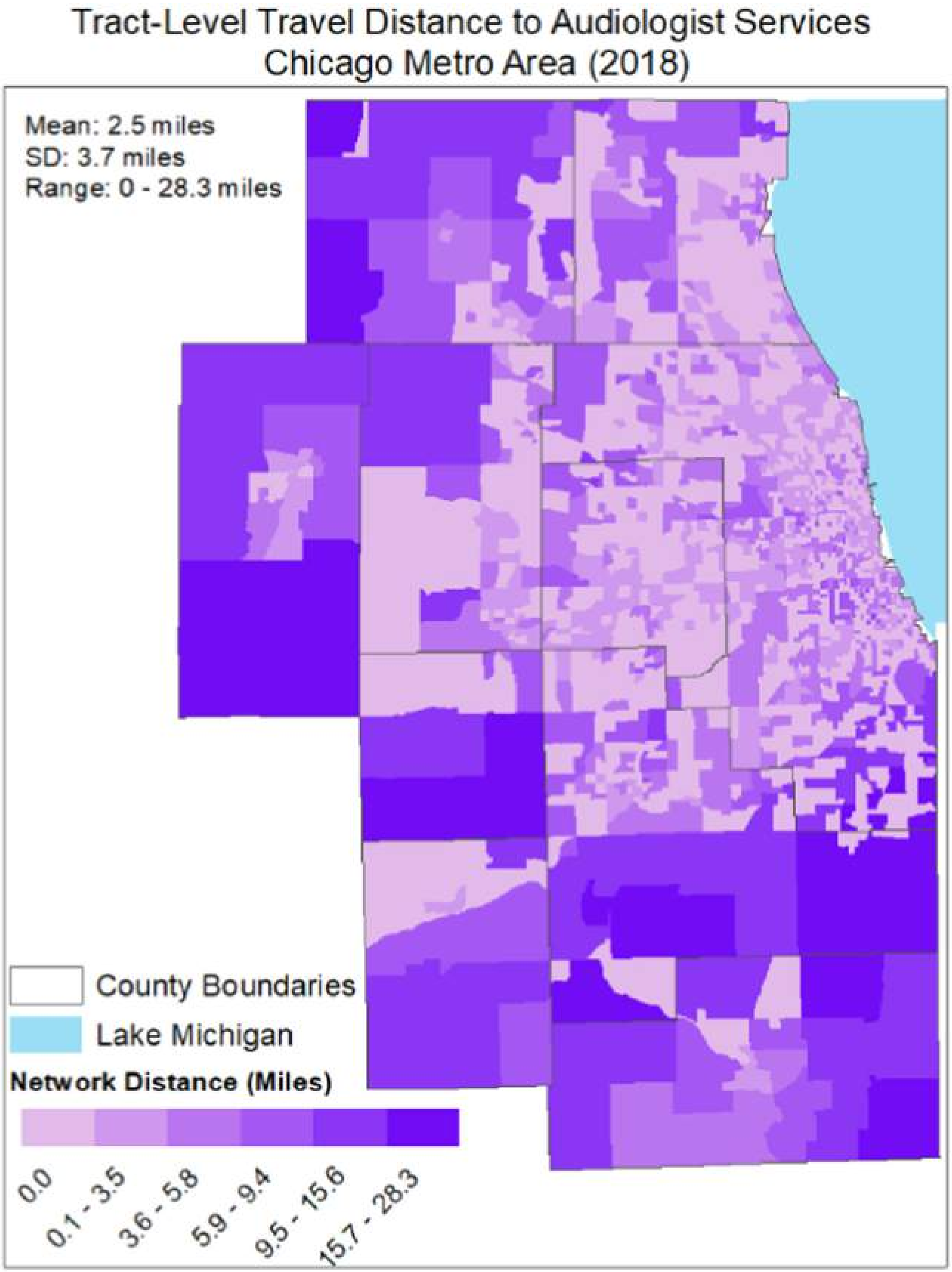


FIGURE 1 Network distance to audiology services from the population-weighted centroid of each census tract in the study area.

RESULTS

The availability of providers reflects the hierarchy of health services, with more PCPs and fewer specialized providers (audiologists). In 2017, the number of Medicare- and Medicaid-enrolled PCPs in the Chicago metropolitan area totaled 1888, compared with 258 Medicare-enrolled audiologists. Further, their locations reflect a strong urban bias,

TABLE 1 Summary of spatial regression model variables.

Variables	Chicagoland suburban counties census tracts (*n* = 356) Median	Range	Chicagoland urban core counties census tracts (*n* = 1656) Median	Range
Shortest network distance to audiologist (miles)	2.98	2.9–28.3	0.37	0.0–21.1
Shortest network distance to audiologist (km)	4.80	4.67–45.4	0.60	0.0–34.0
Share of Black population (%)	4.0%	0–91.0	5.0%	0.0–99.0
Share of Latinx population (%)	12.5%	0.6–92.4	11.2%	0.6–93.9
Share of white population (%)	86.6%	5.3–99.3	69.0%	1.0–98.5
Share of older adults reporting difficulty hearing (%)	2.4%	0–9.1	2.2%	0.5–9.6
Median age (years)	37.9	22.6–61.4	36.9	22.8–71
Share of population with insurance (%)	93.15%	71.7–99.4	89.3%	67.1–99.7
Household income (US, 2016)	$69,497.50	$15,242–$160,318	$59,643	$13,536–$240.000
Share of households without a car (%)	1.5%	0–11.5	8.5%	0.0–59.2
Population density (population per square mile)	720.9	10.68–6734.1	2642.1	175.4–189,424.8

with greater availability in Chicago's central business district and the Medical Corridor to the southwest. Physician and audiologist locations also reflect a general tendency toward locating in areas with higher incomes, such as Chicago's Northside neighborhoods (Figure 2). Census tracts in the urban, “core” counties also have overall shorter network distance to the nearest audiologist, compared with the suburban counties (mean distances of 0.4 miles vs. 3.0 miles; Table 1). Core counties generally had higher population densities, lower household incomes, younger populations, higher uninsured rates, and slightly lower shares of older adults self-reporting hearing difficulty compared with suburban counties (Table 1). Tracts in the region's urban core had an overall higher share of Black residents than their suburban counterparts. Furthermore, Chicagoland's suburban counties had older populations and slightly higher shares of older adults reporting hearing difficulty.

CROSS-*L* FUNCTION FINDINGS

The first step of the analysis was the cross-*L* function, summarizing the spatial dependence between PCPs and audiologists in the study area. Below, in Figure 2, the graphical results of the cross-*L* function are shown, along with a confidence interval based on 999 Monte Carlo simulations. The curve is above the line, suggesting that both sets of providers- audiologists and PCPs- are co-clustered across the study area at all distances. Put another way, the results show that audiologists and PCPs significantly co-cluster across the study area, a pattern also evident in Figure 2.

The kernel density map of PCPs with overlaid audiologist locations illustrates this co-clustering (Figure 2). It also shows that primary care providers have the highest density in the central business district (colloquially known as “the Loop”) and in the medical corridor slightly southwest. The medical corridor consists of a concentration of large hospitals, all clustered within 1-2 miles of each other, and one of these hospitals, Rush University Medical Center, has a clinical audiology practicum site This medical corridor is also where audiologist density is highest, echoing findings from a previous multilevel analysis of audiologist availability at the county level, which showed that proximity to clinical audiology programs was the strongest predictor of audiology supply at the county level (Planey, 2019). Also, from Figure 3, it is apparent that Chicago's majority-Black and Latinx south and west side neighborhoods lack providers, with providers locating in the high-income, and whiter northern neighborhoods, reflecting the city's North-South, and East-West racial and ethnic dividing lines.

SPATIAL REGRESSION MODEL

The first step was to estimate an Ordinary Least Squares (OLS) model to assess model fit with the data. The diagnostics for the initial OLS models predicting distance to the nearest audiologist showed significant spatial autocorrelation, so we estimated spatial lag regression models in GeoDa (Anselin et al., 2006) for both subsets of the study area. For the spatial weights, we used rook weights to define neighboring units (tracts, in this study).

The spatial regression results show varying associations of socioeconomic and health-care factors with distance to audiologist between the region's suburban and urban core counties. In Chicagoland's suburban counties, there was an inverse association between tract-level network distance to audiology services and density of

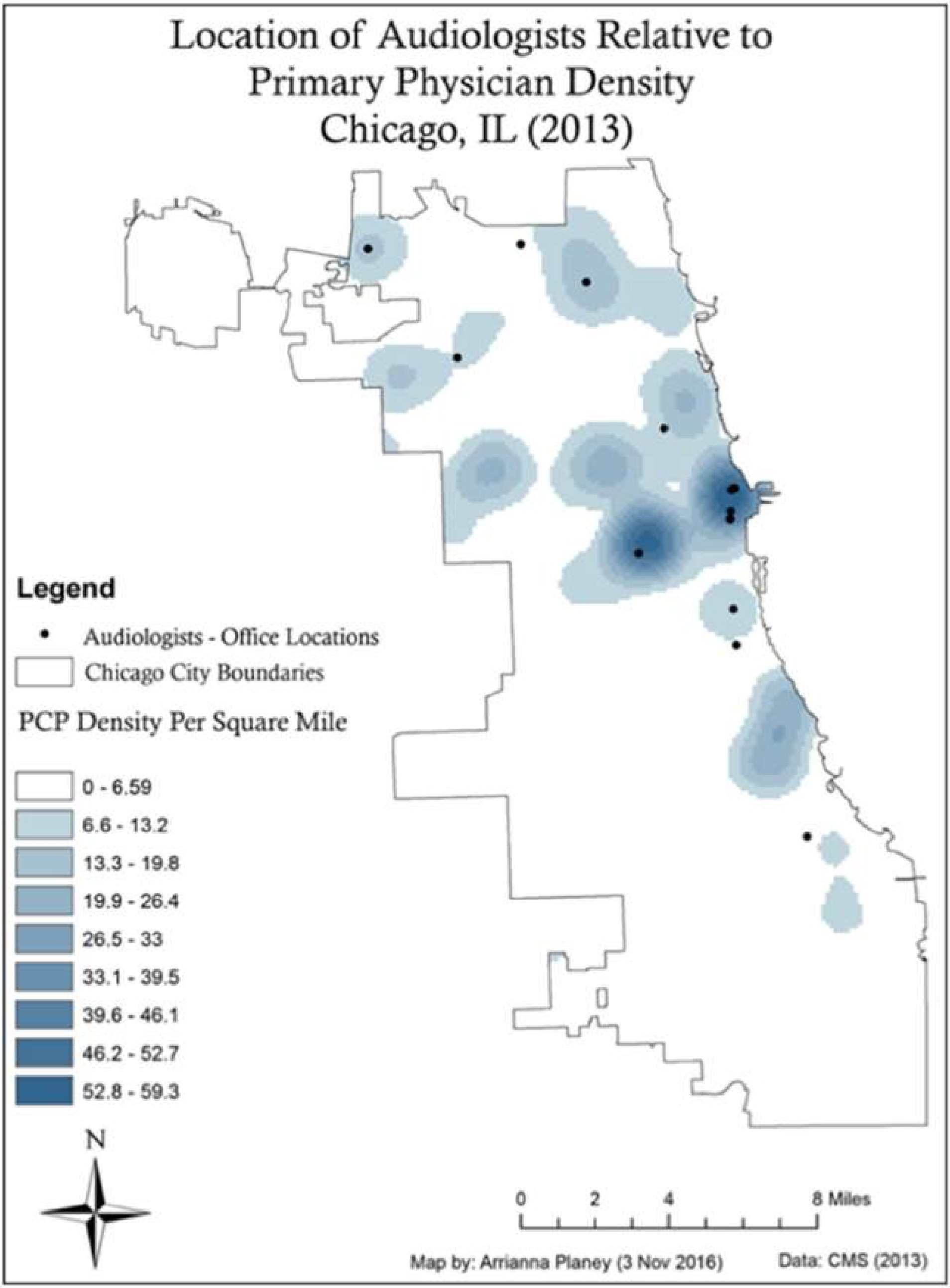


FIGURE 2 (Kernel density estimates of primary care physicians (PCPs) with audiologist locations overlaid the graphical results of the cross-*L* function show that audiologists and primary care providers significantly co-cluster across the study area.

PCPs ($p < 0.05$), reflective of the broader pattern of audiologist co-location with referring PCPs. Moreover, tracts with older populations, higher median age s, had longer travel distances to care. Finally, in these suburban areas, there was a positive association between travel distance to audiologist services and population density, suggesting that audiologists preferentially locate in more densely populated areas (Table 2).

In contrast, the results for the densely populated core counties (Table 3) show somewhat different associations. Residents in Census tracts with a higher proportion of Black residents had poorer spatial access to audiology services ($\beta = 1.236$; $p = 0.00006$), as did tracts with higher proportions of Hispanic residents ($\beta = 1.561$; $p = 0.00017$; Table 3). Moreover, within core counties in Chicagoland, tracts with higher PCP density per square mile had shorter distances to audiologist services ($\beta = -0.333$; $p = 0.00028$). This is consistent with the cross-L function findings, which show that audiologists co-locate with PCPs in the study area (Figure 3).

TABLE 2 Spatial lag regression model assessing associations between travel impedance to audiology services and tract-level sociodemographic characteristics among core counties in Chicagoland.

Metro Chicagoland Core Counties (Cook, DuPage, and Lake counties) ($n = 1656$ census tracts)			
Variables	**Coef (β)**	**Standard error**	**$p > z$**
Share of Black population (%)	1.23562	0.30739	0.00006
Share of Hispanic population (%)	1.56086	0.41567	0.00017
Density of primary care physicians per Sq/Mi	–0.332282	0.0913434	0.00028
Share of older adults reporting difficulty hearing (%)	–0.00302155	0.0599156	0.95978
Median age (years)	0.00941004	0.0140035	0.50160
Share of population with insurance (%)	0.00376367	0.0115372	0.74426
Median household income (US, 2016)	–5.54637e–006	3.41045e–006	0.10389
Population density (population per square mile)	0.0748886	0.016132	0.00000
AIC: 8224.56			

TABLE 3 Spatial lag regression model assessing associations between travel impedance to audiology services and tract-level sociodemographic characteristics among suburban counties in Chicagoland.

Chicagoland suburban counties ($n = 356$ census tracts)			
Variables	**Coef (β)**	**Standard error**	**$p > z$**
Share of Black population (%)	–0.362935	1.81919	0.84187
Share of Hispanic population (%)	–0.283073	1.94329	0.88418
Density of primary care physicians per Sq/Mi	–5.00409	2.0919	0.01675
Share of older adults reporting difficulty hearing (%)	–0.0646897	0.209271	0.75723
Median age (years)	0.103763	0.0513545	0.04333
Share of population with insurance (%)	–0.0990129	0.0429696	0.02121
Median household income (US, 2016)	4.52324e-006	1.41021e-005	0.74840
Population density (population per square mile)	0.0227465	0.00442043	0.00000
AIC: 2067			

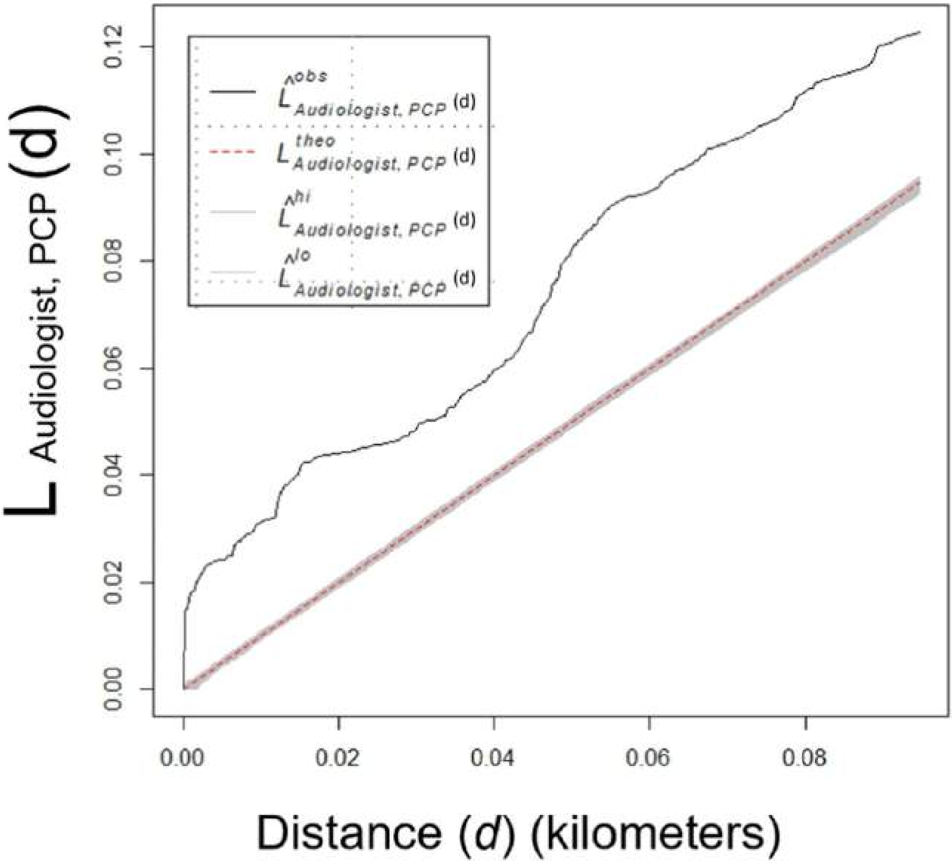


FIGURE 3 Cross-*L* function—Audiologists and primary care physicians in Chicago.The graphical results of the cross-L function show that audiologists and primary care providers significantly co-cluster across the study area.

DISCUSSION

Coupling ESDA and spatial regression modeling approaches, this study assesses whether audiologists co-locate with referring PCPs, and whether this co-location results in racial, ethnic, and class disparities in spatial access to hearing health care. The results show a strong tendency for audiologists and PCPs to co-cluster geographically in a pattern that both reflects and facilitates referral links mandated in health policies associated with reimbursement. Although a spatial analysis like this cannot identify the reasons for co-clustering, the observed proximity between providers is consistent with a behavioral process in which audiologists locate near PCPs to streamline mandated referral processes. In addition, co-clustering is observed in and around major hospitals and audiology training programs that employ both types of health-care providers. This is consistent with Bureau of Labor Statistics data, which show that audiologists are primarily employed in physicians' offices, private practices ("officers of other health practitioners"), and general medical and surgical hospitals (Bureau of Labor Statistics, 2016).

These findings confirm our hypothesis that the clustering of primary and specialist care providers reinforces racial and ethnic disparities in spatial access to care within Chicagoland's more urbanized areas, while affirming demographic differentials in the spatial accessibility of audiology services within the outer-ring suburban areas of Chicagoland. In Chicagoland's "urban" core, tracts with a higher proportion of Black and Hispanic residents had poorer spatial access to audiology services (Table 3), consistent with prior work showing that health-care access is poorer in more racially and ethnically segregated neighborhoods (Anderson, 2017; Bell et al., 2017; White et al., 2012). Moreover, the findings show that residents in Chicago's Central Business District have both lower rates of car ownership and better access to health-care providers due to their proximity to the medical corridor.

Moreover, within Chicagoland's suburban counties, there is evidence of an inverse care-type association in which places with a higher share of older adults (≥65) and lower median incomes have longer travel distance to audiology services. This finding mirrors prior analyses at the national scale (Planey, 2019). Further, the spatial regression model findings verify that network travel distance to audiologist services is *inversely* associated with PCP density at the tract level, providing further support for co-location. Thus, the findings confirmed our second hypothesis, which posited inequities in spatial access to colocated specialist care across the axes of race, ethnicity, and class in the study area.

Effectively, there is an inverse care association (Tudor Hart, 1971) between both availability and accessibility of audiology services. Prior work on utilization of hearing health services supports these findings, including lower rates of hearing loss diagnosis among people with low incomes and higher likelihoods (nearly twice as high) of hearing aid ownership and use among whites compared with Black and Latinx people (Bainbridge & Ramachandran, 2014; Nieman et al., 2016; Yi et al., 2022).

Our findings contribute to understandings of health provider locations and the interdependencies among providers across hierarchies of care. This bridges a gap in the literature, as most previous work focuses on single types of providers, ignoring their locational interdependencies within health-care policy contexts. Moreover, given the demonstrated lack of providers in areas with lower incomes and higher proportions of Black residents (Elesh & Schollaert, 1972), this study assesses how inequitable distributions of specialist providers may be reinforced via their co-clustering with referring PCPs.

To date, most geographic studies of health-care service accessibility focus on one set of providers. Moreover, this study answers the call to bring policy into studies of health-care geographies by considering the co-location of specialists and referring PCPs within a context where PCP referral is a prerequisite for Medicare reimbursement. As such, it is fitting that this study is based on practice locations of Medicare-enrolled providers. Moreover, Medicare's status as the “de facto regulator of the healthcare system” in the United States (Givan, 2016, p. 105) affirms the importance of focusing on Medicare- and Medicaid-enrolled providers.

This study is novel in its application of spatial analytic approaches to assess specialist co-location with primary physicians and the effect of PCP and specialist co-location on disparities on spatial accessibility of care. Further, defining the outcome variable for the spatial regression model as the network travel distance to audiology services from the population-weighted tract centroids is advantageous on two counts: this approach reduces estimation errors, in comparison to distance calculations based on geometric/areal centroids (Berke & Shi, 2009) and network distance measures are more accurate than estimates based on Euclidian distance (Apparicio et al., 2008; Shahid et al., 2009). Further, this approach partially addresses the tendency for average distances to over-emphasize providers who are inconvenient based on network distance (Guagliardo, 2004).

LIMITATIONS

This study is limited by its focus on a single metropolitan area, so the generalizability of findings to other urban and rural regions and to other countries, is unclear. Other countries may lack the referral mandates that encourage the co-location process. Future studies are needed to assess the spatial dependence between audiologists (or other specialists) and PCPs in diverse study areas. Moreover, the current study excludes Illinois' rural areas, which have lower levels of access to PCPs and specialists.

It should also be noted that the *K*-function and cross-*L* functions, and kernel density estimation are based on Euclidean distance. Future directions include *K*-functions based on network distance, such as constrained kernels, or the split kernel method (Morioka et al., 2021; Okabe et al., 2009). Undoubtedly, these approaches would be computationally intensive and contingent upon characteristics of the network itself (density, angles), but they could be a more meaningful measure of clustering or dispersion of health-care providers in an urban area.

There is a need for more studies of provider co-location that are attentive to (in)equity in spatial access to care among marginalized communities, who typically have heavier burdens of noncommunicable or chronic conditions and a greater need for continuity and coordination in the management of these conditions. The spatial and social inequalities observed here may be representative of many types of specialist health-care services in the United States in which providers gravitate, both individually and collectively, to places and neighborhoods perceived as profitable.

CONCLUSIONS AND POLICY IMPLICATIONS

Set in the context of the United States' highly marketized health-care system, this study begins with the proposition that health-care policies governing interprofessional practice are reflected in the spatial distribution of health-care services. Taken together, the findings from both the exploratory cluster analyses and spatial regression models assessing tract-level travel impedance to care for urban core and suburban counties in Chicagoland show that the clustering of providers—audiologists and referring PCPs—reinforces racial, ethnic, and class disparities in spatial access to care. Given that untreated hearing and balance disorders are associated with a threefold risk of falls among older adults (Jiam et al., 2016; Kowalewski, 2018; Mahmoudi et al., 2019)—which are a leading cause of emergency department use among older adults (Moreland & Lee, 2021)—the accessibility of audiology services is of great importance as the US population ages. These effects will likely be spatially uneven, given that suburban and rural counties are aging faster than urban counties, while urban counties have higher provider supply due to the advantageous combination of high population density and higher household incomes (Planey, 2019). Moreover, given the disproportionate impact of the COVID-19 pandemic on older adults and the disease's downstream effects on the vestibular and auditory systems, it is likely that there will be greater need for treatment for hearing and balance disorder treatments (Fancello et al., 2022; Fraczek et al., 2020; Jeong et al., 2021; Jafari et al., 2022; Koumpa et al., 2020; Mustafa, 2020; Ricciardiello et al., 2021).

This study contributes to the literature on health-care access by assessing the effects of specialist co-location with PCPs on spatial access to care at the axes of social difference—that is, race, ethnicity, and class—in a highly segregated metropolitan region. First, by measuring area-level inequities in spatial access to health-care services in the Chicago metro area—a metro classified as “hypersegregated” per Massey and Denton (1988), this study follows up on White and colleagues' call for greater attention to racial and ethnic segregation as a fundamental cause underlying place-based health-care disparities (White et al., 2012), Second, in addressing the policy context of audiologist co-location with PCPs, this paper extends Bambra, Smith, and Pearce's invitation to apply political economic approaches to the study of health and place to assess *healthcare* in place (Bambra et al., 2019). In doing so, this study raises questions about perceptions of primary care-centered models of health care as a given "good": A key takeaway here is that specialist colocation with PCPs as a policy solution is not equitable if the underlying distribution of primary care is inequitable. In this context, the findings of this study can inform health-care policies addressing hearing health-care accessibility and care coordination for an aging population with a growing burden of comorbid conditions amid a growing shortage of audiologists.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICS STATEMENT

Support for this project was provided by a grant (I.D. 74800) from the Robert Wood Johnson Foundation, through the Health Policy Research Scholars (HPRS) predoctoral fellowship, as well as a Dissertation Award from HPRS, awarded to the lead author.

ORCID

Sharita R. Thomas http://orcid.org/0000-0002-9227-2761

REFERENCES

Agrawal, Y., Platz, E. A., & Niparko, J. K. (2009). Risk factors for hearing loss in US adults: Data from the National Health and Nutrition Examination Survey, 1999 to 2002. *Otology & Neurotology*, *30*(2), 139–145. https://doi.org/10.1097/MAO.0b013e318192483c

Anderson, K. (2018). Racial/ethnic residential segregation, the distribution of physician's offices and access to health care: The case of Houston, Texas. *Social Sciences*, *7*(8), 119. https://doi.org/10.3390/socsci7080119

Anderson, K. F. (2017). Racial residential segregation and the distribution of auxiliary health care practitioners across urban space. In J. J. Kronenfeld (Ed.), *Health and health care concerns among women and racial and ethnic minorities* (Vol. 35, pp. 145–167). Emerald Publishing Limited. https://doi.org/10.1108/S0275-495920170000035008

Andrews, G. J., & Phillips, D. R. (2002). Changing local geographies of private residential care for older people 1983–1999: Lessons for social policy in England and Wales. *Social Science & Medicine*, *55*(1), 63–78. https://doi.org/10.1016/s0277-9536(01)00207-6

Anselin, L., Syabri, I., & Kho, Y. (2006). Geoda: An introduction to spatial data analysis. *Geographical Analysis*, *38*(1), 5–22. https://doi.org/10.1111/j.0016-7363.2005.00671.x

Apparicio, P., Abdelmajid, M., Riva, M., & Shearmur, R. (2008). Comparing alternative approaches to measuring the geographical accessibility of urban health services: Distance types and aggregation-error issues. *International Journal of Health Geographics*, *7*, 7. https://doi.org/10.1186/1476-072X-7-7

Arnold, M. L., Hyer, K., & Chisolm, T. (2017). Medicaid hearing aid coverage for older adult beneficiaries: A state-by-state comparison. *Health Affairs*, *36*(8), 1476–1484. https://doi.org/10.1377/hlthaff.2016.1610

Asabor, E. N., Warren, J. L., & Cohen, T. (2022). Racial/ethnic segregation and access to COVID-19 testing: Spatial distribution of COVID-19 testing sites in the four largest highly segregated cities in the United States. *American Journal of Public Health*, *112*(3), 518–526. https://doi.org/10.2105/AJPH.2021.306558

Bailey, T. C., & Gatrell, A. C. (1995). Interactive spatial data analysis, *Longman scientific & technical*. Essex.

Bainbridge, K. E., & Ramachandran, V. (2014). Hearing aid use among older US adults; the National Health and Nutrition Examination Survey, 2005–2006 and 2009–2010. *Ear & Hearing*, *35*(3), 289–294. https://doi.org/10.1097/01.aud.0000441036.40169.29

Bambra, C., Smith, K. E., & Pearce, J. (2019). Scaling up: The politics of health and place. *Social Science & Medicine (1982)*, *232*, 36–42. https://doi.org/10.1016/j.socscimed.2019.04.036

Barnett, D. D., Koul, R., & Coppola, N. M. (2014). Satisfaction with health care among people with hearing impairment: A survey of Medicare beneficiaries. *Disability and Rehabilitation*, *36*(1), 39–48. https://doi.org/10.3109/09638288.2013.777803

Bell, C. N., Bowie, J. V., Thorpe, R. J., & Levine, D. M. (2017). A spatial analysis of race, local health-promoting resources and preventable hospitalizations. *Preventive Medicine*, *105*, 149–155. https://doi.org/10.1016/j.ypmed.2017.09.012

Berke, E. M., & Shi, X. (2009). Computing travel time when the exact address is unknown: A comparison of point and polygon ZIP code approximation methods. *International Journal of Health Geographics*, *8*, 23. https://doi.org/10.1186/1476-072X-8-23

Besag, J., & Diggle, P. J. (1977). Simple Monte Carlo tests for spatial pattern. *Applied Statistics*, *26*(3), 327. https://doi.org/10.2307/2346974

Bonciani, M., Schäfer, W., Barsanti, S., Heinemann, S., & Groenewegen, P. P. (2018). The benefits of co-location in primary care practices: The perspectives of general practitioners and patients in 34 countries. *BMC Health Services Research*, *18*(1), 132. https://doi.org/10.1186/s12913-018-2913-4

Bureau of Labor Statistics, US Department of Labor. (2016). *Occupational employment and wages 2019–Audiologists*. http://www.bls.gov/oes/current/oes291181.htm

Caldwell, J. T., Ford, C. L., Wallace, S. P., Wang, M. C., & Takahashi, L. M. (2017). Racial and ethnic residential segregation and access to health care in rural areas. *Health & Place*, *43*, 104–112. https://doi.org/10.1016/j.healthplace.2016.11.015

Carlos, H. A., Shi, X., Sargent, J., Tanski, S., & Berke, E. M. (2010). Density estimation and adaptive bandwidths: A primer for public health practitioners. *International Journal of Health Geographics*, *9*, 39. https://doi.org/10.1186/1476-072X-9-39

Center for Medicare and Medicaid Services. (2016). https://www.cms.gov/Medicare/Medicare-Fee-For-Service-Payment/PhysicianFeeSched/audiology.html

Cooper, R. A. (1994). Seeking a balanced physician workforce for the 21st century. *JAMA*, *272*(9), 680. https://doi.org/10.1001/jama.1994.03520090044017

Coronado, G. D., Thompson, B., Koepsell, T. D., Schwartz, S. M., & McLerran, D. (2004). Use of Pap test among Hispanics and non-Hispanic whites in a rural setting. *Preventive Medicine*, *38*(6), 713–722. https://doi.org/10.1016/j.ypmed.2004.01.009

Cromley, E., & McLafferty, S. L. (2012). *GIS and public health* (2nd ed.). The Guilford Press.

Crooks, V. A., & Schuurman, N. (2012). Interpreting the results of a modified gravity model: Examining access to primary health care physicians in five Canadian provinces and territories. *BMC Health Services Research*, *12*, 230. https://doi.org/10.1186/1472-6963-12-230

Cutchin, M. P. (1997). Physician retention in rural communities: The perspective of experiential place integration. *Health & Place*, *3*(1), 25–41. https://doi.org/10.1016/s1353-8292(96)00033-0

Davies, T. M., Hazelton, M. L., & Marshall, J. C. (2011). sparr: Analyzing spatial relative risk using fixed and adaptive kernel density estimation in R. *Journal of Statistical Software*, *39*(1), 1–14. https://doi.org/10.18637/jss.v039.i01

Elesh, D., & Schollaert, P. T. (1972). Race and urban medicine: Factors affecting the distribution of physicians in Chicago. *Journal of Health and Social Behavior*, *13*(3), 236–250.

Van Eyken, E., Van Camp, G., & Van Laer, L. (2007). The complexity of age-related hearing impairment: Contributing environmental and genetic factors. *Audiology & Neuro-otology*, *12*(6), 345–358. https://doi.org/10.1159/000106478

Fancello, V., Fancello, G., Hatzopoulos, S., Bianchini, C., Stomeo, F., Pelucchi, S., & Ciorba, A. (2022). Sensorineural hearing loss post-COVID-19 infection: An update. *Audiology Research*, *12*(3), 307–315. https://doi.org/10.3390/audiolres12030032

Fraczek, M., Resler, K., & Szetela, B. (2020). Can we expect more patients with hearing loss due to COVID-19? *The Hearing Journal*, *73*(12), 10–12. https://doi.org/10.1097/01.HJ.0000725064.86460.3c

Gesler, W. M., & Cromartie, J. B. (1985). Patterns of illness and hospital use in central Harlem health district. *Journal of Geography*, *84*(5), 211–216. https://doi.org/10.1080/00221348508979134

Gibson, D. M. (2015). The geographic distribution of eye care providers in the United States: Implications for a national strategy to improve vision health. *Preventive Medicine*, *73*, 30–36. https://doi.org/10.1016/j.ypmed.2015.01.008

Givan, R. K. (2016). *The challenge to change: Reforming health care on the front line in the United States and the United Kingdom*. Cornell University Press.

Glantz, G. (2017). Policy & politics. *The Hearing Journal*, *70*(2), 20. https://doi.org/10.1097/01.HJ.0000513097.55183.ce

Glantz, M. J., Chamberlain, M. C., Liu, Q., Hsieh, C.-C., Edwards, K. R., Van Horn, A., & Recht, L. (2009). Gender disparity in the rate of partner abandonment in patients with serious medical illness. *Cancer*, *115*(22), 5237–5242. https://doi.org/10.1002/cncr.24577

Goman, A. M., Reed, N. S., & Lin, F. R. (2017). Addressing estimated hearing loss in adults in 2060. *JAMA Otolaryngology–Head & Neck Surgery*, *143*(7), 733–734. https://doi.org/10.1001/jamaoto.2016.4642

Guagliardo, M. F. (2004). Spatial accessibility of primary care: Concepts, methods and challenges. *International Journal of Health Geographics*, *3*(1), 3. https://doi.org/10.1186/1476-072X-3-3

Guagliardo, M. F., Ronzio, C. R., Cheung, I., Chacko, E., & Joseph, J. G. (2004). Physician accessibility: An urban case study of pediatric providers. *Health & Place*, *10*(3), 273–283. https://doi.org/10.1016/j.healthplace.2003.01.001

Hanlon, N. (2009). Access and utilization reconsidered: Towards a broader understanding of the spatial ordering of primary health care. In V. A. Crooks & G. J. Andrews (Eds.), *Primary health care: People, practice, place* (pp. 43–2056). Ashgate Publishers.

Haynes, R., Jones, A. P., Sauerzapf, V., & Zhao, H. (2006). Validation of travel times to hospital estimated by GIS. *International Journal of Health Geographics*, *5*, 40. https://doi.org/10.1186/1476-072X-5-40

Iezzoni, L. I., Killeen, M. B., & O'Day, B. L. (2006). Rural residents with disabilities confront substantial barriers to obtaining primary care. *Health Services Research*, *41*(4 Pt 1), 1258–1275. https://doi.org/10.1111/j.1475-6773.2006.00534.x

Jacob, S. A., Palanisamy, U. D., Napier, J., Verstegen, D., Dhanoa, A., & Chong, E. Y.-C. (2022). Health care needs of deaf signers: The case for culturally competent health care providers. *Academic Medicine*, *97*(3), 335–340. https://doi.org/10.1097/ACM.0000000000004181

Jafari, Z., Kolb, B. E., & Mohajerani, M. H. (2022). Hearing loss, tinnitus, and dizziness in COVID-19: A systematic review and meta-analysis. *Canadian Journal of Neurological Sciences/Journal Canadien des Sciences Neurologiques*, *49*(2), 184–195. https://doi.org/10.1017/cjn.2021.63

James, T. G., Coady, K. A., Stacciarini, J.-M. R., McKee, M. M., Phillips, D. G., Maruca, D., & Cheong, J. (2021). “They're not willing to accommodate deaf patients”: Communication experiences of deaf American sign language users in the emergency department. *Qualitative Health Research*, *32*, 48–63. https://doi.org/10.1177/10497323211046238

Jeong, M., Ocwieja, K. E., Han, D., Wackym, P. A., Zhang, Y., Brown, A., Moncada, C., Vambutas, A., Kanne, T., Crain, R., Siegel, N., Leger, V., Santos, F., Welling, D. B., Gehrke, L., & Stankovic, K. M. (2021). Direct SARS-CoV-2 infection of the human inner ear may underlie COVID-19-associated audiovestibular dysfunction. *Communications Medicine*, *1*(1), 44. https://doi.org/10.1038/s43856-021-00044-w

Jeremiah Hayanga, A., Kaiser, H. E., Sinha, R., Berenholtz, S. M., Makary, M., & Chang, D. (2009). Residential segregation and access to surgical care by minority populations in US counties. *Journal of the American College of Surgeons*, *208*(6), 1017–1022. https://doi.org/10.1016/j.jamcollsurg.2009.01.047

Jesson, J. K., & Wilson, K. A. (2003). One-stop health centres: What co-location means for pharmacy. *Health & Place*, *9*(3), 253–261. https://doi.org/10.1016/S1353-8292(02)00057-6

Jiam, N. T.-L., Li, C., & Agrawal, Y. (2016). Hearing loss and falls: A systematic review and meta-analysis. *The Laryngoscope*, *126*(11), 2587–2596. https://doi.org/10.1002/lary.25927

Jones, L. A., Ferrans, C. E., Polite, B. N., Brewer, K. C., Maker, A. V., Pauls, H. A., & Rauscher, G. H. (2017). Examining racial disparities in colon cancer clinical delay in the colon cancer patterns of care in Chicago study. *Annals of Epidemiology*, *27*(11), 731–738. https://doi.org/10.1016/j.annepidem.2017.10.006

Kazanjian, A., & Pagliccia, N. (1996). Key factors in physicians' choice of practice location: Findings from a survey of practitioners and their spouses. *Health & Place*, *2*(1), 27–34. https://doi.org/10.1016/1353-8292(95)00039-9

Ko, M., Derose, K. P., Needleman, J., & Ponce, N. A. (2014). Whose social capital matters? The case of U.S. urban public hospital closures and conversions to private ownership. *Social Science & Medicine (1982)*, *114*, 188–196. https://doi.org/10.1016/j.socscimed.2014.03.024

Koumpa, F. S., Forde, C. T., & Manjaly, J. G. (2020). Sudden irreversible hearing loss post-COVID-19. *BMJ Case Reports*, *13*(11), e238419. https://doi.org/10.1136/bcr-2020-238419

Kowalewski, V. (2018). Hearing loss contributes to balance difficulties in both younger and older adults. *Journal of Preventive Medicine*, *03*(2), 1–5. https://doi.org/10.21767/2572-5483.100033

Laditka, J. N. (2004). Physician supply, physician diversity, and outcomes of primary health care for older persons in the United States. *Health & Place*, *10*(3), 231–244. https://doi.org/10.1016/j.healthplace.2003.09.004

Lasser, K. E., Himmelstein, D. U., & Woolhandler, S. (2006). Access to care, health status, and health disparities in the United States and Canada: Results of a cross-national population-based survey. *American Journal of Public Health*, *96*(7), 1300–1307. https://doi.org/10.2105/AJPH.2004.059402

Levesque, J.-F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, *12*, 18. https://doi.org/10.1186/1475-9276-12-18

Loosmore, N. B., & Ford, E. D. (2006). Statistical inference using the g or K point pattern spatial statistics. *Ecology*, *87*(8), 1925–1931. https://doi.org/10.1890/0012-9658(2006)87[1925:siutgo]2.0.co;2

Luo, W., & Wang, F. (2003). Measures of spatial accessibility to healthcare in a GIS environment: Synthesis and a case study in Chicago region. *Environment and Planning B, Planning & Design*, *30*(6), 865–884. https://doi.org/10.1068/b29120

Mahboubi, H., Lin, H. W., & Bhattacharyya, N. (2018). Prevalence, characteristics, and treatment patterns of hearing difficulty in the United States. *JAMA Otolaryngology–Head & Neck Surgery*, *144*(1), 65–70. https://doi.org/10.1001/jamaoto.2017.2223

Mahmoudi, E., Basu, T., Langa, K., McKee, M. M., Zazove, P., Alexander, N., & Kamdar, N. (2019). Can hearing aids delay time to diagnosis of dementia, depression, or falls in older adults? *Journal of the American Geriatrics Society*, *67*(11), 2362–2369. https://doi.org/10.1111/jgs.16109

Mahmoudi, E., Zazove, P., Meade, M., & McKee, M. M. (2018). Association between hearing aid use and health care use and cost among older adults with hearing loss. *JAMA Otolaryngology–Head & Neck Surgery*, *144*(6), 498–505. https://doi.org/10.1001/jamaoto.2018.0273

Massey, D. S., & Denton, N. A. (1988). The dimensions of residential segregation. *Social Forces*, *67*(2), 281. https://doi.org/10.2307/2579183

McDonald, J., Ward, B., Lane, R., Kearns, R., Powell Davies, G., Fuller, J., Dennis, S., Spooner, C., & Russell, G. (2017). How are co-located primary health care centres integrating care for people with chronic conditions? *International Journal of Integrated Care*, *17*(3), 51. https://doi.org/10.5334/ijic.3163

McKee, M. M., Choi, H., Wilson, S., DeJonckheere, M. J., Zazove, P., & Levy, H. (2019). Determinants of hearing aid use among older Americans with hearing loss. *The Gerontologist*, *59*(6), 1171–1181. https://doi.org/10.1093/geront/gny051

McKee, M. M., Winters, P. C., Sen, A., Zazove, P., & Fiscella, K. (2015). Emergency department utilization among deaf American sign language users. *Disability and Health Journal*, *8*(4), 573–578. https://doi.org/10.1016/j.dhjo.2015.05.004

McManus, M. A., Levtov, R., White, K. R., Forsman, I., Foust, T., & Thompson, M. (2010). Medicaid reimbursement of hearing services for infants and young children. *Pediatrics*, *126*(Suppl. 1), S34–S42. https://doi.org/10.1542/peds.2010-0354H

McNeal, M. H. (2016). Say what? The Affordable Care Act, Medicare, and hearing aids. *SSRN Electronic Journal*, 621–670. https://doi.org/10.2139/ssrn.2794177

Miller, B. F., Petterson, S., Brown Levey, S. M., Payne-Murphy, J. C., Moore, M., & Bazemore, A. (2014). Primary care, behavioral health, provider colocation, and rurality. *The Journal of the American Board of Family Medicine*, *27*(3), 367–374. https://doi.org/10.3122/jabfm.2014.03.130260

Mobley, L. R., Root, E., Anselin, L., Lozano-Gracia, N., & Koschinsky, J. (2006). Spatial analysis of elderly access to primary care services. *International Journal of Health Geographics*, *5*, 19. https://doi.org/10.1186/1476-072X-5-19

Moreland, B., & Lee, R. (2021). Emergency department visits and hospitalizations for selected nonfatal injuries among adults aged ≥65 years—United States, 2018. *MMWR. Morbidity and Mortality Weekly Report*, *70*(18), 661–666. https://doi.org/10.15585/mmwr.mm7018a1

Morioka, W., Okabe, A., Kwan, M.-P., & McLafferty, S. L. (2021). An exact statistical method for analyzing co-location on a street network and its computational implementation. *International Journal of Geographical Information Science*, *36*(4), 1–26. https://doi.org/10.1080/13658816.2021.1976409

Muluk, S., Sabik, L., Chen, Q., Jacobs, B., Sun, Z., & Drake, C. (2022). Disparities in geographic access to medical oncologists. *Health Services Research*, *57*, 1035–1044. https://doi.org/10.1111/1475-6773.13991

Mustafa, M. W. M. (2020). Audiological profile of asymptomatic Covid-19 PCR-positive cases. *American Journal of Otolaryngology*, *41*(3), 102483. https://doi.org/10.1016/j.amjoto.2020.102483

Nash, S. D., Cruickshanks, K. J., Huang, G.-H., Klein, B. E. K., Klein, R., Nieto, F. J., & Tweed, T. S. (2013). Unmet hearing health care needs: The Beaver Dam offspring study. *American Journal of Public Health*, *103*(6), 1134–1139. https://doi.org/10.2105/AJPH.2012.301031

National Institute on Deafness and Other Communication Disorders (NIDCD). (2021). *Quick statistics about hearing*. https://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing#6

Nieman, C. L., Marrone, N., Szanton, S. L., Thorpe, R. J., & Lin, F. R. (2016). Racial/ethnic and socioeconomic disparities in hearing health care among older Americans. *Journal of Aging and Health*, *28*(1), 68–94. https://doi.org/10.1177/0898264315585505

Norris, P. (1997). The state and the market: The impact of pharmacy licensing on the geographical distribution of pharmacies. *Health & Place*, *3*(4), 259–269. https://doi.org/10.1016/S1353-8292(97)00019-1

Okabe, A., Satoh, T., & Sugihara, K. (2009). A kernel density estimation method for networks, its computational method and a GIS-based tool. *International Journal of Geographical Information Science*, *23*(1), 7–32. https://doi.org/10.1080/13658810802475491

Penchansky, R., & Thomas, J. W. (1981). The concept of access: Definition and relationship to consumer satisfaction. *Medical Care*, *19*(2), 127–140.

Pessis, P. (2009). Direct access: The evolution of hearing and balance health care in the 21st century. *Seminars in Hearing*, *30*(03), 222–229. https://doi.org/10.1055/s-0029-1225406

Planey, A. M. (2019). Audiologist availability and supply in the United States: A multi-scale spatial and political economic analysis. *Social Science & Medicine (1982)*, *222*, 216–224. https://doi.org/10.1016/j.socscimed.2019.01.015

Popelka, M. M., Cruickshanks, K. J., Wiley, T. L., Tweed, T. S., Klein, B. E. K., & Klein, R. (1998). Low prevalence of hearing aid use among older adults with hearing loss: The epidemiology of hearing loss study. *Journal of the American Geriatrics Society*, *46*(9), 1075–1078. https://doi.org/10.1111/j.1532-5415.1998.tb06643.x

President's Council of Advisors on Science and Technology (PCAST). (2015). Aging America & hearing loss: Imperative of improved hearing technologies. Accessed January 4, 2024. https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_hearing_tech_letterreport_final.pdf

Probst, J. C., Laditka, S. B., Wang, J.-Y., & Johnson, A. O. (2007). Effects of residence and race on burden of travel for care: Cross sectional analysis of the 2001 US National Household Travel Survey. *BMC Health Services Research*, *7*, 40. https://doi.org/10.1186/1472-6963-7-40

Reed, N. S., Altan, A., Deal, J. A., Yeh, C., Kravetz, A. D., Wallhagen, M., & Lin, F. R. (2019). Trends in health care costs and utilization associated with untreated hearing loss over 10 years. *JAMA Otolaryngology–Head & Neck Surgery*, *145*(1), 27–34. https://doi.org/10.1001/jamaoto.2018.2875

Ricciardiello, F., Pisani, D., Viola, P., Cristiano, E., Scarpa, A., Giannone, A., Longo, G., Russo, G., Bocchetti, M., Coppola, C., Perrella, M., Oliva, F., & Chiarella, G. (2021). Sudden sensorineural hearing loss in mild COVID-19: Case series and analysis of the literature. *Audiology Research*, *11*(3), 313–326. https://doi.org/10.3390/audiolres11030029

Ripley, B. D. (1976). The second-order analysis of stationary point processes. *Journal of Applied Probability*, *13*(2), 255–266. https://doi.org/10.2307/3212829

Rumball-Smith, J., Wodchis, W. P., Koné, A., Kenealy, T., Barnsley, J., & Ashton, T. (2014). Under the same roof: Co-location of practitioners within primary care is associated with specialized chronic care management. *BMC Family Practice*, *15*, 149. https://doi.org/10.1186/1471-2296-15-149

Saurman, E. (2016). Improving access: Modifying Penchansky and Thomas's theory of access. *Journal of Health Services Research & Policy*, *21*(1), 36–39. https://doi.org/10.1177/1355819615600001

Schiaffino, M. K., Nara, A., & Mao, L. (2016). Language services in hospitals vary by ownership and location. *Health Affairs*, *35*(8), 1399–1403. https://doi.org/10.1377/hlthaff.2015.0955

Shahid, R., Bertazzon, S., Knudtson, M. L., & Ghali, W. A. (2009). Comparison of distance measures in spatial analytical modeling for health service planning. *BMC Health Services Research*, *9*, 200. https://doi.org/10.1186/1472-6963-9-200

Shannon, J., Bagwell-Adams, G., Shannon, S., Lee, J. S., & Wei, Y. (2018). The mobility of food retailers: How proximity to SNAP authorized food retailers changed in Atlanta during the great recession. *Social Science & Medicine*, *209*, 125–135. https://doi.org/10.1016/j.socscimed.2018.05.046

Stimson, R. J. (1981). The provision and use of general practitioner services in Adelaide, Australia: Application of tools of locational analysis and theories of provider and user spatial behaviour. *Social Science & Medicine. Medical Geography*, *15D*(1), 27–44. https://doi.org/10.1016/0160-8002(81)90014-9

Thomas, M., Kohli, V., & King, D. (2004). Barriers to childhood immunization: Findings from a needs assessment study. *Home Health Care Services Quarterly*, *23*(2), 19–39. https://doi.org/10.1300/J027v23n02_02

Tobler, W. R. (1970). A computer movie simulating urban growth in the Detroit region. *Economic Geography*, *46*, 234. https://doi.org/10.2307/143141

Tudor Hart, J. (1971). The inverse care law. *The Lancet*, *297*(7696), 405–412. https://doi.org/10.1016/s0140-6736(71)92410-x

Waller, L. A., & Gotway, C. A. (2004). *Applied statistics for public health data* (p. 137). Wiley and Sons.

White, K., Haas, J. S., & Williams, D. R. (2012). Elucidating the role of place in health care disparities: The example of racial/ethnic residential segregation. *Health Services Research*, *47*(3 Pt 2), 1278–1299. https://doi.org/10.1111/j.1475-6773.2012.01410.x

Whitson, H. E., & Lin, F. R. (2014). Hearing and vision care for older adults: Sensing a need to update Medicare policy. *Journal of the American Medical Association*, *312*(17), 1739–1740. https://doi.org/10.1001/jama.2014.13535

Wiles, J., & Rosenberg, M. (2009). The role of scale in conceptualizing primary health care practice: Considering social and institutional structures and systems. In V. A. Crooks & G. J. Andrews (Eds.), *Primary health care: People, practice, and place* (Vol. 2009, pp. 75–92). Ashgate Publishing Company.

Willink, A., Reed, N. S., & Lin, F. R. (2019). Access to hearing care services among older medicare beneficiaries using hearing aids. *Health Affairs*, *38*(1), 124–131. https://doi.org/10.1377/hlthaff.2018.05217

Willink, A., Reed, N. S., Swenor, B., Leinbach, L., DuGoff, E. H., & Davis, K. (2020). Dental, vision, and hearing services: Access, spending, and coverage for medicare beneficiaries. *Health Affairs*, *39*(2), 297–304. https://doi.org/10.1377/hlthaff.2019.00451

Windmill, I. M., & Freeman, B. A. (2013). Demand for audiology services: 30-yr projections and impact on academic programs. *Journal of the American Academy of Audiology*, *24*(5), 407–416. https://doi.org/10.3766/jaaa.24.5.7

Wu, E. C., Zardouz, S., Mahboubi, H., Ashtiani, A. K., Shahriari, S., Ziai, K., Rothholtz, V. S., & Djalilian, H. R. (2013). Knowledge and education of primary care physicians on management of children with hearing loss and pediatric cochlear implantation. *Otology & Neurotology*, *34*(4), 593–594. https://doi.org/10.1097/MAO.0b013e31828dac80

Yao, N., Foltz, S. M., Odisho, A. Y., & Wheeler, D. C. (2015). Geographic analysis of urologist density and prostate cancer mortality in the United States. *PLoS ONE*, *10*(6), e0131578. https://doi.org/10.1371/journal.pone.0131578

Yi, J. S., Garcia Morales, E. E., Reed, N. S., Willink, A., & Nieman, C. L. (2022). Racial and ethnic differences in hearing aid use among medicare beneficiaries. *Journal of Aging and Health*, *34*(6–8), 1117–1124. https://doi.org/10.1177/08982643221095716

How to cite this article: Planey, A. M., Thomas, S. R., Lewis, J. A., & Maaita, M. (2024). The colocation of primary care physicians and audiologists in the Chicago metro region reinforces racial, ethnic, and class inequities in spatial access to care. *World Medical & Health Policy*, *16*, 273–294. https://doi.org/10.1002/wmh3.598

AUTHOR BIOGRAPHIES

Arrianna Marie Planey: Arrianna Marie Planey is an Assistant Professor in the Department of Health Policy and Management in the Gillings School of Global Public Health at University of North Carolina, Chapel Hill. She is also a Faculty Fellow in the Cecil G. Sheps Center for Health Services Research, and the Carolina Population Center (CPC), and an associate member of the Lineberger Comprehensive Cancer Center (LCCC).

Sharita R. Thomas: Sharita R. Thomas is a public health and health policy researcher with a Master’s degree in Public Policy from the Duke University Sanford School of Public Policy. She is currently a PhD candidate at the University of North Carolina at Chapel Hill Gillings School of Global Public Health where her areas of expertise include qualitative research methods, policy analysis, and econometric methods. Her research interests include rural population health, population health and access of persons who are Black, substance misuse and behavioral health concerns, and healthcare equity.

Jodi A. Lewis: Jodi A. Lewis is currently a PhD student at the University of Chapel Hill Gillings School of Global Public Health, studying Health Politics and Policy. She also holds a Master of Public Health in Policy Analysis from the University of Minnesota School of Public Health and a Master of Science in Interdisciplinary Health Sciences from Drexel University College of Medicine. Her primary research interest is maternal health, particularly racial and ethnic inequities in patient care and health outcomes.

Marah Maaita: Marah Maaita is currently pursuing a Ph.D in Health Policy and Management from the University of North Carolina at Chapel Hill. She also holds a master's degree in Urban and Regional Planning from Michigan State University. Her research interests include health disparities and the effects of socioeconomic factors, health policy, and place on healthcare access and health outcomes. Marah is particularly interested in promoting health equity and improving access to healthcare for underserved communities.

Received: 23 July 2023 | Revised: 26 November 2023 | Accepted: 30 November 2023

DOI: 10.1002/wmh3.599

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

“We are adapting to it because it is within us”: The co-becoming of COVID-19 in Malawi

Chúk Odenigbo[1] | **Sonia Wesche**[1] | **Paul Mkandawire**[2] | **Eric Crighton**[1]

[1]Department of Geography, Environment and Geomatics, University of Ottawa, Ottawa, Ontario, Canada

[2]Institute of Interdisciplinary Studies, Carleton University, Ottawa, Ontario, Canada

Correspondence

Chúk Odenigbo, Department of Geography, Environment and Geomatics at the University of Ottawa, Ottawa, Ontario, Canada.

Email: coden075@uottawa.ca

Funding information

Mitacs Accelerate Programme, Grant/Award Number: IT19260

Abstract

Using a case study design, this research explores the Coronavirus 2019 disease (COVID-19) pandemic from the perspectives and worldviews of Malawians (Black/African knowledge) through the Bawaka Yolŋu ontology of co-becoming (Black/Indigenous knowledge). This study seeks to examine the ways in which COVID-19 has influenced perceptions of place and the places themselves, thereby contributing to the development of policies and strategies for effectively navigating and living with the ongoing COVID-19 pandemic. The study involved forty-one in-depth semi-structured interviews and two unstructured interviews, enabling a nuanced exploration of COVID-19's impact through the diverse perspectives of Malawian knowledge holders including religious leaders, health-care workers, farmers, and community leaders. The findings reveal a multifaceted transformation in the relationship of Malawians with nature, place, and one another. Nature, once a source of sustenance, has become a realm of danger due to its association with airborne transmission. Place, typically a communal space, has shifted towards individualized safety, necessitating changes in how homes are adapted and perceived. The communal fabric of Malawian society, deeply ingrained in communal practices, has been strained, altering traditional gatherings and societal interactions. This research adds depth to our understanding of COVID-19's complex impacts, emphasizing the importance of cultural and environmental contexts in shaping responses to the pandemic. The insights gained hold significance for tailored policy

---

interventions and community-focused strategies to navigate and adapt to the evolving challenges presented by COVID-19.

KEYWORDS
Black knowledge, co-becoming, COVID-19, Indigenous knowledge, Malawi, place, relational, space

Key points

- *Indigenous/Black knowledge offers perspectives necessary for building robust public health policies*: Co-becoming, as a form of knowledge production and framing, offers a new perspective on the relationship between place and space. It allows for a deeper understanding of how COVID-19 has influenced and changed the dynamics between humans, nature, and the environment in Malawi.
- *Diseases impact people*'*s perceptions of places and mobility*: Co-becoming sheds light on the influence of COVID-19 on people's perceptions of different places and their mobility patterns. COVID-19 led to increased stigmatization of movement and nomadic lifestyles in Malawi, as the disease was associated with travelers. People became less likely to leave their communities, resulting in a stronger place-based lifestyle.
- *Diseases have cultural implications in a given place*: This study highlights the changing relationships and adaptations in Malawi's communal culture due to COVID-19. Customs and cultural practices were modified to reduce in-person interactions, leading to decreased social cohesion and individualized responsibility. Furthermore, people created new social norms and expectations in response to the COVID-19 pandemic.

INTRODUCTION

Place provides an important lens for understanding health and disease (Bambra, 2018). Place allows us to form links between the tangible elements of a landscape and the intangible social realities that inform how people see the world, approach problems, and build knowledge (Crooks et al., 2018). As such, derivations of place feature heavily in the frameworks of health and the conceptualization of disease in many cultures (Darko, 2009; Penchalaiah, 2013; Torri, 2012). According to Hippocratic texts, early modern medicine acknowledged “the relationships between places, health, disease, and the physical and mental constitutional nature of people and nations” (Wear, 2008). Nevertheless, present-day responses to international disease tend to downplay the role of place in counteracting disease outbreak, focusing more on building strategies that center the symptoms of a disease, treatment, and medical interventions (Timmermans & Haas, 2008; Wilson, 2003). The Coronavirus 2019 disease (COVID-19) exemplifies the shortcomings of international thought and practice when it comes to disease prevention and mitigation (Parmet et al., 2021; del Pozo & Beletsky, 2020; Taylor, 2021; Xu & Basu, 2020). The global response to the COVID-19 pandemic has predominantly been top-down and state-driven (Parmet et al., 2021; Pillai et al., 2020); examples include quarantining entire populations, mandating the use of masks, and enforcing vaccine passports (Anderson et al., 2020; Güner et al., 2020). Despite these measures, over six million people globally have died from COVID-19 (Johns Hopkins University, 2022). Alternative forms of place-based knowledge production surrounding health and community demonstrate the capacity to offer additional perspectives that may mitigate some of the shortcomings that plagued the global response to the COVID-19 pandemic (Mirzaie et al., 2020; Tillu et al., 2020; Umeta Chali et al., 2021). This study highlights the learning that can stem from integrating multiple place-based forms of knowledge production when designing policy and procedures to respond to unexpected disease outbreaks. We do this by qualitatively exploring the COVID-19 pandemic through the worldviews of Malawians (Black/African knowledge), and analyze the results with an epistemology of co-becoming (Black/Indigenous knowledge); bringing together two forms of knowledge that have often been dismissed in crafting public health response plans.

THEORY: CO-BECOMING

Space and place are the essence of geographic study. Space speaks to the geometric structure of a place, whereas place is a volumetric concept, imbuing space with meaning and value (Lefebvre, 1974). Oftentimes, space and place are described using static language, creating a false semblance of permanency; however, within the Yolŋu ethnocultural mosaic, place is seen as dynamic, where their ancestral homeland, Bawaka Country, is seen in constant evolution with the self (Country et al., 2016). There is an ingrained understanding that Bawaka Country is the home of many human, non-human, and more-than-human beings, Indigenous and non-Indigenous (Country et al., 2016). As the various beings coexist with one another in this space, the land plays a central role in stories and identities. These beings become who they are in part (if not entirely) because of Bakawa Country, and in turn, Bawaka Country becomes a place as these beings each individually and collectively give meaning to the space (Country et al., 2016). *Co-becoming* can thus be described as an active state of existing where "humans, more-than-humans and all that is tangible and non-tangible […] become together in an active, sentient, mutually caring and multidirectional manner" (Country et al., 2016). Co-becoming recognizes that relationships are in constant flux, and thus, beings and their way of being fluctuate in relation to one another. Co-becoming is hence not a singular process with an end but a permanent state of being where "state of being" is characterized by nonstop motion (Country et al., 2016). This implies a state of perpetual emergence and evolution where every being forms and becomes in relationship to other beings and the land (Country et al., 2016).

Co-becoming is a form of Indigenous knowledge produced through the knowledge systems, practices, beliefs, and innovations developed over generations by the Yolŋu. As a form of knowledge production, co-becoming encompasses the wisdom, cultural expressions, and understanding of the natural environment that the people, culture, community, society, and nation have accumulated and passed down from one generation to another. This is key as Indigenous knowledge systems are built upon the experiences of earlier generations, following which they are then consistently tested by each following generation, thereby becoming deeply rooted in the specific local context, including the land, resources, and ecosystems that the community have inhabited since time immemorial (Hewson, 2014).

Ideas and frameworks similar to co-becoming have been proposed in various academic disciplines. In political geography, for example, Jones (2009) reconceptualizes the understanding of space, place, and regionality by looking beyond the physical elements that define the limits of space (Jones, 2009). He argues that space no longer corresponds to rigid boundaries, but thanks to networks and relationships, space is able to stretch and flow, combining with in situ spatial elements to form place; thereby creating spaces and places that exist beyond the limits of territory and geography (Jones, 2009). In economic geography, Boggs and Rantisi (2003) talk about how the social interactions (*relationships*) between elements that influence the economy shape the geography of economic performance (Boggs & Rantisi, 2003). Their paper shows that establishing certain socioeconomic relationships can generate similar landscapes of economic performance, arguing that "economic actions cannot be explained away or subsumed under the logic of capital" (Boggs & Rantisi, 2003). In environmental science, Brown (2017) describes emergent strategy as a means of designing solutions to environmental issues in recognizing the continual state of flux and stream of "ever-mutating, emergent patterns" that have to be navigated for self, societal, and planet well-being (Brown, 2017). Other examples can be found in empirical sciences (Smolin, 2008), gender studies (Barad, 2018), linguistics (White, 1985), and ecology (Hatley, 2016). The particularity of co-becoming, as stemming from Bawaka Country, are threefold: (1) it is irreplicable, (2) it originates from an Indigenous knowledge, and (3) it centers Blackness as analytical.

The first distinction is the importance of irreplicability. Relationality in scientific disciplines is often studied from the perspective of replication, where a set way of doing or being is extended to other places with the goal of recreating desired results or universal laws. Contrary to this, co-becoming centers the uniqueness of multiple intertwining and interacting relationships, where the lessons from one setting cannot necessarily be replicated elsewhere; they arise solely as a function of the land, the relationships with the land by the various beings that inhabit that land, and the relationships between the various beings on that land (Country et al., 2016). This produces results that are unique to a given place that can only exist in that very specific entwining of human, non-human, more-than-human, and land relationships.

The second distinction is that co-becoming derives from an Indigenous knowledge. Drawing on Indigenous knowledge(s) and knowledge production enables the interrogation of Eurocentric thought and science as the only true way of knowing and allows for exploration beyond the limits set out by conventional science (Country et al., 2016; Sinclaire et al., 2021). Mi'kmaw Elder Albert Marshall speaks to the importance of using *Etuaptmumk* (two-eyed seeing) as a guiding principle in transcultural, transdisciplinary or collaborative work (Sinclaire et al., 2021). One eye is imbued with the strengths of Indigenous knowledge, whereas the other eye is filled with the strengths of "Western" knowledge; thus, being able to see with two eyes means the ability to use multiple knowledge systems to see more clearly and advance in a way that benefits all (Sinclaire et al., 2021).

The third distinction of co-becoming is Black knowledge. Distinct from Indigenous knowledge, Black knowledge is shaped by the unique circumstances of what it means to be Black in each society, including the legacies of slavery, colonization, segregation, and ongoing systemic racism. Black knowledges thus center resilience born from necessity, creativity despite adversity, and discourse to build relationships (Du Bois & Wortham, 2011; El-Ghadban & Saint-Éloi, 2021). By employing Black knowledge, we can reframe our understanding of a place as inherently Black, rather than perceiving Blackness as "other" or divergent. In this context, rather than comparing Black peoples to their non-Black counterparts, their blackness becomes analytical; a tool through which the (Black) knowledge produced through this research via (Black) peoples in a (Black) place is able to be elevated to being independently relevant, instead of existing as secondary to Eurocentric modes of thought and practice (Lewis, 2018).

We are grateful that the Yolŋu have agreed to share this knowledge with the world and have it inform the work we do in interacting with spaces and places (Country et al., 2016).

CO-BECOMING AND COVID-19

From a co-becoming perspective, the idea of "beings" goes beyond referring only to humanity and includes both non-human and more-than-human entities. This means that a virus can become a part of a landscape and can influence our understanding of place by both modifying the space, and impacting relationships between beings, the land, and itself (the virus).

COVID-19 is an enveloped positive-sense single-stranded ribonucleic acid virus that belongs to the coronaviridae family of the order nidovirales, an order of viruses with both animal and human hosts (Brugère-Picoux et al., 2021). The disease can be transmitted from human to animal, and in return, from animal to human. The Danish authorities, for example, announced that a mutant 453F COVID-19 virus strain had appeared in mink farms and crossed the species barrier, infecting 12 people (Brugère-Picoux et al., 2021). The fluidity of COVID-19 between human and animal hosts has changed the relationship between human and animal beings that manifest in questions around urbanization practices and human encroachment on natural habitats (Borzée et al., 2020; Mishra & Arora, 2021; Rastandeh & Jarchow, 2020); this demonstrates a link between changing relationships leading to changing perceptions of space and place.

COVID-19 was first identified in China, a country with an estimated 92% Han Chinese population (Government of China, 2019). Outside of China, the Han are often racialized as "Chinese," "Asian," or "East Asian" depending on the country (Lee et al., 2017; Li & Nicholson, 2021). As the disease spread around the world, countries where the Han, or those who had features that could be construed as Han, constituted a visible minority that saw an increase in instances of discrimination, racism, and societal exclusion, which led to cases of verbal and physical acts of violence (Lee et al., 2017; Li & Nicholson, 2021). This change in relationships between human beings of various identities created, exacerbated, or brought to light social tensions that had hitherto largely been rendered invisible in the name of social integration and cohesion (Li & Nicholson, 2021). These new relationships between the "Chinese", "Asian," or "East Asian" racialized identities and others led to a shift in the perception of place, where Chinatowns, Chinese restaurants, and other places that are largely associated with Han racialized identity were either seen as breeding grounds of disease to be avoided, or spaces of retaliation to harm communities in light of the pandemic (Tessler et al., 2020).

These are but two examples of how COVID-19 has changed relationships between beings, and how these new relationships have shifted the perceptions, understandings, and sometimes, the physicalities of a place. The virus has been known to exist for over 4 years; various sociopolitical responses have impacted, reformed, and reshaped the lives of both human and non-human beings. The short- and long-term implications are still being studied and brought to light with very real consequences on the place and relationships to beings in a place. To summarize, places are co-becoming with COVID-19 in both permanent and temporary ways.

A large body of literature examines the unique character of individual places in recognition that "where we gain complex understanding, it is restricted to particular localities" (Tuan, 1975). Additional noteworthy sources include Appadurai (2003), Crewe and Lowe (1995), Kitchin (1998), Sayer (1991), and Urry (1995). In the context of disease and health, a place-based evaluation of the COVID-19 pandemic allows for a more nuanced comprehension of vulnerability and resilience, moving beyond biological factors and raising questions around the available health-care infrastructure, access to good health care, the sociocultural perception(s) of disease and the place-specific racial determinants of health and wellbeing.

Integrating the varied elements that make up a place into creating a localized understanding of a disease can lead to more targeted public policies that shift as beings co-become with the addition of another (disease/viral) entity. COVID-19 has reframed global narratives on power (Sharun & Dhama, 2021), highlighted flaws in urban planning and design (Sharifi & Khavarian-Garmsir, 2020), illuminated discussions around climate change mitigation (Manzanedo & Manning, 2020), fueled changes in animal migratory patterns (Altizer et al., 2011), and more. Each of these examples can be linked to an approach that conceptualizes health as a spectrum ranging between good and bad, with good health residing in decisions built around the complex relationships that exist within a place (Renaud & Bouchard, 1994).

STUDY LOCATION

Malawi is a small land-locked country located in south-eastern Africa bordering Mozambique, Zambia, and Tanzania. The country has a population of 20 million people, most of whom are divided between the 10 major ethnic groups, with the Chewa, the Lomwe, and the Yao being the largest (National Statistical Office, 2019). The landmass is around 118,000 km^2 divided into three regions (northern, central, and southern) and 28 administrative districts. A former British colony, the World Bank reports that Malawi has one of the world's lowest gross domestic products, and it is listed as one of the 10 poorest countries by the United Nations (Oluwole, 2021). The economy is largely agricultural with an estimated 80%–85% of the population living in rural areas (Msyamboza et al., 2012). The functional literacy rate sits at 62% with wide regional variations, and discrepancies between the sexes; the male literacy rate being approximately 70% and the female rate being 55% (UNESCO, 2016).

Malawi provides an interesting backdrop against which to explore COVID-19 through a lens of co-becoming. As Tengatenga et al. (2021) note, in Malawian society, “the social, cultural, and religious are intertwined such that it is difficult to draw the line between these three spheres” (Tengatenga et al., 2021). This reflects a society in which disease, health care, and public health cannot be approached in a silo but have to be understood within the social, cultural, and religious contexts that define and shape the realities faced by those living in Malawi. The onset of the COVID-19 pandemic thus presents and represents more than the simple physicality of catching a disease; it also impacted the natural, supernatural, and spiritual realms whereby health belongs not just to the individual but the community at large (Tengatenga et al., 2021). Accordingly, it is not surprising that efforts at following the global pandemic response model in Malawi were met with strong resistance and protests.

In centering Malawian lived experiences with the COVID-19 pandemic (Black/African knowledge), we explore the possibility of gaining different perspectives of COVID-19, and consequently, different, new, or innovative directives and policies that can render societies more resilient in the face of new disease outbreak.

MATERIALS AND METHODS

Given that this project seeks to weave multiple forms of knowledge, qualitative methodology was determined to be the most appropriate because it allows for a complex, multicomponent intervention geared toward exploration and discovery (Busetto et al., 2020). A case study approach was chosen to narrow the scope and increase the feasibility of the research, providing tangible outcomes.

Data were collected through a series of in-depth semi-structured interviews ($n = 41$) between September and December 2021 and unstructured interviews ($n = 2$) in June 2022. Semi-structured interviews allow for a methodical inquiry into the thoughts, feelings, and beliefs that interviewees hold while also giving them the flexibility and the power to change the direction of the conversation and allow for the evolution of other lines of questioning (DeJonckheere & Vaughn, 2019). This method of inquiry lent itself well to this research because it allowed for COVID-19 to be explored through the worldview and perspectives of each key informant who were the knowledge-holders in this instance. The interview guide used was field tested for cultural compatibility by the lead researcher at a distance, and locally situated Malawian research assistants ($n = 4$) before being implemented. The interview guide provided the broad topics we wished to touch upon (COVID-19 in Malawi, COVID-19 and place, responses to COVID-19, and community networks) and approached them through clear open-ended questions and probes. The interview format was chosen to support the creation of an ethical space by redistributing the power in the interviewer–interviewee relationship to allow for the person being interviewed to steer the discussion as they saw fit (Dragon Smith, 2020). Unstructured interviews were conducted by the lead researcher in person and used for follow-up, to fill in any context gaps identified in reviewing initial results.

Kumar (1989) explains that key informant interviews are most appropriate when doing research in low-income countries for generating information “when understanding of the underlying motivations [,beliefs] and attitudes of a target population is required” (Kumar, 1989). Potential participants were identified via a referral process through a community-based partner organization, Soils, Food, and Healthy Communities (SFHC) in Ekwendeni, Mzimba, Malawi. To obtain diverse experiences and perspectives, an effort was made to maximize participant variability in terms of ethnicity, age, gender, socioeconomic status, and employment and community role. Participants included religious leaders, teachers, students, health-care workers, traditional healers, fishermen, market sellers, community leaders, and farmers. The interviews were conducted in English ($n = 22$) and Chitumbuka/Chichewa ($n = 21$). We stopped at 41 semi-structured interviews because many of the same ideas were being repeated and we judged that theoretical saturation had been reached (Marshall et al., 2013); and we conducted two unstructured interviews after which we felt that we had been able to successfully fill in context-gaps that were identified during data analysis.

Before participation, prospective key informants were read a consent form describing the objectives of the study and asked to confirm their willingness to take part. Written consent was procured where possible, and verbal consent was obtained as an alternative for participants with limited literacy. With permission, interviews were digitally recorded and later transcribed and translated to English, as needed. COVID-19 protocols were followed for all in-person interviews. Analysis was conducted through ATLAS.ti using the framework method (Gale et al., 2013). Interview transcripts were evaluated for content, seeking emergent recurring themes through the words of the interviewees. An open code was applied to each sentence describing what the lead researcher determined as important in each interview. Comparisons and contrasts were formed between the highlighted codes for the different interviewees, with recoding as new themes emerged.

RESULTS AND DISCUSSION

Given that co-becoming centers the relationships between the land, humans, more-than-human and non-human entities, the results have been largely divided into three thematic categories that follow this ontology; we look at how COVID-19 impacts the relationship with nature, with place and each other in Malawi. This section is structured like a series of stories, reflecting the format in which Black, African, and Indigenous knowledges are often transmitted from generation to generation and built upon since time immemorial. For the purposes of privacy, pseudonyms were used in the recordings and written text.

Relationship with nature

In exploring how COVID-19 has impacted the relationship that Malawians have with nature, a key informant who worked for the Ministry of Agriculture was asked to describe what the environment/nature meant to Malawians *before* the COVID-19 pandemic. According to Gwe, Malawians have a complex relationship with nature where there is care, but given the levels of poverty in the country, the relationship has mostly become transactional. Most people depend on the environment for their survival.

> They [your average Malawian] know the pros and cons of the importance of caring for the environment. But now, what is challenging is… I can say the poverty level. Most of the people depend on the environment to survive, as I've said, with the charcoal burning, […] the mushroom production […] to sell on the market… These are natural foods. Yeah. So they care about the environment, but they're forced to destroy the environment to be able to eat. (Gwe)

This relationship is further demonstrated through an interview with Fil, a park ranger. He explains how the government of Malawi received Nyika National Park from the British and made it into a forest reserve but could not manage it, so made it into a national park for tourism purposes. When asked if they receive a lot of visitors from Malawi, he responded:

> The locals do not visit, but they are proud it is here. However, there is a serious poaching problem in the park as people [locals] only come in to steal resources. (Fil)

As COVID-19 hit Malawi, there were significant economic consequences that exacerbated the transactional element of the relationship with nature.

> A lot of trees are being wasted just to burn charcoal. So, that is a source of income. You cannot just go there and say stop burning it. People will say "Give me money, what am I going to eat?" And as you know, Malawi is a developing country, it is also developing very fast. So a lot of these environmental issues are happening. (Gwe)

> There has been no foreign money coming in [during COVID-19] and villagers have been sneaking into the park more to hunt animals and sell their body parts. (Fil)

We thus see nature, in part, being used as a tool for survival, and during a pandemic with economic consequences, the reliance on nature to survive increased to the detriment of the environment. When we asked the other key informants, none of whom work in environmental protection or conservation, to describe COVID-19 from their perspective, many reported that COVID-19 is spread through the air:

> I heard that COVID-19 is a disease that moves in the air and it can attack anyone. (Gulu)

> COVID-19 starts mainly from the air that we breathe through the parts that produce fluids like the mouth but also the nose. (Meta)

> This is because it [COVID-19] is due to the wind/air. (Zinny)

> The way I heard, I hear that it is air or wind […] because it [COVID-19] is blown by the air or wind. (Ace)

In associating COVID-19 with the very air that we breathe, nature immediately becomes perceived as a place of harm or holds connotations of harm. Flora, who works as a traditional healer speaks to her efforts to keep her family safe from COVID-19 in their home. In the following quote, Flora talks about the fear she has of leaving the doors and windows open during the night, despite the desire for fresh air.

> But also the door, windows in the bedrooms and the door here, I was opening [them] during the night, but I wanted that the air should do what? Should be passing.[1] (Flora)

Flora builds what she perceives to be a safe place for her family by shutting out the air, *the carrier of COVID-19*.

The co-becoming of COVID-19 and nature in Malawi is more nuanced than transactional or a simple fear of the outdoors and the air. As much as nature can harm, nature can heal as well. Many of the ethnicities in Malawi have co-become with the environment for as far back as their collective histories have been told, and even after the introduction of British health care during the colonial era, many traditional health practices persist (Lwanda, 2005). Fil spoke of how the early Bantu peoples who moved to what is currently Malawi would turn water bodies into shrines, places of worship, to ask for rain in the event of famine, and healing in the event of disease. Some of these practices continue to today.

> People from Chisanga village come to the waterfall to pray for rains during the growing seasons and healing when someone is sick. They consider this place a shrine and say the spirits are strong here. (Fil)

Steaming was mentioned as a popular method used to not only purify the air and the lungs, but also as an act of prevention.

> In the rural areas, people have been steaming way before even the COVID-19 itself because when they come across a certain flu, people were already resorting to steaming. They will take a blanket, they will take maybe some traditional medicine, they would rub themselves [with the medicine] there inside the blanket, [and turn] to the pot where [they are] boiling the leaves of […] mamani, which is today known as steaming. (Ric)

Steaming requires that the user go out into nature and find the right plant, before then beginning the process, thereby making nature a place of medicine, prevention, and healing, as much as a place of risk and danger. In this context, the blue gum tree (*Eucalyptus globulus*) was commonly reported as being an important medicine against COVID-19, with many respondents mentioning boiling, steaming, and ingesting the leaves.

> There are people taking blue gum leaves and lemons, yeah, saying those things are working. (Son)

The trust in the blue gum tree's ability to heal has been so strong that many of the trees have been completely stripped of their leaves and left barren, impacting not only the tree and any ecosystems that the tree is a part of but also harming social cohesion as others who seek leaves for steaming struggle to find them.

Interestingly enough, the blue gum tree is native to Tasmania and southeastern Australia but has naturalized in Malawi and other areas of Southern and Eastern Africa (Morgan, 2021). The British brought the tree over to countries they had colonized, where there was a significant loss of local tree cover (Morgan, 2021). The blue gum tree came to symbolize hope for a colonial future for the British settlers (Morgan, 2021), but through the crafts of traditional healers, the blue gum tree was adopted into Malawian medicinal traditions, thereby co-becoming with Malawians as it nativised to the land.

We can thus draw parallels between COVID-19 and the blue gum tree as both entities enter the landscape in a similar fashion, coming in from foreign lands and multiplying in the locality. As the disease becomes endemic to the environment, it cements the transactional value of nature where people harm the environment to be able to feed themselves; and modifies existing relationships with nature to encompass a new sense of danger: the idea that disease is in the air. Cultural, traditional, and local knowledge is then used to recreate safety and healing through the environment, thus allowing the environment to co-become with COVID-19 and continue to co-become with Malawians.

Relationship with place

Co-becoming fundamentally describes the dynamic ever-changing relationships that people have with places and all that live in those places. Ric, a university student, shares how COVID-19 created a shift in the understanding of place. Typically, people come together in bars to watch sports, but as a means of slowing the spread of COVID-19, public health messaging asked people to stay home and avoid crowded areas:

> Because how do you tell a person “don't visit crowded areas”; yet there is a very big game. Maybe since I'm a soccer fan, […] and I don't have a TV to watch, I will be forced to move out of the house to go and watch. (Ric)

Ric then highlights how “home” is not adapted for the change of relationship to place necessary in supporting the transition from communal to individual as imposed to COVID-19 measures. In his example, many people do not have TVs in their home, and so they come together in bars when there is a soccer game; however, if people are being asked to stay home, then the home needs to change to support the cultural love of soccer in noncrowded spaces:

> …but if the government made some things affordable, it means most of the people have an access to them. And they will remain in the houses because they have them. But the more things get expensive, the more people will move out of their houses, they'll go to crowded areas. (Ric)

At a larger scale, COVID-19 has imparted a question of safety on the way urban versus rural spaces are understood and perceived. For example, several respondents indicated that urban areas were more dangerous because they are more crowded and disease can more easily spread. According to Dwe:

> [Urban areas are more dangerous because] in the urban [area], there are more [people] than in the community[village], like in rural areas. […] In the community [rural areas], they are scattered and in urban [areas], they are in compact areas. (Dwe)

The belief that rural areas are safer than urban spaces is not held by all, as is illustrated in a quote by Rus:

> I think the rural [is more dangerous] cause the measures have not spread much into the rural areas, but then the urban people, I think they have an advantage because they're more […] exposed to the news [and] the internet, [so] I think they know much about COVID. (Rus)

As COVID-19 settles on the landscape, places in Malawi were further seen with a critical eye on safety based around proximity to other people (adaptation to social distancing), and the ability to support habitual, institutional, and structural changes (adaptation to other COVID-19 measures). Gwe gave a government perspective:

> Because if we're meeting farmers in groups, it was restricted to a maximum of 50 farmers [at a time], but a maximum of 50 farmers [requires a space of] 100 metres by 100 metres so that we [can] observe social distancing. And then, you know, if we [have a lack of] resources, you are restricted not to convene a meeting where there are no buckets for water, there's no masks… you cannot convene a meeting when you don't have masks to provide to all those people. (Gwe)

Through public health communication, all the interviewees spoke to the importance of social distancing, but expressed the difficulty of doing so because of the communal lifestyle that has been ingrained across the country. Throughout this research, our observations noted a communal approach to everyday activities: women would wash clothes together by the river and share stories; men would convene around street food and eat together; people were often walking and working in pairs or groups. It was rare to see someone isolated, standing or eating alone. Even painters on the beach of Lake Malawi would approach tourists together to sell their art.

We also see place become a key component in the government strategy against COVID-19. Government messaging took place at multiple geographic scales to ensure that people understood the urgency of adaptation.

> Each and every day there were reports [by the National COVID-19 Committee] at the local level, national level, and the district level. You could hear people saying "Oh in Mzuzu today, we had so many cases today." So people were saying "oh it is here, let us start to change." (Gwe)

Another element of the changing relationship with place is captured through a statement that Fil offered:

> Malawians don't travel. (Fil)

Fil explained that Malawians rarely leave their home community and that there is stigma in being nomadic. This demonstrates a very place-based culture where once someone has settled; it is inconceivable to move. The impacts have been twofold, where the lack of movement most likely contributed to a lower infection rate; however, the stigma of movement also increased. Since COVID-19 came to countries through travelers, incidents of violence against those who moved between places were recorded.

While some countries took a COVID-zero approach where the goal was to eradicate the virus completely from the population, and others centered individual freedoms with the desire of living with the virus, the focus in Malawi has been on sociocultural change through public education. Malawi does not have the resources that are available to many medium- and high-income nations where COVID-zero or an approach dependent on a fully functioning health-care system were feasible. Instead, the country sought to raise awareness on the dangers of COVID-19 and how to avoid catching it.

As can be surmised from the interview responses shared above, this approach has ultimately led to a change in how certain places are seen, understood and assessed in regard to danger, risk, and likelihood of catching COVID-19, which has, in turn, led to lifestyle changes, some of which may be permanent. Malawi focused their efforts on reshaping and recreating the meaning of place to protect communities. We listened to key informants debate the safety of rural versus urban spaces, risky cultural practices that either need to change permanently or temporarily be stopped, and places that induce fear, versus those that inspire healing. Place in Malawi, thus, co-becomes with COVID-19 as people's relationships to places change through what they look for and need in a place because of COVID-19.

Relationship with each other

COVID-19, by virtue of the way the disease spreads, has influenced the relationships people have with one another because communal events, greeting habits and any interaction defined by a shared space or touch suddenly became dangerous. Unlike Malaria, which comes from mosquitos or cholera that comes from polluted water sources, COVID-19 is perceived as coming from other people. Preventative measures often feature maintaining distance from people, wearing protective face covering if you are interacting with anyone and keeping a small circle of friends and family that you see on a regular basis. This impedes social interactions to the point where Abu, a community leader and organizer states frankly:

> Not even a relative will visit me. (Abu)

During the interviews, several informants talked about how things have changed in the first 2 years of the pandemic. Son exemplifies this position:

> I would say life is not as normal as it was and as we have defined it to be. A lot of things have changed. (Son)

In digging further, it was evident that there was a feeling that these changes were permanent, that COVID-19 had changed the trajectory of Malawian life forever. Flora summarizes this sentiment:

> Mmmh, the way life was in the past compared to now, it has changed. The way we were, when we were born compared to the present time where we are now, I see that where we are going with life now, it has changed. (Flora)

When asked to speak to how culture has rendered people either more or less resilient to the disease, many participants spoke about how Malawi has a very communal culture where people come together quite a bit.

> Because for us, we are Africans […] we believe very much in communal life. (Ric)

People come together to watch sports, for weddings, for funerals, for rites of passage, and more. Malawi's nickname is the warm heart of Africa, and this is not due to the country's geographical placement (since it is much too south to be humanized into the heart position), nor is the country shaped like a heart. This nickname arose because the country is well-known for just how friendly and outgoing the people are (Allison, 2020). The advent of COVID-19 changes how this friendliness takes form and how people come (or do not come) together:

(1) According to village chiefs and heads:

> Since this disease came, I haven't seen people gathering as was the case before. We have stopped walking around. Everyone is just staying at his/her house. We are unable to meet each other in difficult times. (Zinny)

> People in my village, one way they protect themselves is when we have a funeral, I tell them the truth: “Colleagues, let us not follow our traditions/customs because there is a vicious pandemic during this period. When we come back from the graveyard, there will be no vigil here, we will do shaving and sweeping once and for all. Staying crowded in one place for a long time puts us in danger of contracting COVID-19.” So that is what people in my area here obey, no vigils. (Meta)

> How has it affected things? I fail to call people of my village so that we should meet, because I am also afraid that if we meet and sit together, are they not going to pass to me some COVID? Or am I not going to pass on the COVID to them? That's where I am afraid so in that way development can not progress. (Ama)

(2) And according to community members:

> So there has been an awareness to say, despite prayer being a communal thing, it's better for people to be in their homes. (Ric—university student)

> This disease has really affected us. When it comes to farming, we did not farm well because in the village we are used to helping each other at the field, and for you to call someone to help you. [Now] you fear how you will work [together] on the field (Moana—farmer)

Despite the communal attitudes expressed pre-COVID-19, the limited capacity of the government of Malawi to create systemic change across the country, and the widespread recognition that their government can only do so much, has led to a general societal push for personal responsibility in managing the disease.

> It spreads because we do not take care of ourselves. We ignore wearing masks, we do not want to wash our hands and we do not want to social distance. (Moana)

The “personal responsibility” narrative has inspired feelings of shame amongst folk who have gotten COVID-19, as they see it as being their fault or due to some moral failing:

> Yes, I've known a number of priests. I will not mention names, when one got sick, he said “don't tell anybody.” And he was really in isolation and would remain quiet. (Rue)

While it is too early to tell what social changes will be permanent and which will be temporary, COVID-19 is having very real impacts in the way people in Malawi relate to one another. This can be seen in new customs and expectations emerging:

> Before you sit with the guest, you're supposed to have preventive measures so that we prevent this infection, we should protect ourselves. (Ama)

Ama explains that it is important for a good host to be able to offer their guests a place to wash their hands and masks, thereby implying that those who do not do so are failing in their duty as a host. Thus, we are witnessing the co-becoming of a human society after the addition of a new non-human member: COVID-19.

Through a lens of co-becoming, we become witness to active shifts in how people relate to each other in a given society. In Malawi, we see communities change to become more resilient, casting away practices or habits that made them vulnerable to COVID-19. While it is unknown which changes are permanent and which are temporary, there is a general need to re-explore what was once known to reknow it. Village chiefs must find new ways of bringing their people together, community members have to adapt to new ways of interacting with one another, and society needs to redefine itself to hold a new collective identity. These are direct impacts of COVID-19 that are not captured in a “Western” framework when evaluating public health but are important to address as relationships may make communities more vulnerable, or more resilient, to disease.

Everything is connected

It is important to note that for simplicity's sake, the results were divided into three broad areas of relationship to nature, place and each other; however, as is espoused in a co-becoming framework, everything is connected. Moana, for example, mentioned how farmers feel scared of calling someone over to help them in their work (quote previously cited). This fear changes their relationship with their fellow farmer, which in turn impacts their relationship with work, which impacts their relationship to the land that they till, which in turn impacts both how they view place and nature.

CONCLUSION

As a form of knowledge production and framing, co-becoming enables a new look at the relationship between place and space, allowing the relationship to take on new meaning as more entities are introduced into the dynamic and are credited with their part in shaping our realities, just as we shape their realities. With the addition of COVID-19 to the landscape, co-becoming offers an avenue from which we can analyze the effects that the disease has had on the land and those who inhabit it. The results of this study reveal some of the changing relationships with nature, place, and community that Malawi experienced from the start of the COVID-19 pandemic.

Through a lens of co-becoming, we learn that the transactional relationship that many Malawians have with nature, where nature's inherent value is brushed aside for economic gain, was intensified as the economic fall-out from the pandemic as the pandemic response impacted people's ability to feed themselves and their families. Furthermore, COVID-19 inspired a fear of nature as people interpreted the disease as being found in the air. This fear changed the way people related with nature, where people would try to minimize the circulation of fresh air in their homes and avoid outdoor spaces for fear of catching COVID-19 from the air. Conversely, nature was also seen as a source of prevention and healing with traditional practices, such as steaming, being implemented to mitigate illness.

Co-becoming enables us to see the influence that COVID-19 has had on peoples' perceptions of different places. For example, movement and nomadic lifestyles, already stigmatized in Malawi, became more so as COVID-19 came to be known as a disease that comes in with those who travel, and people became even less likely to leave their communities. Furthermore, COVID-19 became a part of how people evaluated places. Some people, for example, started seeing urban spaces as safer because people were more aware and educated on COVID-19, whereas others interpreted rural spaces to be safer because the number of people were fewer and far between. This allows us to recognize that people navigated spaces in Malawi with COVID-19 in mind to minimize the risk of exposure.

COVID-19 has also had consequences for Malawi's communal culture. Through a co-becoming framework, we start to notice changing relationships where customs and cultural practices were being adapted so that people would be able to spend less time together. Community leaders expressed fear in interacting with their own communities for fear of catching or spreading COVID-19; and farmers spoke of increased difficulty at work because they no longer felt safe in relying on their neighbor for help. There were calls for individual responsibility which, although empowering, had the unintended consequences of creating a feeling of moral failing should one catch the disease, leading to them feeling like an outcast/rejected by their own communities.

Being able to analyze COVID-19 through a lens of co-becoming reveals place-based impacts and threads that are not seen through conventional measures. The perspectives people hold on place, country, land, nature, more-than-human and non-human beings have been left out of the conversation, and thus out of planning and policy development. By using this Black/Indigenous knowledge, rather than seeing human beings as disconnected from more-than-human and non-human beings, and thus human futures as distinct from the futures of every other entity, we "significantly expand people's sense of what Earth futures are desirable and achievable" as is the hope of Bawaka Country in sharing this knowledge (Country et al., 2016).

Through challenging the relationships between place and people, and the merging of people as place, we have begun a conversation on what long COVID-19 ("not recovering [for] several weeks or months following the start of symptoms that were suggestive of covid, whether you were tested or not" [Nabavi, 2020]) looks like outside the human body, questioning what some of the permanent impacts of COVID-19 are on society. Co-becoming allows us to recognize that when we look for disease symptoms, we should not just be looking at the way the symptoms manifest in human beings, but how they manifest in space, place, the land, and in non-human entities. We cannot succeed in healing people from COVID-19 without healing the relationships harmed as a result of COVID-19, and we cannot envision living with COVID-19 without understanding what that truly means at a relational level.

In this study, we have leveraged Black/Indigenous knowledge to delve into the transformative impact of COVID-19 on the perception and nature of place. Employing a case study approach, we have embarked on an exploration of the COVID-19 pandemic within the context of Malawi, drawing from the rich worldviews of its inhabitants, which embody Black/African knowledge. Our investigative framework, grounded in co-becoming, has allowed us to unveil the profound alterations wrought by the pandemic, both on the conceptualization of place and the very essence of places themselves. Missuz, who works in health care, explained it best:

> But generally, we are adapting to it because it is within us. (Missuz)

POLICY IMPACT AND RECOMMENDATIONS

The main objective of this research is to demonstrate the importance of integrating multiple forms of knowledge production in designing public health policy and procedures when responding to new disease outbreaks. Using Co-becoming (Indigenous/Black knowledge) to explore and frame Malawian worldviews (African/Black knowledge) regarding the COVID-19 pandemic, we recommend the following:

1. Incorporate Indigenous and local knowledge: Recognize the importance of Indigenous and local knowledge systems in understanding and responding to the impacts of disease. Include Indigenous and local communities in decision making processes and policy development, ensuring their perspectives and experiences are valued and integrated into strategies.
2. Build context-specific strategies: Strategies for managing a new disease outbreak should be tailored to the specific cultural, social, and environmental contexts of each region. Avoid imposing a one-size-fits-all approach and instead consider the unique needs, values, and practices of communities when developing and implementing public health measures.
3. Devise community-based solutions: Encourage the development of solutions that bring people together in community with one another, rather than center their individual needs and wants. By fostering collaborative efforts and empowering local communities to take responsibility for their communal health, we can actively prevent the tearing of the social fabric that we witnessed across the world during the COVID-19 pandemic.
4. Seek a holistic understanding of impacts: Expand the understanding of the impacts of disease beyond human health to encompass the effects on space, place, land, and non-human entities. It is important to develop policies that consider the interconnectedness of human and non-human beings and aim to protect and restore these relationships.
5. Emphasize long-term resilience: Foster resilience by recognizing that any new disease may become endemic and incorporating it into the overall framework of public health management. Encourage the development of adaptive strategies that enable communities to live with the virus while maintaining their cultural practices, social connections, and well-being.
6. Ensure inclusive and participatory governance: Ensure that governance structures are inclusive and participatory, allowing for the meaningful participation of racialised and marginalized groups, Indigenous communities, and local stakeholders in decision making processes. Incorporate diverse perspectives and expertize in policy development and implementation.

7. Promote education and awareness: Disseminate accurate and culturally appropriate information to empower individuals and communities to make informed decisions regarding their personal and collective responses to new disease outbreaks. It is important to remain transparent and as guidelines change, explain not only the change but the reasoning for the change and the implications of not changing so that people can understand the reasoning and follow along.
8. Facilitate interdisciplinary approaches: Encourage interdisciplinary approaches to studying the impacts of a disease, acknowledging the complex relationships between humans, nature, and place. Foster collaborations between different disciplines, including Black, Indigenous, and scientific knowledge, to gain a comprehensive understanding of the challenges and opportunities presented by the epidemic/pandemic.
9. Embrace knowledge exchange and learning: Facilitate knowledge exchange and learning between different regions and communities, recognizing the valuable lessons that can be learned from diverse approaches to managing new diseases. Encourage the sharing of best practices, experiences, and strategies to build resilience and improve future responses to public health crises.

STUDY LIMITATIONS

There are limitations to this study. Although data collection was led by a Malawian team on the ground, the results were interpreted by a Canadian researcher (the lead author), and so there are cultural elements to the understanding of disease and health that may have been missed that should be explored. Efforts were made to mitigate this blind spot through having discussions and sharing initial findings with our community partner in Malawi to confirm the accuracy of our interpretations. This research took place between September 2021 and June 2022. Since then, COVID-19 conditions in Malawi may have changed, and perspectives and practices may have evolved.

AUTHOR CONTRIBUTIONS

Chúk Odenigbo, Paul Mkandawire, and Eric Crighton contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Chúk Odenigbo, and the first draft of the manuscript was written by Chúk Odenigbo. All authors commented on previous versions of the manuscript and all authors read and approved the final manuscript.

ACKNOWLEDGMENTS

The authors would like to acknowledge the hard work of Esther Lupafya and the rest of the team at SFHC for helping coordinate the research work on the ground in Malawi; Gladson Chirwa, David Banda, Lizzie Shumba, and Laifolo Dakishoni for conducting many of the interviews; and, each of the key informants for being so open in sharing their thoughts, opinions, and concerns that helped shape this paper. Thank you to Abhayjeet Singh Sachal who played an important role in data collection and transcription. The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article. This work was supported by Mitacs through the Mitacs Accelerate Programme (Grant Number IT19260).

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Due to ethical reasons and the promise of anonymity to the participants, we cannot share the data set; however, we can share tools used in the data collection such as the question guide. Please reach out to the lead author.

ETHICS STATEMENT

This project received approval from the Research Ethics Board at the University of Ottawa in Canada (application number: S-03-21-6554) and the National Committee on Research in the Social Sciences and Humanities at the National Commission for Science and Technology in Malawi (reference number: NCST/RTT/2/6).

ORCID

Chúk Odenigbo https://orcid.org/0000-0002-0145-902X

ENDNOTE

[1] Interpretation: *But also the door, the windows in the bedrooms and the door here, I was opening them during the night because I wanted the air to circulate*. (Flora)

REFERENCES

Allison, J. (2020). *The warm heart of Africa*. Peace Corps Writers.

Altizer, S., Bartel, R., & Han, B. A. (2011). Animal migration and infectious disease risk. *Science*, *331*(6015), 296–302.

Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, *395*(10228), 931–934.

Appadurai, A. (2003). The production of locality. In R. Fardon (Ed.), *Counterworks* (1st ed., pp. 208–229). Routledge.

Bambra, C. (2018). Placing health inequalities: Where you live can kill you. In V. A. Crooks, G. J. Andrews & J. Pearce (Eds.), *Routledge handbook of health geography* (pp. 28–36). Routledge Handbooks.

Barad, K. (2018). Posthumanist performativity: Toward an understanding of how matter comes to matter. In C. Åsberg & R. Braidotti (Eds.), *A feminist companion to the posthumanities* (pp. 223–239). Springer.

Boggs, J. S., & Rantisi, N. M. (2003). The 'relational turn' in economic geography. *Journal of Economic Geography*, *3*(2), 109–116.

Du Bois, W. E. B., & Wortham, R. A. (2011). *The sociological souls of black folk: Essays by W. E. B. Du Bois*. Lexington Books.

Borzée, A., McNeely, J., Magellan, K., Miller, J., Porter, L., Dutta, T., Kadinjappalli, K. P., Sharma, S., Shahabuddin, G., Aprilinayati, F., Ryan, G. E., Hughes, A., Abd Mutalib, A. H., Wahab, A., Bista, D., Chavanich, S. A., Chong, J. L., Gale, G. A., Ghaffari, H., … Zhang, L. (2020). COVID-19 highlights the need for more effective wildlife trade legislation. *Trends in Ecology & Evolution*, *35*(12), 1052–1055.

Brown, A. M. (2017). *Emergent strategy: Shaping change, changing worlds* (Vol. 1). AK Press.

Brugère-Picoux, J., Leroy, E., Rosolen, S., Angot, J.-L., & Buisson, Y. (2021). Rapport 21-11. Covid-19 et monde animal, d'une origine encore mystérieuse vers un futur toujours incertain. *Bulletin de l'Académie Nationale de Médecine*, *205*(8), 879–890.

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, *2*(1), 14. https://doi.org/10.1186/s42466-020-00059-z

Country, B., Wright, S., Suchet-Pearson, S., Lloyd, K., Burarrwanga, L., Ganambarr, R., Ganambarr-Stubbs, M., Ganambarr, B., Maymuru, D., & Sweeney, J. (2016). Co-becoming Bawaka. *Progress in Human Geography*, *40*(4), 455–475.

Crewe, L., & Lowe, M. (1995). Gap on the map? Towards a geography of consumption and identity. *Environment and Planning A: Economy and Space*, *27*, 1877–1898. https://doi.org/10.1068/a271877

Crooks, V. A., Andrews, G. J., & Pearce, J. (2018). *Routledge handbook of health geography*. Routledge.

Darko, I. N. (2009). *Ghanaian Indigenous health practices: The use of herbs*. Master of Arts, Ontario Institute for Studies in Education at the University of Toronto.

DeJonckheere, M., & Vaughn, L. M. (2019). Semistructured interviewing in primary care research: A balance of relationship and rigour. *Family Medicine and Community Health*, *7*(2), e000057.

Dragon Smith, C. (2020). *Creating ethical spaces: Opportunities to connect with land for life and learning in the NWT (the Jane Glassco Northern Fellowship)*. The Gordon Foundation. https://gordonfoundation.ca/resource/chloe-dragon-smith-policy-paper/?lang=fr

El-Ghadban, Y., & Saint-Éloi, R. (2021). *Les racistes n'ont jamais vu la mer*. Mémoire d'encrier.

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, *13*, 117.

Government of China. (2019). *Annual data*. National Bureau of Statistics of China. http://www.stats.gov.cn/english/Statisticaldata/AnnualData/

Güner, R., Hasanoğlu, İ., & Aktaş, F. (2020). COVID-19: Prevention and control measures in community. *Turkish Journal of Medical Sciences*, *50*(SI–1), 571–577.

Hatley, J. (2016). Robin Wall Kimmerer. Braiding sweetgrass: Indigenous wisdom, scientific knowledge and the teachings of plants. *Environmental Philosophy*, *13*(1), 143–145.

Hewson, M. G. (2014). *Embracing Indigenous knowledge in science and medical teaching*. Springer.

Johns Hopkins University. (2022). *COVID-19 map*. Johns Hopkins Coronavirus Resource Center. https://coronavirus.jhu.edu/map.html

Jones, M. (2009). Phase space: Geography, relational thinking, and beyond. *Progress in Human Geography*, *33*(4), 487–506.

Kitchin, R. (1998). 'Out of place', 'knowing one's place': Space, power and the exclusion of disabled people. *Disability & Society*, *13*(3), 343–356. https://doi.org/10.1080/09687599826678

Kumar, K. (1989). *Conducting key informant interviews in developing countries (13; A.I.D. program design and evaluation methodology report)*. Agency for International Development. https://pdf.usaid.gov/pdf_docs/PNAAX226.PDF

Lee, S. J., Park, E., & Wong, J.-H. S. (2017). Racialization, schooling, and becoming American: Asian American experiences. *Educational Studies*, *53*(5), 492–510.

Lefebvre, H. (1974). La production de l'espace. *L Homme et la société*, *31*(1), 15–32.

Lewis, J. S. (2018). Releasing a tradition. *The Cambridge Journal of Anthropology*, *36*(2), 21–33.

Li, Y., & Nicholson, H. L. (2021). When 'model minorities' become 'yellow peril'—Othering and the racialization of Asian Americans in the COVID-19 pandemic. *Sociology Compass*, *15*(2), e12849. https://doi.org/10.1111/soc4.12849

Lwanda, J. L. (2005). *Politics, culture and medicine in Malawi: Historical continuities and ruptures with special reference to HIV/AIDS*. Kachere Series.

Manzanedo, R. D., & Manning, P. (2020). COVID-19: Lessons for the climate change emergency. *Science of the Total Environment*, *742*, 140563.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research?: A review of qualitative interviews in is research. *Journal of Computer Information Systems*, *54*(1), 11–22.

Mirzaie, A., Halaji, M., Dehkordi, F. S., Ranjbar, R., & Noorbazargan, H. (2020). A narrative literature review on traditional medicine options for treatment of corona virus disease 2019 (COVID-19). *Complementary Therapies in Clinical Practice*, *40*, 101214.

Mishra, P., & Arora, N. K. (2021). Human impacts on natural habitats leading to Covid-19 pandemic. In R. C. Sobti, N. S. Dhalla, M. Watanabe, & A. Sobti (Eds.), *Delineating health and health system: Mechanistic insights into Covid 19 complications* (pp. 97–110). Springer.

Morgan, R. A. (2021). Fueling the colonial future. *Pacific Historical Review*, *90*(2), 183–210.

Msyamboza, K. P., Dzamalala, C., Mdokwe, C., Kamiza, S., Lemerani, M., Dzowela, T., & Kathyola, D. (2012). Burden of cancer in Malawi; common types, incidence and trends: National population-based cancer registry. *BMC Research Notes*, *5*(1), 149. https://doi.org/10.1186/1756-0500-5-149

Nabavi, N. (2020). Long Covid: How to define it and how to manage it. *BMJ*, *370*, m3489. https://doi.org/10.1136/bmj.m3489

National Statistical Office. (2019). *2018 Malawi population and housing*. Government of Malawi. https://malawi.unfpa.org/sites/default/files/resource-pdf/2018%20Malawi%20Population%20and%20Housing%20Census%20Main%20Report%20%281%29.pdf

Oluwole, V. (2021, May 21) *Mapped: The 25 poorest countries in the world*. Business Insider Africa. https://africa.businessinsider.com/local/markets/mapped-the-25-poorest-countries-in-the-world/f2tg0wr

Parmet, W. E., Burris, S., Gable, L., de Guia, S., Levin, D. E., & Terry, N. P. (2021). COVID-19: The promise and failure of law in an inequitable nation. *American Journal of Public Health*, *111*(1), 47–49.

Penchalaiah, K. (2013). *Ethnomedicine among the Yanadis of Andhra Pradesh, India: a tribal medical practices*. LAP Lambert Academic Publishing.

Pillai, S., Siddika, N., Hoque Apu, E., & Kabir, R. (2020). COVID-19: Situation of European countries so far. *Archives of Medical Research*, *51*(7), 723–725.

del Pozo, B., & Beletsky, L. (2020). No 'back to normal' after COVID-19 for our failed drug policies. *International Journal of Drug Policy*, *83*, 102901.

Rastandeh, A., & Jarchow, M. (2020). Urbanization and biodiversity loss in the post-COVID-19 era: Complex challenges and possible solutions. *Cities & Health*, *5*, 1–4.

Renaud, M., & Bouchard, L. (1994). Expliquer l'inexpliqué: l'environnement social comme facteur clé de la santé. *Interface*, *15*(2), 15–25.

Sayer, A. (1991). Behind the locality debate: Deconstructing geography's dualisms. *Environment and Planning A: Economy and Space*, *23*, 283–308. https://doi.org/10.1068/a230283

Sharifi, A., & Khavarian-Garmsir, A. R. (2020). The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management. *Science of the Total Environment*, *749*, 142391.

Sharun, K., & Dhama, K. (2021). COVID-19 vaccine diplomacy and equitable access to vaccines amid ongoing pandemic. *Archives of Medical Research*, *52*(7), 761–763.

Sinclaire, M., Schultz, A., Linton, J., & McGibbon, E. (2021). Etuaptmumk (Two-eyed seeing) and ethical space: Ways to disrupt health researchers' colonial attraction to a singular biomedical worldview. *Witness: The Canadian Journal of Critical Nursing Discourse*, *3*(1), 57–72.

Smolin, L. (2008, November 10). *Science and democracy*. TEDx. https://www.ted.com/talks/lee_smolin_science_and_democracy

Taylor, L. (2021). Covid-19: Investigation probes Bolsonaro's role in Brazil's failed pandemic response. *BMJ*, *373*, n1181.

Tengatenga, J., Tengatenga Duley, S. M., & Tengatenga, C. J. (2021). Zimitsani Moto: Understanding the Malawi COVID-19 response. *Laws*, *10*(2), 20.

Tessler, H., Choi, M., & Kao, G. (2020). The anxiety of being asian American: Hate crimes and negative biases during the COVID-19 pandemic. *American Journal of Criminal Justice*, *45*(4), 636–646.

Tillu, G., Chaturvedi, S., Chopra, A., & Patwardhan, B. (2020). Public health approach of ayurveda and yoga for COVID-19 prophylaxis. *The Journal of Alternative and Complementary Medicine*, *26*(5), 360–364.

Timmermans, S., & Haas, S. (2008). Towards a sociology of disease. *Sociology of Health & Illness*, *30*(5), 659–676.

Torri, M. C. (2012). Intercultural health practices: Towards an equal recognition between Indigenous medicine and biomedicine? A case study from Chile. *Health Care Analysis*, *20*(1), 31–49.

Tuan, Y.-F. (1975). Place: An experiential perspective. *Geographical Review*, *65*(2), 151–165.

Umeta Chali, B., Melaku, T., Berhanu, N., Mengistu, B., Milkessa, G., Mamo, G., Alemu, S., & Mulugeta, T. (2021). Traditional medicine practice in the context of COVID-19 pandemic: Community claim in Jimma Zone, Oromia, Ethiopia. *Infection and Drug Resistance*, *14*, 3773–3783.

UNESCO. (2016, November 27). *Malawi*. Institut de statistique de l'UNESCO. http://uis.unesco.org/fr/country/mw

Urry, J. (1995). *Consuming places* (1st ed.). Routledge.

Wear, A. (2008). Place, health, and disease: the *airs, waters, places* tradition in early modern England and North America. *Journal of Medieval and Early Modern Studies*, *38*(3), 443–465.

White, R. (1985). Thoughts on social relationships and language in Hominid evolution. *Journal of Social and Personal Relationships*, *2*(1), 95–115.

Wilson, K. (2003). Therapeutic landscapes and first nations peoples: An exploration of culture, health and place. *Health & Place*, *9*(2), 83–93.

Xu, H. D., & Basu, R. (2020). How the United States flunked the COVID-19 test: Some observations and several lessons. *The American Review of Public Administration*, *50*(6–7), 568–576.

AUTHOR BIOGRAPHIES

Chúk Odenigbo is a PhD candidate under the cosupervision of Dr. Eric Crighton and Dr. Paul Mkandawire, and the interim supervision of Dr. Sonia Wesche. His research focuses on the link between environment, culture, and public health. Chúk is passionate about the ways in which the environment impacts human health and the role of justice in our understanding of how our societies function. This passion manifests itself in his medical geography research where he seeks to build from several forms of knowledge to better understand the impacts of the environment (biophysical, sociocultural, socioeconomic, and sociopolitical) on the vulnerability/resilience of a community to disease.

Sonia Wesche is an Associate Professor in Environmental Studies, Geography and Indigenous Studies at the University of Ottawa. She works collaboratively with Indigenous communities in the Northwest Territories and Yukon, and more recently also in Nunavut, to better understand local- and regional-scale vulnerability and capacity to adapt to environmental change. Her interdisciplinary research is primarily community-based, and draws on multiple sources of information, with a focus on Indigenous knowledge and knowledge coproduction. She is particularly interested in links among environmental change, Indigenous land and resource use, food and water security, and health and well-being in Indigenous communities.

Paul Mkandawire teaches global human rights and social justice in the Institute of Interdisciplinary Studies. He also teaches in the Institute of African Studies and holds cross-appointment in the Department of Health Sciences. He is Director of the Institute of Interdisciplinary Studies. His research combines disciplinary perspectives from epidemiology, economics and medical geography, and uses both qualitative and quantitative approaches, to answer/ask questions about: (i) global/public health and human rights; (ii) political ecology and geographic spread of infectious diseases; (iii) current and historical responses to pandemic outbreaks; and (iv) science, politics and global health policy.

Eric Crighton is a Full Professor in the Department of Geography, Environment and Geomatics, Adjunct Scientist at the Institute for Clinical Evaluative Sciences (ICES) and Director of the Health and Environment Analysis Lab (HEALab). Dr. Crighton's research is broadly focused on better understanding environmental and geographic relationships to human health, and in particular children's health. Specific areas of interest include: the effects of environmental risk perceptions on stress and behavior; relationships between environmental and socioeconomic factors and disease; and, approaches to improving environmental health education.

How to cite this article: Odenigbo, C., Wesche, S., Mkandawire, P., & Crighton, E. (2024). “We are adapting to it because it is within us”: The co-becoming of COVID-19 in Malawi. *World Medical & Health Policy*, *16*, 295–315. https://doi.org/10.1002/wmh3.599

Received: 18 May 2023 | Revised: 26 November 2023 | Accepted: 4 December 2023

DOI: 10.1002/wmh3.602

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Using an intersectionality framework to assess gender inequities in food security: A case study from Uganda

Farzaneh Barak[1] | **Peace Musiimenta**[2] | **Hugo Melgar-Quiñonez**[1,3]

[1]Faculty of Agricultural and Environmental Sciences, School of Human Nutrition, McGill University, Montreal, Québec, Canada

[2]College of Humanities and Social Sciences, School of Women and Gender Studies, Makerere University, Kampala, Uganda

[3]Faculty of Agricultural and Environmental Sciences, Margaret A. Gilliam Institute for Global Food Security, McGill University, Montreal, Québec, Canada

Correspondence

Farzaneh Barak, Faculty of Agricultural and Environmental Sciences, School of Human Nutrition, McGill University, Ste-Anne-de-Bellevue, Montreal, QC, H9X 3V9, Canada.
Email: farzaneh.barak@mail.mcgill.ca

Funding information

Fonds de Recherche du Québec Société et Culture (FRQSC), Grant/Award Number: 277185

Abstract

Prior research in health equity, including food security, indicates that disadvantaged groups, such as women with limited resources, face many obstacles in achieving food security. One of the first of its kind to draw on intersectionality and the social determinants of health frameworks, this study identified and tested gender differences in experiencing food security inequities using nationally representative data from the Gallup World Poll, Uganda 2019 ($N = 951$). Binary logit models disaggregated by gender were estimated to identify gender differences in food security. Three points of intersection were categorized: individual characteristics (gender, age, region, marital status, household number of children and adults); available resources (education, income, employment, shelter, social support); and the socio-political context (community infrastructures, corruption within the business). Testing the moderation effect of gender with each variable (difference-in-difference) showed that although most variables correlated with a difference in experiencing food security by gender, only two—marital status, and social support—presented a statistically significant difference. Accounting for this moderation effect, the final model showed that lacking shelter and residing in Eastern Uganda decreased food security. More adults in the household, higher education, higher income, available social support, and satisfaction with community infrastructures enhanced the odds of food security. Results suggest that (a) conventional food security quantitative approaches may not suffice to model inequities when gender is a control variable rather than a foundation to explain inequities; and (b) gendered-centered analysis helps better identify disadvantaged groups and inform policies that target associated inequities.

KEYWORDS

food security, gender, inequity, intersectionality

Key points

- Using the social determinants of health framework while employing an intersectionality theoretical approach enhanced the identification of gender differences in experiencing food security inequities through new analytical approaches (i.e., difference-in-difference).
- Challenging the conventional analytical approaches that control for gender, results revealed layers of gender differences. Most previous studies narrowly focus on describing unequal food security outcomes by gender. Our study's diff-in-diff analysis revealed that the gender gap size differed significantly between levels of social support (social strata) and marital status (social identity), which is consistent with previous studies.
- This study provides evidence of the importance of including an intersectional lens in studying gender as a focal point in generating unequal experiences of food insecurity.
- Having shelter and being satisfied with everyday life, including infrastructure, air quality, water, healthcare, affordable housing, and education system are strong contributors to food security status, regardless of gender differences. Results highlight the importance of incorporating intermediary and structural determinants when studying food security equity and call for a more in-depth analysis of food security.

INTRODUCTION

Gender is one of the most studied variables associated with food security inequities. A *gender gap* when experiencing food insecurity results when men and women face disproportionate socioeconomic inequities (Broussard, 2019; Gebre et al., 2021). Equity refers to the “equal opportunity to be healthy [herein, food secure], for all population groups” (Braveman, 2003, p. 257) through equitable distribution of resources between more- and less-advantaged social groups.

Despite evidence that gender differences in food security exist in low-, middle-, and high-income countries (Broussard, 2019; Harris et al., 2021; Kassie et al., 2015; Sinclair et al., 2019; Sraboni et al., 2014; Wambogo et al., 2018), most studies on gender and food security have been conducted in low- and middle-income countries (LIMCs) in the context of agricultural settings. This is to be expected as most LIMC populations live in rural areas, where agricultural activities form their primary income source (Aryal et al., 2019; Gebre et al., 2021; Harris-Fry et al., 2020; Kassie et al., 2015; Lutomia et al., 2019; Sraboni et al., 2014).

Yet, few studies have assessed the relationship between food security and gender on a national or global scale, despite gender being a significant factor shaping variations in food security experiences. We were inspired by researchers who shifted from gender as a control variable to gender as a factor that helps illuminate gender differences and how they affect the complexities involved in food security dynamics (see, e.g., Abdi, 2018; Broussard, 2019; Sinclair et al., 2019; Smith et al., 2017; Wambogo et al., 2018).

Evidence shows that women are generally more food insecure than men. Broussard (2019) raises two arguments to this effect. First, there is a gender gap in mild to moderate food insecurity in most regions around the globe. Second, severe food insecurity is significantly different between men and women only in South-of-Sahara Africa (SSA) and South Asia (2.7% and 1.9% gender gap, respectively). Similarly, the 2022 report on the *State of Food Insecurity in the World* shows a growing gender gap worldwide in moderate or severe food insecurity from 2019 to 2021 reflecting the COVID-19 pandemic's disproportionate effect on women (Food and Agriculture Association [FAO] et al., 2002).

Although multiple definitions of food security exist, we adopted the FAO's (2002) definition: "food security exists when all people, at all times, have social, physical, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (p. 49). Research on food security consistently reveal that certain social positions/groups (e.g., gender, race, and class) have fewer resources and are, therefore, more disadvantaged when it comes to being food secure (Botreau & Cohen, 2020; Broussard, 2019; Gebre et al., 2021).

Gaps in access to social, human, and financial resources (e.g., education, information, training programs, and non-farm market) and gender norms are often considered important drivers of a higher probability of food insecurity in households headed by single, widowed, or divorced women. To illustrate, Aryal et al. (2019) report that Bhutan households headed by single, widowed, or divorced women are less likely to be food secure compared with households headed by men or households where there is a husband, but he is not physically present due to off-farm work.

These and similar situations lead to different food insecurity experiences beyond insufficient food to eat thus constituting a complex phenomenon encompassing sociocultural norms and structural determinants. Briones Alonso et al. (2018) argue that gender is a critical sociocultural determinant of food security along with family and decision-making power. Their review documents the direct and indirect impact of gender norms on women's food security at individual and household levels with examples including restricted mobility for traveling to the market, division of household labor, dietary practices, and intrahousehold food distribution.

In the broader institutional and political context, a review (between 1984 and 2018) of 124 countries in Asia, Africa, Europe, Latin America, and the Caribbean shows corruption, conflicts, military expenses, tensions related to religion and ethnicity, and poor quality of bureaucracy as the main political and institutional factors affecting food security (Abdullah et al., 2020). Other studies have likewise found that reducing corruption and promoting governance are positively correlated with food security (Helal et al., 2016; Nugroho et al., 2022; Olken & Pande, 2012; Sumaila et al., 2017; Uchendu & Abolarin, 2015).

Studies further indicate that well-known determinants of food insecurity include residing in rural areas, low education, low income, unemployment, age, and lack of social support (Broussard, 2019; FAO et al., 2022; Sinclair et al., 2019; Smith et al., 2017; Wambogo et al., 2018). Gender differences associated with such determinants can explain 23%–97% of the gender gap in food insecurity (Broussard, 2019). That said, most earlier studies reported the observed gender differences without examining their significance for food security. The latter is integral for providing evidence on whether these gender differences merit empirical and policy attention.

For example, Sinclair et al. (2019) report that rural men and women are more vulnerable to food insecurity in SSA and the Middle East and North Africa (MENA). In Latin America, in addition to rural residency, living in a small town for both men and women, and a large city's suburb for women only, is positively associated with food insecurity. Their results profile the different food security experiences by gender, residence area, and region. However, they do not further test the combined effect of (i.e., the intersection among) gender, residence area, and region. For instance, is the probability of experiencing food insecurity significantly different between a rural woman living in SSA and a woman living in a large city in Latin America or a man living in a small MENA town?

Intersecting gender with various vulnerabilities and barriers can exacerbate food insecurity experiences disproportionately between men and women. However, food security research has overlooked such differences and reported only the inequalities in the food security outcome without testing the statistical significance of these differences (Smith et al., 2017; Wambogo et al., 2018). To effectively direct policies and programs, an empirical analysis should identify and test not only a potential gender gap in outcomes but also model and test the significance of those gender differences for other relevant determinants.

Social determinants of health (SDH) Framework

In that spirit, we drew on the SDH framework, which posits that it is crucial to project the distinct difference between addressing determinants of health, or health inequities (Solar & Irwin, 2010). We were concerned with how gender intersects with other axes of inequity to shape men's and women's food insecurity experiences differently. The SDH framework accommodates the interactions between (a) the socioeconomic and political context and (b) a set of socioeconomic positions that stratify the population according to gender, race/ethnicity, income, and other determinants. These socioeconomic stratifiers reflect a person's position within social hierarchies (i.e., social strata). Each person is presumed to experience different privileges and vulnerabilities to health equity outcomes.

Intersectionality theoretical framework

Introduced and developed within Black feminist theory (Collins, 1990; Combahee River Collective, 1977; Crenshaw, 1989, 1991), intersectionality (i.e., the interconnected nature of social categorizations or positions such as race, gender, and class) is a theoretical framework used in public health to determine the combined effects of several social positions or social categories in generating individuals' unequal health experiences (Bowleg, 2012; Hancock, 2007). It allows for a multi-dimensional analysis of how the social-cultural context constructs those personal experiences at various socioeconomic and demographic intersections (Collins, 1990; Crenshaw, 1989).

Current intersectionality scholarship highlights how individual identities and social positions are occupied with processes of privilege and oppression in structural and institutional contexts to shape inequalities in health and well-being outcomes (Bauer, 2014). Intersectionality scholarship further emphasizes the non-additivity effects of social strata/positions and considers their joint and combined effects (Bowleg & Bauer, 2016; Bowleg, 2008, 2012; Dubrow, 2008; Hancock, 2007). Non-additive means not increasing when combined. To wit, intersectionality theory posits that studying “rich Asian men” is more informative than studying rich, Asian, and male individuals separately. The intersection of social positions is at the heart of this theory. “No social category or form of social inequality is more salient than another…. Social categories are not additive and thus cannot be ranked" (Bowleg, 2012, p. 1271). What happens when they intersect is of foremost interest.

Although most intersectionality research has been mainly qualitative, quantitative studies are emerging (see Bauer et al., 2021; Phillips et al., 2020). To account for intersectionality in the quantitative research methodology, a broad array of methods exists (Bauer & Scheim, 2019a) ranging from common techniques, such as logistic regression, to more advanced ones, including multilevel modeling, structural equation modeling, and decomposition (Bauer et al., 2021; Phillips et al., 2020). Researchers have advanced and are still developing methodological debates for intersectional statistical analysis (Bauer & Scheim, 2019a, 2019b; Evans et al., 2018, 2020; Harnois & Bastos, 2019; Merlo, 2018).

To date, the use of an intersectional approach in the food security literature is very limited. In a 2021 scoping review, only two papers out of 243 (0.8%) papers studying equity in agriculture, nutrition, and health applied an intersectional approach (Harris et al., 2021). Unfortunately, associated studies (i.e., Abera et al., 2019; Jha et al., 2009) do not focus on food security as the primary outcome, and no definition or explanation of intersectionality is provided.[1] Interdisciplinary quantitative researchers encounter further barriers to incorporating intersectionality (Bauer et al., 2021; Phillips et al., 2020). A recent systematic review on intersectionality in quantitative research highlighted three main areas for improvement: theory (including in-depth engagement with intersectionality core concepts), sampling and measurement methods, and analytical approaches (Bauer et al., 2021).

An emergent demand for incorporating intersectionality into food security research reflects both its perceived ability to better ensure inclusion and the presumed merit of pairing it with the SDH framework. With this appreciation, we aimed to address gendered predictors of food security inequities by (a) describing food security inequities guided by the SDH framework, (b) identifying gender gaps in experiencing food insecurity and (c) examining the intersections between each predictor of inequity with gender and testing their significance within the intersectionality theoretical framework. The intent was to transcend the boundaries of conventional gender disaggregated analysis and embrace an intersectionality framework that reveals the complex interplay of factors predicting food security inequities.

MATERIALS AND METHODS

Data source

Our study focused on Uganda and its 2019 nationally representative Gallup World Poll (GWP) data ($N = 951$; men = 454; women = 497), which are cross-national and use individuals as the unit of analysis (ages >15 years). The GWP survey is conducted annually in over 150 countries and utilizes self-reported data on personal experiences, aspirations, and opinions to analyze issues affecting individuals' lives (Gallup Inc., 2020). The GWP national survey comprises standardized questions comparable across countries. Region-specific questions are also included to track progress toward the United Nation's Sustainable Development Goals (SDGs). Researchers from multiple disciplines are studying food security determinants using GWP data (e.g., Broussard, 2019; Sinclair et al., 2019; Smith et al., 2017; Wambogo et al., 2018).

Study context

Ugandan data were collected using a stratified multiple-stage cluster design. Face-to-face household interviews were conducted in local languages (i.e., English, Ateso, Luganda, and

Runyankole). The GWP sample aimed to achieve national representativeness, encompassing most regions within the country. Virtually the entire Ugandan population was represented. Only a small fraction (less than 4%) of residents was excluded in the 2019 round due to security considerations (three North Eastern regions—Kotido, Moroto, and Nakapiripirit).[2]

Uganda has one of the highest prevalence of severe food insecurity in SSA (FAO et al., 2022; Wambogo et al., 2018). When monitoring the progress toward SDG2 (Zero Hunger), Uganda seems far from meeting this goal.[3] The *State of Food Insecurity in the World* report (FAO et al., 2022) indicates that Uganda's moderate and severe food insecurity rate (2019–2021) had increased from 63% (2014–2016) to 72.5% compared with SSA's average food security rate which increased from 50.7% to 61%.

Key determinants of food insecurity in Uganda are rooted in a complex set of underlying conditions at the individual, household, community, and system levels. At the individual and household levels, common food security determinants include low income, low education, lack of land or asset ownership, lack of access to clean water and hygiene, and lack of skills or access to technology to mitigate or manage risks related to environmental and climate shocks (Feed the Future, 2018; Mfitumukiza et al., 2020; Mukasa et al., 2020; Nabuuma et al., 2021; Semazzi & Kakungulu, 2020).

At the systems level, prolonged drought, declining soil fertility, and reduced land size are key drivers of household food insecurity, mainly affecting crop yields and agricultural productivity (Apanovich & Mazur, 2018; Feed the Future, 2018; Semazzi & Kakungulu, 2020; Twongyirwe et al., 2019). Although 70% of Ugandans are involved in subsistence agriculture—predominantly women residing in rural areas—the country is quickly urbanizing (United Nations Development Programme, Uganda, 2020). The Ugandan urban population is projected to exceed the rural population by 2060, especially due to rural-urban migration (World Bank, 2020). The total population will double between 2020 and 2060 despite existing challenges in delivering basic needs such as education, electricity, water, and sanitation (Uganda Bureau of Statistics, & ICF, 2018; World Bank, 2020).

An UNDP report analyzing the socioeconomic impact of COVID-19 shows that the pandemic and public health policies intended to limit contagion mostly affected the poorest people in rural and urban areas (UNDP Uganda, 2020). In particular, the informally employed and refugee women disproportionately experienced food insecurity suggesting that the pandemic and health policies have worsened the situation of already disadvantaged and vulnerable populations.

To elaborate, strict COVID lockdowns in March 2020 occurred post-planting and pre-harvest for maize, millet, and beans—the main crops in rural Uganda (Mahmud & Riley, 2021). The immediate impact was a significant (60%) drop in household non-farm income in Uganda at large, mostly due to loss of income at that time in Western Uganda's rural areas (Mahmud & Riley, 2021). Ugandan households responded to this income loss by lowering food expenditure for each adult member (40% reduction on average) with a high likelihood of missing at least one meal per day. In their investigation of Ugandan households' experiences since the lockdown, Kansiime et al. (2021) report worsening diet quality and food insecurity in both rural and urban areas.

Gender in Uganda

Uganda's progress with gender equality is slow with several glaring gaps, including pervasive and widely accepted early and forced marriages, especially for girls; high rates of intimate partner violence; unequal distribution of unpaid care work; and limited land rights and management for women (Organization for Economic Co-operation and

Development, 2015). The adverse effect on food security has been well-studied in isolation from the other axes of inequities and depicts the complex nexus of food security, gender, and equity in Uganda, specifically in the COVID-19 context.

World Health Organization, (2002) defines *gender* as socially constructed characteristics of women, men, girls, and boys, including associated norms, behaviors, sociocultural roles, and relationships with each other. The scientific literature uses the terms "gender" (roles) and "sex" (biological) interchangeably, when they are in fact distinct (Krieger, 2003). In both measurement and description throughout the GWP documentation, sex and gender appear conflated as is the case in most health research surveys (Johnson et al., 2009). GWP respondents are asked about their gender with the response options of male or female (sex).

Due to the hostile public and political environment for lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) people in Uganda, we assumed gender is socioculturally identified as a binary concept in the Ugandan context. Expression of non-binary gender identity (more than just male or female sex) in Uganda is dangerous. LGBTQIA shelters and people are attacked, and some people killed (Human Dignity Trust, 2022) due to an anti-homosexuality bill passed into law in May 2023 (Anti-Homosexuality Act, 2023). "Among other things, [it] imposes a life sentence on consensual same-sex conduct among adults, which is already criminalized…adds the death penalty for so-called 'aggravated homosexuality' [and] criminalizes activities that promote homosexuality with up to 20 years in prison" (Shaw, 2023, p. 1).

In Uganda, gender is, therefore, extensively linked to the social and political context (structural determinants), which is prescribed for males and females through parliamentary legislation. We acknowledge this limitation in using the gender variable of GWP data, as some respondents might not be able to openly reveal their gender identity and must adhere to the binary man/woman. Accounting for these limitations arising from (a) sociocultural barriers in reporting gender and (b) survey shortcomings in distinguishing between sex and gender, we used the term *gender* to refer to variable sex (male or female) in GWP data.

This research design decision was based on the ongoing discussion in gender literature, wherein researchers argue that the health outcome under study can direct researchers to differentiate between sex and gender and clarify the concept when it is conflated in secondary data (Johnson et al., 2009; Krieger, 2003). Our study's primary outcome was food security, witih sociocultural determinants such as income, education, marital status, and social support considered contributing factors to achieving equity in experiencing food security. In effect, studying social factors rather than biological factors supports using gender as a social construct instead of sex as a biological construct.

Outcome: Food security status

We measured food security using the Food Insecurity Experience Scale (FIES). Since 2014, the FIES Survey Module (FIES-SM) has been included in the GWP, in the FAO *Voices of the Hungry* project, and is used to monitor progress toward SDG 2.1.2 (i.e., prevalence of a population's moderate or severe food insecurity based on FIES). The FIES-SM is an experience-based approach that directly measures the access dimension of food security through eight questions with binary response options (Yes/No) (see Table 1). The FIES questions were tested and validated to be cross-culturally comparable both globally (Cafiero et al., 2016) and in SSA (Wambogo et al., 2018).

Researchers using FIES normally categorize food insecurity into four levels (Ballard et al., 2013). From a theoretical and conceptual perspective, we focused on the *access* dimension of food security and conceptualized it as stages in which an individual does not experience a "lack of food" in terms of quantity but instead experiences compromising food

TABLE 1 Food Insecurity Experiences Scale (FIES) questions; Cafiero et al. (2016).

Binary outcome	FIES categories	Short reference	During the last 12 MONTHS, was there a time when because of a lack of money or other resources? (Yes/No/Do not know/Refused to answer)
Food security	Food secure	FS	No affirmative responses
	Mild FI	WORRIED	1) You were worried you would run out of food?
		HEALTHY	2) You were unable to eat healthy and nutritious food?
		FEWFOODS	3) You ate only a few kinds of foods?
Food insecurity	Moderate FI	SKIPPED	4) You had to skip a meal?
		ATELESS	5) You ate less than you thought you should?
		RANOUT	6) Your household ran out of food?
	Severe FI	HUNGRY	7) You were hungry but did not eat?
		WHLDAY	8) You went without eating for a whole day?

quality. We thus condensed the classification into two categories: food security and insecurity (see Table 1). A food insecure individual experiences both a “lack of food” and limitations to the quality of the food they consume. A similar measurement approach to SDG 2.1.2 (see Cafiero et al., 2018) allowed us to compare results with FAO estimates.

Predictors of food security inequities

Guided by the SDH framework and intersectionality theory, we categorized points of intersection into three levels: personal characteristics and demographics (*social identities*), human capital and available resources (*social strata)*, and the socioeconomic and political context that uses power hierarchies (*structural determinants)* (Evans et al., 2018; Harris et al., 2021; Solar & Irwin, 2010). The latter operates through intermediary determinants especially aspects of social strata (e.g., housing, food security, work, and available social supports).

Drawing on the variables available in the GWP dataset, we selected variables to assess each level (i.e., social identities, social strata, and structural determinants) (see Table S1). We measured (a) personal characteristics (social identities) using gender, age, region, marital status, and household number of children aged <15 and adults aged >15; (b) human capital and resources (social strata) using education, income, employment, shelter (i.e., housing), and social support; and (c) socioeconomic and political context (structural determinants) using the Community Basics Index (CB-index), and corruption within the business.

We used two variables to measure structural determinants because, first, the comprehensive CB-index reports individuals' satisfaction with everyday life, including infrastructure, air quality, water, healthcare, affordable housing, and the educational system. Few studies in the food security literature have examined the structural determinants of food security within an equity framework (Harris et al., 2021). Explicit consideration of environments lacks quantitative intersectional analyses to consider the structural mechanisms and processes that shape power and policies (Bauer, 2014). Second, corruption can also adversely affect food security at individual and household levels (Helal et al., 2016;

Olabiyi, 2022; Uchendu & Abolarin, 2015); reducing corruption promotes governance and is a strategy to mitigate food insecurity (Olabiyi, 2022).

Analytical strategy

Accounting for the complex survey design,[4] our analysis involved three steps: (1) run disaggregated analysis by gender, (2) apply the difference-in-difference (diff-in-diff) approach to (a) test the intersection of gender with variables exhibiting a gender difference in step one and (b) test the statistical significance of such differences, and (3) compare models before and after including significant interactions with gender.

In the first step, we estimated binary logit models for the total sample. In doing so, the difference in the predicted probabilities (Pr) was computed[5] and referred to as marginal effect (MEs). MEs are the change in Pr of food security for a change in one specific independent variable while holding other independent variables at specific values (Long & Freese, 2014). For example, for the binary variable of gender, the Pr of food security was computed at two levels, men (= 0) and women (= 1). This generated two Pr (s) for food security outcome while holding other variables at a specific value (such as average marginal effect [AME)][6] in the analysis). MEs are the differences between the Pr of food security for men and women:

$$\text{ME (gender)} = \text{Pr (food security|women)} - \text{Pr (food security|men)}$$

In the second step, we selected variables that showed a gender difference between men and women in terms of significance and direction of MEs. To test the significance of gender differences, we used the diff-in-diff approach to test the interaction effect of each selected variable with gender. In doing so, separated binary logit models were estimated for each interaction between gender and each selected variables while controlling for other variables.

Although the intersectionality literature acknowledges the “measurement difficulty of capturing the intersections” (Bauer, 2014, p. 12) in quantitative research, Hinze et al. (2012) argue that creative use of existent statistical techniques, such as using interaction terms or stratification in logistic regressions, can capture the intersections (Hinze et al., 2012). In the context of an intersectionality framework, researchers commonly use interaction terms to examine the multiplicative (non-additive) effect beyond the sum of the main effects (Bauer et al., 2021). Methodological literature across different disciplines has shown that the coefficient for the interaction term, in terms of predictions as described earlier, is not a proper way to interpret and test an interaction effect (Mize, 2019). Nevertheless, researchers tend to use only the statistics for the coefficient on the interaction term to conclude whether an interaction effect is significant or not (Mize, 2019).

We thus applied the diff-in-diff approach to test the significance of the interaction effects in terms of the predictions (Mize, 2019). WE estimated four Pr (s) for each level when using an interaction term between two binary variables. To illustrate, for testing the interaction between gender (men/women) and education (low/high), four levels were generated: (a) high-educated men, (b) high-educated women, (c) low-educated men, and (d) low-educated women. In the diff-in-diff approach, first, we estimated MEs of gender (gender gaps) for each education category, referred to as first difference (1st diff):

$$\text{ME}_1\ [\text{Gender Gap}_{\text{high education group}}] = \text{Pr (food security|women)} - \text{Pr (food security|men)}$$

$$\text{ME}_2\ [\text{Gender Gap}_{\text{low education group}}] = \text{Pr (food security|women)} - \text{Pr (food security|men)}$$

Then, we estimated the differences in effects of gender across levels of education, referred to as the second difference (2nd diff): $ME_1 - ME_2$.

In the last step, we included significant interactions in the final model to account for the intersection of gender with the variables that showed an interactive effect. Odds ratios were computed from the initial model estimated in the first step (main effects model before including interactions) and the final logit model that included interactions. This analytical approach examines associations rather than establishes causality. We used STATA (version 17.0) for all steps of our analysis.

RESULTS

Among the studied population ($N = 951$), 52% were women ($n = 497$) (Table 2; see also Table S2). Compared to women, a higher proportion of men were employed, had higher education, and an above-average income. However, a higher proportion of men than women responded affirmatively to almost all FIES items.

Table 3 presents the difference in the predicted probabilities of food security for each variable, disaggregated by gender. In the total population, being a woman tended to increase the probability of food security ($\Delta = 0.05$; $p < 0.1$). Although being unmarried did not significantly change the predicted probability of food security in the total sample, when disaggregated by gender, a different pattern emerged. Marital status was associated with food security differentially; the association was positive for men and negative for women ($\Delta_{\text{men}} = 0.09$; $p < 0.1$ vs. $\Delta_{\text{women}} = -0.09$; $p < 0.05$). On average, one additional child was related to a 0.02 increase in the predicted probability of food security ($p < 0.05$). After disaggregation by gender, a similar pattern remained significant only for men.

The predicted probability of food security for high-educated compared to low-educated men was 0.10 higher ($p < 0.05$) while in the total sample, education showed a 0.07 increase in food security ($\Delta = 0.07$; $p < 0.05$). Although, on average, a one-unit increase in income was significantly associated with an increase in food security for men and women, this increase was twice for men ($\Delta_{\text{men}} = 0.06$; $p < 0.01$ and $\Delta_{\text{women}} = 0.03$; $p < 0.05$). A lack of housing in the previous 12 months was related to a significant decrease in food security in all models (all $p < 0.01$). Similarly, men and women with a family or a relative's help had, respectively, 0.10 and 0.24 ($p < 0.05$ and $p < 0.01$, respectively) higher food security compared to those without social support. Satisfaction with basic community infrastructures was associated with improved food security with almost similar probability ($\Delta_{\text{men}} = 0.15$ and $\Delta_{\text{women}} = 0.14$; $p < 0.05$).

For the next analysis stage, variables that exhibited a gender difference in direction or significance were selected: age, region, marital status, household members under and over 15 years, education, income, employment, social support, and corruption within a business.

Table 4 and Figures S1–3 present the results of testing whether (a) these differences (gender gaps) were statistically significant and (b) gender significantly intersected with each variable using the test of interaction effect (diff-in-diff). The results for marital status showed a significant gender gap between married men and women with married women having a significantly higher probability of food security (0.32) than married men (0.19; $\Delta = 0.13$; $p < 0.01$).

The second difference showed that the size of the gender gap differed significantly between married and single status (second difference = –0.14; $p = 0.03$); the effect of gender significantly differed between married and single status (Figure S1B). Results indicated that the probability of food security for single women (0.24) tended to be less than married

TABLE 2 Sample characteristics overall and by gender in Uganda.[a]

Characteristics	Overall[b] (*n* = 951)	Men (*n* = 454)	Women (*n* = 497)
Independent variable			
Personal characteristics			
Age (in years), %			
15–25	45.3	45.1	45.5
26–45	37.6	37.6	37.5
>45	17.1	17.3	16.9
Region, %			
Central	27.6	25.6	29.6
Eastern	27.3	30.6	24.3
Northern	17.7	19.9	15.7
Western	27.4	23.9	30.5
Marital status, %			
Married	43.9	44.0	43.7
Single[c]	56.1	56.0	56.3
Household size <15 years	2.5 (0.1)	2.3 (0.1)	2.6 (0.1)
Household size >15 years	2.8 (0.1)	2.9 (0.1)	2.8 (0.1)
Human capital and resources			
Education, %			
Low education	45.2	40.5*	49.5
High education	54.8	59.5	50.5
Income[d]	5.8 (0.1)	6.0 (0.1)*	5.7 (0.1)
Employment, %			
Employed	54.1	63.6***	45.3
Underemployed	19.8	17.7	21.8
Out of workforce	26.1	18.7	32.9
Shelter, %			
No	53.5	55.4	51.8
Yes	46.5	44.6	48.2
Social support, %			
No	19.8	20.2	19.4
Yes	80.2	79.8	80.6
Structural determinants			
CB-index,[e] %			
Dissatisfied	64.5	67.2	62.0

TABLE 2 (Continued)

Characteristics	Overall[b] ($n = 951$)	Men ($n = 454$)	Women ($n = 497$)
Satisfied	35.5	32.8	38.0
Corruption within business, %			
No	20.9	20.0	21.8
Yes	79.1	80.0	78.2
Outcome variable: Food security items[f]			
WORRIED, %	71.3	72.0	70.6
HEALTHY, %	73.5	73.0	74.1
FEWFOODS, %	79.1	80.0	78.3
SKIPPED, %	65.7	68.4	63.2
ATELESS, %	70.7	70.7	70.6
RANOUT, %	63.3	66.4	60.5
HUNGRY, %	62.5	67.2*	58.2
WHLDAY, %	44.0	46.8	41.4

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.01$; two-tailed tests.

[a] Values are means (SDs) or percentages (weighted).

[b] Chi-square and adjusted Wald tests were used to evaluate the distributions between groups.

[c] Never married, divorced, separated, widowed.

[d] Per capita annual log income in international dollars estimated by dividing the annual household income by the total number of individuals living in the household. Income ranged from $0 to ~$45 K dollars with a mean of $964. To normalize the income distribution, we transformed it into log income, and we refer to this variable as income.

[e] Community Basic Index measuring the seven items of public transportation systems, roads and highways, quality of air, water, and healthcare, availability of affordable housing, and educational system.

[f] Only affirmative responses (%) were reported.

women (0.32) ($p = 0.06$). No significant difference was observed between married and single status for men.

The predicted probability of food security for the four combinations of gender and social support status showed a significant gender gap in food security between men and women who had social support ($\Delta = 0.07$; $p < 0.05$). The difference of 0.12 increase in the probability of food security for socially supported men and women was statistically significant ($p < 0.05$). Another pattern that merits attention is the marginally significant gender gap across low-education level ($\Delta = 0.09$; $p = 0.057$). Testing the effect of education between men and women showed no significance, although the first difference of men's group was significant ($\Delta_{\text{men}} = 0.1$; $p = 0.02$ vs. $\Delta_{\text{women}} = 0.03$; $p = 0.45$; second Difference = − 0.07; $p = 0.27$). Other variables, such as business corruption, age, region, and employment did not exert a significant difference within any group (see Figures S1D and S2A–C).

To test for significant group differences between men and women at different income levels, information about the significance of the group difference (men vs. women) was directly incorporated into Figure S3A. That is, the gender gap was significant with women having significantly higher food security with income between zero and six compared to men (all contrasts $p < 0.05$). No gender differences were found in food security when income was between six and 11 (all contrasts $p = \text{ns}$).

TABLE 3 Predicted probabilities of food security overall and by gender.[a]

Variables	Overall	Men	Women
Gender			
Women vs. Men	0.05*(0.03)	–	–
Age			
26-45 vs. 15–25	– 0.04 (0.03)	0.01 (0.04)	– 0.08* (0.04)
>45 vs. 15–25	0.03 (0.05)	0.13 (0.09)	–0.01 (0.07)
>45 vs. 26–45	0.07 (0.05)	0.13 (0.08)	0.07 (0.07)
Region			
Eastern vs. Central	– 0.10** (0.05)	– 0.08 (0.06)	– 0.13** (0.06)
Northern vs. Central	– 0.03 (0.04)	– 0.03 (0.07)	– 0.06 (0.05)
Western vs. Central	– 0.01 (0.05)	– 0.01 (0.07)	– 0.01 (0.05)
Northern vs. Eastern	0.07 (0.05)	0.05 (0.06)	0.08 (0.06)
Western vs. Eastern	0.09* (0.05)	0.07 (0.06)	0.12** (0.06)
Western vs Northern	0.02 (0.05)	0.02 (0.07)	0.05 (0.05)
Marital status			
Single vs. Married	– 0.02 (0.03)	0.09* (0.05)	– 0.09** (0.04)
Household size <15 years[b]	0.02** (0.01)	0.03** (0.01)	0.01 (0.01)
Household size >15 years[b]	– 0.001 (0.01)	–0.01 (0.01)	0.01 (0.01)
Education			
Secondary or higher vs. <Secondary	0.07** (0.03)	0.10** (0.04)	0.04 (0.05)
Income[b]	0.04*** (0.01)	0.06*** (0.02)	0.03** (0.01)
Employment			
Underemployed vs. Employed	– 0.07* (0.04)	– 0.03 (0.06)	– 0.09** (0.05)
Out of workforce vs. Employed	0.01 (0.04)	– 0.01 (0.05)	0.03 (0.06)
Out of workforce vs. Underemployed	0.08* (0.05)	0.02 (0.07)	0.12** (0.06)
Shelter			
Yes vs. No	– 0.16*** (0.03)	– 0.18*** (0.04)	– 0.14*** (0.05)
Social support			
Yes vs. No	0.18*** (0.03)	0.10** (0.05)	0.24*** (0.04)
CB-index			
Satisfied vs. Dissatisfied	0.15*** (0.03)	0.15** (0.05)	0.14** (0.05)
Corruption within business			
Yes vs. No	– 0.02 (0.04)	0.01 (0.05)	– 0.05 (0.06)

Note: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$; two-tailed tests.

[a] Marginal effects (MEs) were computed at average marginal effects (AME) with standard errors in parentheses.

[b] For continuous variables, a one-unit discrete change was reported.

TABLE 4 Probability of food security by gender and variables of interest with test of interaction effect.

	Pr (FS)[a] Women	Pr (FS) Men	Gender gap[b] (1st difference)	Contrasts[c] (2nd difference)
Binary × binary interactions				
Education				
Secondary or higher	0.29 (0.03)	0.27 (0.03)	0.29–0.27 = 0.02 (0.04)	0.02 to 0.09 = –0.07 (0.06)
<Secondary	0.26 (0.04)	0.17 (0.04)	0.26–0.17 = 0.09* (0.05)	
Marital status				
Single	0.24 (0.03)	0.25 (0.03)	0.24–0.25 = – 0.01 (0.04)	–0.01 to 0.13 = –0.14** (0.06)
Married	0.32 (0.04)	0.19 (0.03)	0.32–0.19 = 0.13*** (0.05)	
Social support				
Have social support	0.31 (0.03)	0.24 (0.03)	0.31–0.24 = 0.07** (0.03)	0.07 to (–0.05) = 0.12** (0.05)
No social support	0.08 (0.03)	0.13 (0.04)	0.08–0.13 = – 0.05 (0.05)	
Corruption within business				
No corruption	0.31 (0.05)	0.21 (0.05)	0.31–0.21 = 0.1 (0.06)	0.1 to 0.04 = –0.06 (0.07)
With corruption	0.27 (0.03)	0.23 (0.03)	0.27–0.23 = 0.04 (0.03)	
Multi-category × binary interactions				
Age				
15–25	0.29 (0.03)	0.23 (0.03)	0.29–0.23 = 0.06 (0.04)	None[d]
26–45	0.24 (0.04)	0.20 (0.03)	0.24–0.20 = 0.05 (0.05)	None
>45	0.31 (0.06)	0.26 (0.07)	0.31–0.26 = 0.05 (0.09)	None
Region				
Central	0.32 (0.04)	0.25 (0.04)	0.32–0.25 = 0.07 (0.05)	None
Eastern	0.19 (0.05)	0.18 (0.04)	0.19–0.18 = 0.01 (0.05)	None

(Continues)

TABLE 4 (Continued)

	Pr (FS)[a] Women	Pr (FS) Men	Gender gap[b] (1st difference)	Contrasts[c] (2nd difference)
Northern	0.28 (0.04)	0.23 (0.05)	0.28–0.23 = 0.06 (0.07)	None
Western	0.31 (0.04)	0.24 (0.05)	0.31–0.24 = 0.07 (0.05)	None
Employment				
Employed	0.29 (0.03)	0.23 (0.03)	0.29–0.23 = 0.06 (0.04)	None
Underemployed	0.19 (0.04)	0.20 (0.06)	0.19–0.20 = −0.01 (0.06)	None
Out of workforce	0.31 (0.04)	0.23 (0.05)	0.30–0.23 = 0.08 (0.06)	None

Note: Because of rounding, the differences do not always equal the discrete change coefficient in women minus the discrete change coefficient in men, similar for the 2nd differences. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$; two-tailed tests.

[a] Marginal effects (MEs) were computed at average marginal effects (AME) with standard errors in parentheses.

[b] Statistics for gender gap is the difference in the effect of interest variable between men and women.

[c] The second differences column reports whether gender gaps are significantly different across levels of interest variable. For multi-category variables, the “contrasts” column reports which gender gaps are significantly different across levels of interest variable (second differences).

[d] “None” indicates that none of the paired second differences were significant.

TABLE 5 Odds ratios from logit model for being food secure, comparing two models; before and after including interactions.

Variables	Main effects model OR (95% CI)	Model with interactions OR (95% CI)
Personal characteristics [Social identities]		
Gender (ref. Men)		
Woman	1.39 (0.96, 2.02)*	0.89 (0.27, 2.97)
Age (ref. 15–25)		
26–45	0.76 0.51, 1.13)	0.77 (0.52, 1.14)
>45	1.17 (0.65, 2.08)	1.39 (0.75, 2.56)
Region (ref. Central)		
Eastern	0.52 (0.26, 1.03)*	0.51 (0.25, 1.01)*
Northern	0.85 (0.51, 1.41)	0.84 (0.50, 1.40)
Western	0.96 (0.55, 1.69)	0.95 (0.54, 1.67)
Marital status (ref. Married)		
Single	0.88 (0.60, 1.27)	1.50 (0.82, 2.74)
Household size <15 years	1.13 (1.01, 1.25)**	1.15 (1.03, 1.27)**
Household size >15 years	0.99 (0.88, 1.12)	0.99 (0.88, 1.12)
Human capital and available resources [Social strata]		
Education (ref. Secondary or higher)		
<Secondary	1.56 (1.02, 2.39)**	1.58 (1.03, 2.42)**
Income	1.26 (1.13, 1.42)***	1.28 (1.14, 1.44)***
Employment (ref. Employed)		
Underemployed	0.63 (0.37, 1.08)*	0.63 (0.37, 1.10)
Out of workforce	1.08 (0.67, 1.75)	1.13 (0.70, 1.80)
Shelter (= Yes)	0.360 (0.24, 0.54)***	0.36 (0.24, 0.54)***
Social support (= Yes)	3.99 (2.02, 7.88)***	2.37 (1.08, 5.20)**
Socioeconomic and political context [Structural determinants]		
CB-index (= Satisfied)	2.46 (1.65, 3.67)***	2.39 (1.58, 3.62)***
Corruption within business (= Yes)	0.90 (0.53, 1.52)	0.86 (0.51, 1.46)

Note: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$; two-tailed tests.
Abbreviations: CI, confidence interval; OR, odds ratio.

The second difference showed that the size of the gender gap marginally differed across income levels (–0.04, $p = 0.07$). Testing the effect of income between men and women—high-income men vs low-income men and high-income women vs low-income women—indicated that for men, the income effect was marginally greater than for women ($p < 0.1$). Table 5 presents the odds ratios from binary logit models before and after, including the significant interaction terms. Most variables' effects remained similar after having interactions of gender with marital status and social support. One important difference manifested for the gender variable, which showed a different direction between the main effects and final models. In the final model, women had lower odds of food security than men by a factor of 0.89 (95% confidence interval [CI]: 0.27, 2.97; $p = 0.85$), while in the main effects model, women had higher odds of food security (odds ratio: 1.39; 95% CI: 0.96, 2.02; $p = 0.08$), controlling for other factors.

Overall, the final model showed that residing in the Eastern region of Uganda and having no shelter decreased the odds of food security. On the contrary, having an additional household member under 15 years, higher education, higher income, more social support, and satisfaction with the community infrastructures enhanced the odds of being food secure after accounting for gender variability.

DISCUSSION

The primary research objectives were to determine the sources of gendered food security inequities in Uganda employing an intersectionality perspective and to measure their relative significance using nationally representative GWP data. By challenging the conventional analytical approaches that control for gender, results revealed different layers of gender differences. Most previous studies (e.g., Broussard, 2019; Sinclair et al., 2019; Smith et al., 2017) have focused on describing unequal food security outcomes by gender. By using diff-in-diff analysis, our results went further and revealed that the size of a gender gap differed significantly (statistically) between levels of social support (social strata) and marital status (social identity), which is consistent with previous studies (to be discussed).

Furthermore, although results in the final model did not identify causal relationships, the statistically significant associations provided thought-provoking information about gender and food security consistent with previous studies. This central finding emphasized the importance of accounting for gender as a meaningful source of variation in studying food security and any health outcome instead of treating it as a control variable. Indeed Shapiro et al. (2021) argue that framing sex/gender in quantitative analysis models as a controlling or confounding variable is a "considerable danger" [resulting in] incorrect findings [that are] detrimental to equitably improving global health" (p. 2) as confirmed in our study. We used three intersectional categories to organize the discussion: social identities, social strata, and structural determinants.

Social identities

Marital status

Our results also demonstrated that the effect of gender was statistically significant between levels of marital status. The overall impact of marital status on food security has been well studied. In a comparative global analysis, Broussard (2019) reports mixed effects for gender differences in marital status across regions, exhibiting a significant contribution of gender differences in marital status to explain gender differences in severe food insecurity in SSA. In another SSA study, Wambogo et al. (2018) report no significant association between marital status and severe food insecurity. Only older married adults (>50 years) have lower severe food insecurity than their single counterparts (Wambogo et al., 2018). Like our results, a cross-country analysis of FIES in 134 counties shows that being single (i.e., never or previously married) is positively associated with food insecurity (Smith et al., 2017).

Because results from earlier studies do not disaggregate results by gender, we could not use our results to draw comparative discussion points or conclusions about the final association of marital status with food insecurity in Uganda. However, our results *do* highlight the importance of generating gender-specific results and testing them before drawing conclusions. Due to small marginal distributions, our analysis combined the two categories of never- and previously-married into one category of "single." The unobserved differences between these two categories could affect the overall outcome. Consider that Kassie et al. (2015) report that female-headed households run by a single, widowed, divorced, or separated woman are more disadvantaged than male-headed households in many areas, and women are most likely to be food insecure.

It is thus not surprising that single women in our study had about 0.08 lower food security than married women. Another potential explanation for the lower food security status of single women, particularly in Uganda, is the social and gender barriers that other types of single women face, such as unmarried adolescent mothers, and older widowers (Brown, 2019). Over and above these socioeconomic and demographic disadvantages, structural and institutional context (e.g., ethnicity, living in poor urban areas, political marginalization, and refugee status) can add more complexity to food insecurity experiences of disadvantaged groups such as single women (Brown, 2019; Kwiringira et al., 2014).

Household members

Another result meriting discussion was the positive association between food security and having an additional household member under 15 years old. There is limited evidence to explain the mechanisms of such associations specifically in the context of LIMCs. In a high-income country example, Men et al. (2023) report that having an additional child aged <6 years is correlated with 16.5% lower odds of food insecurity (Men et al., 2023) in Canada. They conclude that Canadian child-benefit programs assist low-income households in coping with food insecurity. In Uganda, some programs assist households with children to alleviate the adverse effects of poverty on child health and nutrition: the Social Assistance Grant for Empowerment (SAGE), and the World Food Program, which provides cash/food assistance to meet the food and nutrition needs of refugees and Ugandan children (Tran & Ghadially, 2021). Future Ugandan food security studies should explore this policy dynamic.

Education and income

Though previous studies found education to be strongly associated with higher food security, including the combined effect of other variables reveals even more layers. In Uganda, 67% of women and 59% of men (aged 15–49) have low education with considerable regional variation (Uganda Bureau of Statistics [UBOS] & ICF, 2018). From the intersectionality perspective herein, gender, age, region, living in urban areas, and income contribute to low education in Uganda. Other scholars propose that only having higher education for women does not translate into a better job, higher income, or improved food security because they face more socioeconomic inequalities, including cultural stereotypes and continued exclusion from active participation in social life (Bhandari & Burroway, 2018; Tanankem et al., 2017).

Similar context complexity exists for income inequalities in Uganda, where women have less access to credit, economic resources, and wage-earning opportunities compared to men (Uganda Bureau of Statistics [UBOS] & ICF, 2018). This disparity may explain the doubled increase in the probability of food security in men found in our study.

The lack of a significant gender gap in our study across different levels of other well-studied predictors of food security (e.g., age, region, and employment) does not mean that these social identities (personal characteristics) and social strata (resources) failed to account for gender gaps. Instead, our results support the call for more in-depth analysis by examining various intersections, not only by gender but also with other social identities and social strata such as ethnicity, religion, and migration status.

Social strata

Social support was statistically significant in our study. Having someone to count on in times of need is associated with a decrease in food insecurity at a globe scale and across different economic development rankings (Smith et al., 2017). Broussard (2019) reports that gender differences in social support significantly contribute to 7%–20% of the gender gap in food insecurity worldwide, excluding SSA. The positive impact of social support on food security is at the household level in Broussard's study. Schmeer et al. (2015) report that increased maternal social support is associated with 0.16 lower odds of household food insecurity. Hadley et al. (2007) observe that Tanzanian women with higher social support encounter lower seasonal food insecurity with stronger associations for wealthier communities. In a quantitative study, Lemke et al. (2003) confirm the protective effect of social support, especially for women, showing that higher social ties and networks are associated with higher food security.

Structural determinants

Infrastructure

Our results indicate that other strong predictors of food security included shelter and the CB-index. The strong association of these less-studied variables, regardless of gender differences, highlights the importance of incorporating structural and intermediary variables when studying food security equity. Previous research suggest that infrastructural development is a possible means of addressing the growing challenge of food insecurity (Frayne & McCordic, 2015; O'Brien et al., 2022). For example, households in South Africa without consistent access to cash income, cooking fuel, medical care, electricity, or water have higher odds of experiencing food insecurity than more advantaged households (Frayne & McCordic, 2015).

Corruption

Although we did not find a significant association between corruption and food security, previous research suggests that reducing corrupt practices within business and government and promoting good governance are fundamental strategies to address food insecurity (Helal et al., 2016; Olabiyi, 2022; Uchendu & Abolarin, 2015). We only assessed corruption within businesses by measuring community perceptions of corruption levels and the extent to which residents view corruption as widespread. The GWP data include another variable about corruption within the government, but it was missing for most respondents in the 2019 Uganda data. As a result, our analysis could not include it. We recommend studying corruption at different levels because it can provide insights into improving food insecurity at structural levels, as discussed in previous studies (see Helal et al., 2016; Nugroho et al., 2022; Olken & Pande, 2012; Sumaila et al., 2017; Uchendu & Abolarin, 2015; Abdullah et al., 2020).

As a final structural determinant comment, existing food security research often overlooks the role of women's legal rights in closing gender gaps in association with food security (Bhandari & Burroway, 2018; Burroway, 2015). In Uganda, the struggle to institutionalize women's rights has been in a “stop-start” process for years and is ongoing (Brown, 2019; Burgess & Campbell, 2016). Food insecurity goes beyond food availability and includes food access as well. Some food security predictors used in our research design are well-studied; yet the role of gender differences and how a lack of women's legal entitlement affect food access is less investigated (Bhandari & Burroway, 2018). We recommend that researchers address this lacuna by focusing on how policy programs and legislative efforts can target structural determinants of food security inequities rooted in a lack of rights and governance for disadvantaged groups, including women (per Collins, 2021).

Study limitations

First, the selection of variables for the analytical model was limited by the variables in the GWP dataset. For instance, lack of information about intrahousehold gender dynamics, patriarchal belief systems, and gender-specific policies and institutional practices disallowed for studying social processes further, as recommended within the intersectionality framework. Second, the performance of two-level interactions only might be limited in satisfying feminist criteria for intersectional analysis for two reasons. (a) because the study focused on gender, the exploratory approach included only the intersections between gender and other variables that exhibited gender inequality.

In addition, (b) there were concerns about model parsimony and difficulties in interpreting high-order interactions when moving beyond two-way interactions. To embrace the complexity of intersectionality, we considered both between and within interaction for each intersection by testing both sides. Testing the intersection of gender with various variables allowed for a heuristic approach in that different independent variable were introduced and assessed in the model. We acknowledge that, on both technical and interpretive grounds, two-way interaction effects have limited capacity to bring the context and complexity of intersectionality into the analysis. Further work should thus be extended to other suggested approaches that are more compatible with feminist understandings of intersectionality, such as multilevel regression analysis and mixed-methods approach (quantitative and qualitative).

Third, while we applied a descriptive intersectionality approach, we did not assess the structural mechanisms of social power to explain why these inequities happened nor did we elaborate further on the mechanisms. Advancing knowledge about inequities in food security within the intersectionality framework must go beyond describing unequal food security outcomes; more analytical work is required to identify root causes. Furthermore, cross-sectional studies have certain limitations. For instance, they cannot establish a cause-and-effect relationship nor analyze outcome patterns over time. Additionally, when interpreting results, the general limitations of survey methods must be considered, including self-report data.

CONCLUSION AND POLICY IMPLICATIONS

Our results contribute to the current knowledge base on the nexus of food (in)security, gender, and equity. First, FIES was used as an experience-based individual measure of food security; accordingly, the gender gap was quantified as the difference between gender means of the FIES. Second, our analysis went beyond identifying gender differences in experiencing food security. We know of no study in this area that has applied a diff-in-diff approach to model gender differences between and within the underlying factors, guided by the intersectionality framework. Third, food security predictors were modeled at different levels of equity recommended by the SDH framework, which provided new insights into less-studied predictors of food insecurity. Using the SDH framework, we were able to draw policy attention to the social identities, strata, and structural variables that intersect and work within different mechanisms to generate health inequities among different groups (Solar & Irwin, 2010).

By demonstrating the interplay between the socioeconomic and political contexts, on the one hand, and socioeconomic strata, on the other, the SDH framework helped us emphasize the importance of including contextual factors when analyzing the impact of structural determinants on health inequities including food security inequities. We established the significance of future researchers incorporating the SDH framework alongside an intersectional approach when conducting quantitative analyses of food security.

Although data were from 2019, illnesses, and deaths due to COVID-19, and policies designed to reduce contagion from 2020 onward, negatively affected food security in all nations including Uganda (Boero et al., 2021). The pandemic also imposed changes in already existing determinants and widened inequalities mostly in terms of income (FAO et al., 2021, 2022). Others can use our Ugandan results to support comprehensive policies developed in situ and elsewhere that include integrating equity-based strategies to tackle food insecurity, considering the extra burden owing to the COVID-19 pandemic and other crises (e.g., refugee crises and natural disasters).

Our study is timely because, in South Africa, households with low levels of education were acutely affected by the adverse economic effects of the pandemic, as they must rely on reduced labor income influenced by lockdown and quarantine policies (Arndt et al., 2020). Kansiime et al. (2021) report similar results for Uganda and Kenya, where poor households dependent on labor income must use food-based coping strategies such as involuntarily changing dietary patterns. Moreover, the documented adverse effect of gender discrimination against women during the pandemic reveal it as one of the main contributors to their higher food insecurity (Béné et al., 2021; International Food Policy Research Institute [IFPRI], 2021; United Nations, Uganda, 2020).

Concerning policy action on food security inequities, we recommend that policymakers consider three broad approaches: (a) identify disadvantaged groups through an intersectionality lens and consider joint, non-additive effects of being disadvantaged rather than independent effects; (b) include context-specific strategies, specifically by benefiting from mixed-methods approaches; and (c) focus on advancing women's rights in the context of food security by targeting inequalities in the socioeconomic, political, and cultural context.

To tackle food security inequities, policymakers should not limit themselves to socioeconomic (social strata) and demographic (social identity) determinants. They should intentionally include the social processes and hierarchical power dynamics (structural determinants) that shape a system of oppression and privilege, which is complicit in the inequitable distribution of food security determinants when observed through an SDH and intersectionality lens.

ACKNOWLEDGMENTS

The authors acknowledge FAO's Voices of the Hungry Project for granting access to the full GWP dataset and supporting materials, which allowed the present study to be conducted. We thank Prof. Claudia Mitchell at McGill University and Dr. Margaret Masette at Makerere University in Uganda for their review, comments, and suggestions on this manuscript.

Sincere thanks to Dr. Timothy Schwinghamer and Dr. Grace Marquis for their editorial comments. The authors also acknowledge excellent guidance from anonymous reviewers. This research study was funded by the Fonds de Recherche du Québec Société et Culture (FRQSC), QC, Canada, to support the doctoral studies of the first author.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

Gallup is not affiliated with political or advocacy groups, and all collected information regarding respondents' identities is strictly confidential. Gallup data are collected using scientifically proven methodologies to provide reliable and impartial data that are allowed to be used by individuals, governments, and organizations. Consultation with the research ethics board office at McGill University established that ethical approval for GWP secondary data analysis was not required.

ORCID

Farzaneh Barak http://orcid.org/0000-0002-0546-5072

ENDNOTES

[1] For more details about intersectionality criteria, see Bauer et al. (2021).

[2] Design effect = 1.51; margin of error = 3.8.

[3] By 2030, end hunger and ensure year-round access by all people, particularly among poor and vulnerable people, including infants, to safe, nutritious, and sufficient food, https://www.un.org/sustainabledevelopment/hunger/

[4] Gallup weighs data to ensure each country's sample is nationally representative. In the presented analytic approach, the data were `svyset` and respondent-level weighting variables were included.

[5] We used `mchange` command in STATA.

[6] Average marginal effects (AME) represent an effect on average across the sample, which is the average (mean) of the marginal effects calculated for each observation in the sample; for further details, see Mize (2019).

REFERENCES

Abdi, T. (2018). *Gender inequality and food security: A global comparative analysis* [Master's thesis, McGill University]. https://escholarship.mcgill.ca/concern/theses/5999n563j?locale=en

Abdullah, A., Qingshi, W., Awan, M. A., & Ashraf, J. (2020). The impact of political risk and institutions on food security. *Current Research in Nutrition and Food Science Journal*, *8*(3), 924–941. https://doi.org/10.12944/CRNFSJ.8.3.21

Abera, S. F., Kantelhardt, E. J., Bezabih, A. M., Gebru, A. A., Ejeta, G., Lauvai, J., Wienke, A., & Scherbaum, V. (2019). Nutrition-specific and sensitive drivers of poor child nutrition in Kilte Awlaelo-Health and demographic surveillance site, tigray, Northern Ethiopia: Implications for public health nutrition in resource-poor settings. *Global Health Action*, *12*(1), 1556572. https://doi.org/10.1080/16549716.2018.1556572

Anti-Homosexuality Act of 2023 (enacted by Ugandan President May 2, 2023). https://www.parliament.go.ug/sites/default/files/The%20Anti-Homosexuality%20Act%2C%202023.pdf

Apanovich, N., & Mazur, R. E. (2018). Determinants of seasonal food security among smallholder farmers in south-central Uganda. *Agriculture & Food Security*, *7*(1), 87. https://doi.org/10.1186/s40066-018-0237-6

Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelov, K., Robinson, S., Levy, S., Simbanegavi, W., van Seventer, D., & Anderson, L. (2020). Covid-19 lockdowns, income distribution, and food security: An analysis for South Africa. *Global Food Security*, *26*, 100410. https://doi.org/10.1016/j.gfs.2020.100410

Aryal, J. P., Mottaleb, K. A., & Rahut, D. B. (2019). Untangling gender differentiated food security gaps in Bhutan: An application of exogenous switching treatment regression. *Review of Development Economics*, *23*(2), 782–802. https://doi.org/10.1111/rode.12566

Ballard, T. J., Kepple, A. W., & Cafiero, C. (2013). *The food insecurity experience scale: Developing a global standard for monitoring hunger worldwide* [Technical paper]. Food and Agriculture Organization. http://www.fao.org/economic/ess/ess-fs/voices/en/

Bauer, G. R. (2014). Incorporating intersectionality theory into population health research methodology: Challenges and the potential to advance health equity. *Social Science & Medicine (1982)*, *110*, 10–17. https://doi.org/10.1016/j.socscimed.2014.03.022

Bauer, G. R., Churchill, S. M., Mahendran, M., Walwyn, C., Lizotte, D., & Villa-Rueda, A. A. (2021). Intersectionality in quantitative research: A systematic review of its emergence and applications of theory and methods. *SSM-Population Health*, *14*, 100798. https://doi.org/10.1016/j.ssmph.2021.100798

Bauer, G. R., & Scheim, A. I. (2019a). Advancing quantitative intersectionality research methods: Intracategorical and intercategorical approaches to shared and differential constructs. *Social Science & Medicine*, *226*, 260–262. https://doi.org/10.1016/j.socscimed.2019.03.018

Bauer, G. R., & Scheim, A. I. (2019b). Methods for analytic intercategorical intersectionality in quantitative research: Discrimination as a mediator of health inequalities. *Social Science & Medicine*, *226*, 236–245. https://doi.org/10.1016/j.socscimed.2018.12.015

Béné, C., Bakker, D., Chavarro, M. J., Even, B., Melo, J., & Sonneveld, A. (2021). Global assessment of the impacts of COVID-19 on food security. *Global Food Security*, *31*, 100575. https://doi.org/10.1016/j.gfs.2021.100575

Bhandari, A., & Burroway, R. (2018). Hungry for equality: A longitudinal analysis of women's legal rights and food security in developing countries. *The Sociological Quarterly*, *59*(3), 424–448. https://doi.org/10.1080/00380253.2018.1479199

Boero, V., Cafiero, C., Gheri, F., Kepple, A. W., Rosero Moncayo, J., & Viviani, S. (2021). *Access to food in 2020. Results of twenty national surveys using the Food Insecurity Experience Scale (FIES)*. Food and Agriculture Organization. https://doi.org/10.4060/cb5623en

Botreau, H., & Cohen, M. J. (2020). Gender inequality and food insecurity: A dozen years after the food price crisis, rural women still bear the brunt of poverty and hunger. In D. Barling & J. Fanzo (Eds.), *Advances in food security and sustainability* (5, pp. 53–117). Elsevier.

Bowleg, L. (2008). When black + lesbian + woman ≠ black lesbian woman: The methodological challenges of qualitative and quantitative intersectionality research. *Sex Roles*, *59*(5), 312–325. https://doi.org/10.1007/s11199-008-9400-z

Bowleg, L. (2012). The problem with the phrase women and minorities: Intersectionality—An important theoretical framework for public health. *American Journal of Public Health*, *102*(7), 1267–1273. https://doi.org/10.2105/AJPH.2012.300750

Bowleg, L., & Bauer, G. (2016). Invited reflection: Quantifying intersectionality. *Psychology of Women Quarterly*, *40*(3), 337–341. https://doi.org/10.1177/0361684316654282

Braveman, P. (2003). Defining equity in health. *Journal of Epidemiology & Community Health*, *57*(4), 254–258. https://doi.org/10.1136/jech.57.4.254

Briones Alonso, E., Cockx, L., & Swinnen, J. (2018). Culture and food security. *Global Food Security*, *17*, 113–127. https://doi.org/10.1016/j.gfs.2018.02.002

Broussard, N. H. (2019). What explains gender differences in food insecurity? *Food Policy*, *83*, 180–194. https://doi.org/10.1016/j.foodpol.2019.01.003

Brown, A. M. (2019). Women's rights, food entitlements, and governance in urban Uganda. In M. R. Izarali, O. Masakure & B. Ibhawoh (Eds.), *Expanding perspectives on human rights in Africa* (pp. 234–250). Taylor and Francis. https://doi.org/10.4324/9780203761762-13

Burgess, R., & Campbell, C. (2016). Creating social policy to support women's agency in coercive settings: A case study from Uganda. *Global Public Health*, *11*(1–2), 48–64. https://doi.org/10.1080/17441692.2015.1005654

Burroway, R. (2015). Women's rights save lives. *Sociology of Development*, *1*(4), 418–441. https://doi.org/10.1525/sod.2015.1.4.418

Cafiero, C., Nord, M., Viviani, S., Grossi, M., Ballard, T., Kepple, A., Miller, M., & Nwosu, C. (2016). *Methods for estimating comparable prevalence rates of food insecurity experienced by adults throughout the world*. Food and Agriculture Association. https://doi.org/10.13140/RG.2.1.5112.9207

Cafiero, C., Viviani, S., & Nord, M. (2018). Food security measurement in a global context: The food insecurity experience scale. *Measurement*, *116*, 146–152. https://doi.org/10.1016/j.measurement.2017.10.065

Collins, A. M. (2021). Empowerment, rights, and global food governance: Gender in the UN Committee for World Food Security. *Globalizations*, *19*(2), 220–237. https://doi.org/10.1080/14747731.2021.1877006

Collins, P. H. (1990). *Black feminist thought*. Taylor & Francis.

Combahee River Collective. (1977). *The Combahee River Collective statement*. https://americanstudies.yale.edu/sites/default/files/files/Keyword%20Coalition_Readings.pdf

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, *1*, 139–167.

Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford LawReview*, *43*(6), 1241–1299.

Dubrow, J. (2008). How can we account for intersectionality in quantitative analysis of survey data? Empirical illustration for Central and Eastern Europe. *Ask: Research and Methods*, *17*(1), 85–100. http://hdl.handle.net/1811/69557

Evans, C. R., Leckie, G., & Merlo, J. (2020). Multilevel versus single-level regression for the analysis of multilevel information: The case of quantitative intersectional analysis. *Social Science & Medicine (1982)*, *245*, 112499. https://doi.org/10.1016/j.socscimed.2019.112499

Evans, C. R., Williams, D. R., Onnela, J.-P., & Subramanian, S. V. (2018). A multilevel approach to modeling health inequalities at the intersection of multiple social identities. *Social science & medicine (1982)*, *203*, 64–73. https://doi.org/10.1016/j.socscimed.2017.11.011

FAO, IFAD, UNICEF, WFP, & WHO. (2021). *The state of food security and nutrition in the world 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. https://doi.org/10.4060/cb4474en

FAO, IFAD, UNICEF, WFP, & WHO. (2022). *The state of food security and nutrition in the world 2022: Repurposing food and agricultural policies to make healthy diets more affordable*. https://www.fao.org/documents/card/en/c/cc0639en

Feed the Future. (2018). Global food security strategy (GFSS): Uganda country plan. https://www.feedthefuture.gov/resource/global-food-security-strategy-gfss-uganda-country-plan/

Food and Agriculture Organization. (2002). *The state of food security and nutrition in the world 2002* (4th ed). https://www.fao.org/3/y7352e/y7352e00.htm#TopOfPage

Frayne, B., & McCordic, C. (2015). Planning for food secure cities: Measuring the influence of infrastructure and income on household food security in Southern African cities. *Geoforum*, *65*, 1–11. https://doi.org/10.1016/j.geoforum.2015.06.025

Gallup Inc. (2020). *Gallup worldwide research methodology and codebook*.

Gebre, G. G., Isoda, H., Amekawa, Y., Rahut, D. B., Nomura, H., & Watanabe, T. (2021). What explains gender gaps in household food security? Evidence from maize farm households in Southern Ethiopia. *Social Indicators Research*, *155*(1), 281–314. https://doi.org/10.1007/s11205-020-02600-8

Hadley, C., Mulder, M. B., & Fitzherbert, E. (2007). Seasonal food insecurity and perceived social support in rural Tanzania. *Public Health Nutrition*, *10*(6), 544–551. https://doi.org/10.1017/S1368980007246725

Hancock, A.-M. (2007). When multiplication doesn't equal quick addition: Examining intersectionality as a research paradigm. *Perspectives on Politics*, *5*(1), 63–79. https://doi.org/10.1017/S1537592707070065

Harnois, C. E., & Bastos, J. L. (2019). The promise and pitfalls of intersectional scale development. *Social Science & Medicine (1982)*, *223*, 73–76. https://doi.org/10.1016/j.socscimed.2019.01.039

Harris, J., Tan, W., Mitchell, B., & Zayed, D. (2021). Equity in agriculture-nutrition-health research: A scoping review. *Nutrition Reviews*, *80*(1), 78–90. https://doi.org/10.1093/nutrit/nuab001

Harris-Fry, H., Nur, H., Shankar, B., Zanello, G., Srinivasan, C., & Kadiyala, S. (2020). The impact of gender equity in agriculture on nutritional status, diets, and household food security: A mixed-methods systematic review. *BMJ Global Health*, *5*(3), e002173. https://doi.org/10.1136/bmjgh-2019-002173

Helal, G., Ahmadigheidari, D., Kosoy, N., & Melgar-Quiñonez, H. (2016). Exploring the relationship between corruption and food security status on a global scale [Abstract]. *FASEB Journal*, *30*(S1), 1149.1. https://doi.org/10.1096/fasebj.30.1_supplement.1149.9

Hinze, S. W., Lin, J., & Andersson, T. E. (2012). Can we capture the intersections? Older Black women, education, and health. *Women's Health Issues*, *22*(1), e91–e98. https://doi.org/10.1016/j.whi.2011.08.002

Human Dignity Trust. (2022). *Map of countries that criminalise LGBT people*. https://www.humandignitytrust.org/lgbt-the-law/map-of-criminalisation/

International Food Policy Research Institute. (2021). *Global food policy report: Transforming food systems after COVID-19*. https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/134343/filename/134557.pdf

Jha, R., Gaiha, R., & Sharma, A. (2009). Calorie and micronutrient deprivation and poverty nutrition traps in rural India. *World development*, *37*(5), 982–991. https://doi.org/10.1016/j.worlddev.2008.09.008

Johnson, J. L., Greaves, L., & Repta, R. (2009). Better science with sex and gender: Facilitating the use of a sex and gender-based analysis in health research. *International Journal for Equity in Health*, *8*(1), 14. https://doi.org/10.1186/1475-9276-8-14

Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., & Owuor, C. (2021). COVID- 19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Development*, *137*, 105199. https://doi.org/10.1016/j.worlddev.2020.105199

Kassie, M., Stage, J., Teklewold, H., & Erenstein, O. (2015). Gendered food security in rural Malawi: Why is women's food security status lower? *Food Security*, *7*(6), 1299–1320. https://doi.org/10.1007/s12571-015-0517-y

Krieger, N. (2003). Genders, sexes, and health: What are the connections–and why does it matter? *International Journal of Epidemiology*, *32*(4), 652–657. https://doi.org/10.1093/ije/dyg156

Kwiringira, J., Atekyereza, P., Niwagaba, C., & Günther, I. (2014). Gender variations in access, choice to use and cleaning of shared latrines; experiences from Kampala Slums, Uganda. *BMC Public Health*, *14*(1), 1180. https://doi.org/10.1186/1471-2458-14-1180

Lemke, S., Vorster, H., van Rensburg, N. J., & Ziche, J. (2003). Empowered women, social networks and the contribution of qualitative research: Broadening our understanding of underlying causes for food and nutrition insecurity. *Public Health Nutrition*, *6*(8), 759–764. https://doi.org/10.1079/phn2003491

Long, J. S., & Freese, J. (2014). *Regression models for categorical dependent variables using Stata*. Stata press.

Lutomia, C. K., Obare, G. A., Kariuki, I. M., & Muricho, G. S. (2019). Determinants of gender differences in household food security perceptions in the Western and eastern regions of Kenya. *Cogent Food & Agriculture*, *5*(1), 1694755. https://doi.org/10.1080/23311932.2019.1694755

Mahmud, M., & Riley, E. (2021). Household response to an extreme shock: Evidence on the immediate impact of the Covid-19 lockdown on economic outcomes and well-being in rural Uganda. *World Development*, *140*, 105318. https://doi.org/10.1016/j.worlddev.2020.105318

Men, F., Fafard st-Germain, A. A., Ross, K., Remtulla, R., & Tarasuk, V. (2023). Effect of Canada child benefit on food insecurity: A propensity score—Matched analysis. *American Journal of Preventive Medicine*, *64*(6), 844–852. https://doi.org/10.1016/j.amepre.2023.01.027

Merlo, J. (2018). Multilevel analysis of individual heterogeneity and discriminatory accuracy (MAIHDA) within an intersectional framework. *Social Science & Medicine (1982)*, *203*, 74–80. https://doi.org/10.1016/j.socscimed.2017.12.026

Mfitumukiza, D., Barasa, B., Kiggundu, N., Nyarwaya, A., & Muzei, J. P. (2020). Smallholder farmers' perceived evaluation of agricultural drought adaptation technologies used in Uganda: Constraints and opportunities. *Journal of Arid Environments*, *177*, 104137. https://doi.org/10.1016/j.jaridenv.2020.104137

Mize, T. (2019). Best practices for estimating, interpreting, and presenting nonlinear interaction effects. *Sociological Science*, *6*, 81–117. https://doi.org/10.15195/v6.a4

Mukasa, J., Olaka, L., & Yahya Said, M. (2020). Drought and households' adaptive capacity to water scarcity in Kasali, Uganda. *Journal of Water and Climate Change*, *11*(S1), 217–232. https://doi.org/10.2166/wcc.2020.012

Nabuuma, D., Ekesa, B., Faber, M., & Mbhenyane, X. (2021). Community perspectives on food security and dietary diversity among rural smallholder farmers: A qualitative study in central Uganda. *Journal of Agriculture and Food Research*, *5*, 100183. https://doi.org/10.1016/j.jafr.2021.100183

Nugroho, A. D., Cubillos Tovar, J. P., Bopushev, S. T., Bozsik, N., Fehér, I., & Lakner, Z. (2022). Effects of corruption control on the number of undernourished people in developing countries. *Foods*, *11*(7), 924. https://www.mdpi.com/2304-8158/11/7/924

O'Brien, C., Leavens, L., Ndiaye, C., & Traoré, D. (2022). Women's empowerment, income, and nutrition in a food processing value chain development project in Touba, Senegal. *International Journal of Environmental Research and Public Health*, *19*(15), Article 9526. https://doi.org/10.3390/ijerph19159526

Olabiyi, O. M. (2022). The effect of bureaucratic corruption on household food insecurity: Evidence from Sub-Saharan Africa. *Food Security*, *14*(2), 437–450. https://doi.org/10.1007/s12571-021-01231-2

Olken, B. A., & Pande, R. (2012). Corruption in developing countries. *Annual Review of Economics*, *4*(1), 479–509. https://doi.org/10.1146/annurev-economics-080511-110917

Organization for Economic Co-operation and Development. (2015). *Uganda Social Institutions and Gender Index (SIGI) country report*. https://www.oecd.org/dev/development-gender/sigi-uganda-launch-event.htm

Phillips, S. P., Vafaei, A., Yu, S., Rodrigues, R., Ilinca, S., Zolyomi, E., & Fors, S. (2020). Systematic review of methods used to study the intersecting impact of sex and social locations on health outcomes. *SSM - Population Health*, *12*, 100705. https://doi.org/10.1016/j.ssmph.2020.100705

Schmeer, K. K., Piperata, B. A., Rodríguez, A. H., Torres, V. M. S., & Cárdenas, F. J. C. (2015). Maternal resources and household food security: Evidence from Nicaragua. *Public Health Nutrition*, *18*(16), 2915–2924. https://doi.org/10.1017/S1368980014003000

Semazzi, J. B., & Kakungulu, M. (2020). Household determinants of food security in rural Central Uganda. *African Journal of Agricultural Research*, *16*(9), 1245–1252. https://doi.org/10.5897/AJAR2020.14992

Shapiro, J. R., Klein, S. L., & Morgan, R. (2021). Stop 'controlling' for sex and gender in global health research. *BMJ Global Health*, *6*(4), e005714. https://doi.org/10.1136/bmjgh-2021-005714

Shaw, A. (2023, April). *Uganda Anti-Homosexuality Bill of 2023: No basis for evidence* [Legal brief]. UCLA School of Law Williams Institute. https://williamsinstitute.law.ucla.edu/wp-content/uploads/Uganda-Anti-LGBT-Bill-Apr-2023.pdf

Sinclair, K., Ahmadigheidari, D., Dallmann, D., Miller, M., & Melgar-Quiñonez, H. (2019). Rural women: Most likely to experience food insecurity and poor health in low- and middle-income countries. *Global Food Security*, *23*, 104–115. https://doi.org/10.1016/j.gfs.2019.04.006

Smith, M. D., Rabbitt, M. P., & Coleman- Jensen, A. (2017). Who are the world's food insecure? New evidence from the food and agriculture organization's food insecurity experience scale. *World development*, *93*, 402–412. https://doi.org/10.1016/j.worlddev.2017.01.006

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health* [Social determinants of health discussion paper 2]. World Health Organization. https://apps.who.int/iris/bitstream/handle/10665/44489/9789241500852_eng.pdf?sequence=1&isAllowed=y

Sraboni, E., Malapit, H. J., Quisumbing, A. R., & Ahmed, A. U. (2014). Women's empowerment in agriculture: What role for food security in Bangladesh? *World development*, *61*, 11–52. https://doi.org/10.1016/j.worlddev.2014.03.025

Sumaila, U. R., Jacquet, J., & Witter, A. (2017). When bad gets worse: Corruption and fisheries. In A. Williams & P. Le Billon (Eds.), *Corruption, natural resources and development* (pp. 93–105). Edward Elgar.

Tanankem, B. V., Efobi, U. R., & Atata, N. S. (2017). Women empowerment and intra-household dietary diversity in Nigeria. *Journal of Research in Gender Studies*, *7*(2), 39–66. https://doi.org/10.22381/JRGS7220173

Tran, A., & Ghadially, B. M. (2021). *Child-sensitive social protection in Uganda: An analysis of direct income support*. Save the Children International, Save the Children Uganda. https://resourcecentre.savethechildren.net/pdf/CSSP-final-report-Spread.pdf/

Twongyirwe, R., Mfitumukiza, D., Barasa, B., Naggayi, B. R., Odongo, H., Nyakato, V., & Mutoni, G. (2019). Perceived effects of drought on household food security in South-western Uganda: Coping responses and determinants. *Weather and Climate Extremes*, *24*, 100201. https://doi.org/10.1016/j.wace.2019.100201

Uchendu, F. N., & Abolarin, T. O. (2015). Corrupt practices negatively influenced food security and live expectancy in developing countries. *Pan African Medical Journal*, *20*, 110. https://doi.org/10.11604/pamj.2015.20.110.5311

Uganda Bureau of Statistics, & ICF. (2018). *Uganda demographic and health survey 2016*. https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf

United Nations Development Programme, Uganda. (2020). *Annual Report 2020: Standing with Uganda to build forward better together in the face of covid-19*. https://www.ug.undp.org/content/uganda/en/home/library/undp-uganda-2020-annual-report.html

United Nations, Uganda. (2020, June). *Leaving no one behind: From the COVID-19 response to recovery and resilience-building*. https://www.undp.org/sites/g/files/zskgke326/files/migration/ug/Fact-sheet-WEB.pdf

Wambogo, E. A., Ghattas, H., Leonard, K. L., & Sahyoun, N. R. (2018). Validity of the food insecurity experience scale for use in sub-saharan Africa and characteristics of food-insecure individuals. *Current Developments in Nutrition*, *2*(9):nzy062. https://doi.org/10.1093/cdn/nzy062

World Bank. (2020). *Tackling the demographic challenge in Uganda*. https://openknowledge.worldbank.org/handle/10986/34676

World Health Organization. (2002). *Integrating gender perspectives in the work of WHO: WHO gender policy*. https://apps.who.int/iris/bitstream/handle/10665/67649/a78322.pdf.jpg?sequence=26&isAllowed=y

AUTHOR BIOGRAPHIES

Farzaneh Barak holds a Ph.D. from the School of Human Nutrition at McGill University, Montreal, Canada. The paper presented here is one of the chapters from her doctoral research project titled "Intersectional Gender Analysis Approach on Women's Empowerment and Food Security: A Case Study from Uganda." She has over ten years of experience in national and international academic research and professional work related to public health nutrition and food security in various countries such as Uganda, Malawi, Canada, and Iran. Her research interests mainly focus on equitable food systems, community-based approaches, intersectionality and equity-centered analysis, gender, and science communication. Currently, she works as a Senior Policy Advisor and Food Security Lead at Inuit Tapiriit Kanatami (ITK) to improve the food security status of Inuit in Canada through research, advocacy, public outreach, and education.

Peace Musiimenta is a professional teacher, Senior Lecturer and researcher in the School of Women and Gender Studies at Makerere University, Kampala, Uganda. Peace holds a Ph.D. in Gender studies, a Master's in Women's Studies, a bachelor's degree in arts with education - all from Makerere University, and a certificate in Professional Development Programme for Gender Trainers from KIT (Netherlands). Peace was hosted as a Guest researchers' scholarship programme awardee at the Nordic Africa Institute (NAI), Sweden (Sep.–Dec. 2022) and a research fellow at the University of Jyväskylä (May 2023). Her research interests include gender and agriculture, women's socio-economic empowerment, gender and education, children and family issues and masculinity studies among others. Peace holds several positions in society including but not limited to Chairing the Women of Uganda Network Board, Heading the College of Humanities and Social Sciences E-learning department, member of the College of Agricultural and Environmental Sciences Research Ethics Committee, Mentoring for the MasterCard scholarship beneficiaries at Makerere University as well as several other students in different Universities in Uganda. She is passionate about supporting young people to discover themselves.

Hugo Melgar-Quiñonez is the Margaret A. Gilliam Faculty Scholar in Global Food Security at McGill University in Montreal, Canada, and is an Associate Professor in the McGill School of Human Nutrition. He holds a degree in Medicine from both the Friedrich Schiller University in Germany and the National University of Guatemala. He also received his doctoral degree in sciences from the Friedrich Schiller University. Dr. Melgar-Quiñonez moved to McGill University in September 2012 and worked as the Director of the McGill Institute for Global Food Security for seven years. Before moving to McGill, he worked as a professor in the Department of Nutrition at Ohio State University and as a researcher in public health nutrition at the University of California in Davis and at the Mexican Institute of Public Health.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Barak, F., Musiimenta, P., & Melgar-Quiñonez, H. (2024). Using an intersectionality framework to assess gender inequities in food security: A case study from Uganda. *World Medical & Health Policy*, *16*, 316–342. https://doi.org/10.1002/wmh3.602

Received: 17 October 2023 | Revised: 12 December 2023 | Accepted: 28 December 2023

DOI: 10.1002/wmh3.603

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Effect of Saudi's updated health insurance policy: 4-Year comparative study pre and post implementation

Abdulmajeed Saad AlHadlaq[1,2]

[1]Department of Surgery, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia

[2]King Saud University, Riyadh, Saudi Arabia

Correspondence

Abdulmajeed Saad AlHadlaq, Department of Surgery, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia.
Email: alhadlaq@gmail.com

Abstract

This study examines the impact of Saudi Arabia's updated Unified Health Insurance Policy, implemented in 2018, over a 4-year period. The objective is to assess its effects on key indicators in the health insurance sector, including gross written premiums (GWPs), insurance penetration, gross claims paid by health insurance, and insurance density. Quantitative data from official sources, including the Saudi Central Bank and the Council of Health Insurance (CHI), were analyzed. A two-sample *t*-test was employed to compare pre implementation (2014–2017) and post implementation (2019–2022) periods for selected indicators. The study found a significant increase in GWPs, suggesting heightened revenue generation for insurers, likely due to increased demand, adjusted pricing strategies, and expanded coverage. Insurance penetration notably widened, indicating improved accessibility, driven by awareness campaigns and subsidies. Gross claims paid by health insurance increased significantly, showing insurers disbursing more funds to cover healthcare costs. However, there was no significant impact on insurance density, highlighting the need for additional strategies to extend coverage. Saudi Arabia's updated Unified Health Insurance Policy has yielded transformative effects, enhancing accessibility and affordability. It has increased revenue generation, improved insurance penetration, and raised the amount paid by insurers to cover healthcare costs. The policy's impact on insurance density is limited, necessitating further efforts to extend coverage. These findings have significant policy implications, urging policymakers to refine healthcare policies and insurers to adapt to new revenue prospects, promising better overall health outcomes for the population. Further comprehensive research is essential to validate these conclusions and explore broader policy impacts.

KEYWORDS

healthcare accessibility, health insurance, insurance impact, Unified Health Policy

Key points

- The updated policy significantly affected revenue generation, insurance penetration, and claims paid, enhancing accessibility and affordability of health insurance.
- Policymakers need to address the gap in insurance density, and insurers should adjust strategies for new opportunities.
- The establishment of the Council of Health Insurance in 1999 marked a significant step in private health insurance in Saudi Arabia.

INTRODUCTION

Health insurance plays a vital role in modern healthcare systems by placing patient care at the forefront, surpassing other operational and regulatory demands. As healthcare costs rise and inflation takes its toll, accessing medical services has become increasingly expensive. In this context, health insurance emerges as a crucial safeguard. It serves as a protective measure against the financial risks associated with medical expenses, ensuring individuals can afford necessary healthcare (Atun et al., 2015; Dickman et al., 2017).

Health insurance is a specialized form of insurance designed to mitigate the financial burden that may arise from medical treatments. By providing a comprehensive coverage, it offers financial security, facilitates access to medical care, promotes preventive healthcare practices, and fulfills legal obligations to ensure healthcare accessibility for all. Its primary objective is to shield individuals from the potentially overwhelming financial strain of high medical bills, given the escalating costs of healthcare services (Keisler-Starkey & Bunch, 2020).

Furthermore, health insurance plays a crucial role in enabling individuals to sustain their long-term medical treatment, particularly for chronic conditions. As healthcare expenses continue to rise, many individuals find it challenging to bear the costs of ongoing care. Health insurance guarantees the continuity of necessary treatments by securing future payments, thus relieving individuals from the burden of financial uncertainty (Wang et al., 2015).

The establishment of the Council of Cooperative Health Insurance (CCHI) in 1999 signified a significant turning point in Saudi Arabia's journey toward embracing private health insurance (Albejaidi, 2018; CHI Rules and Regulations, 2022; Rahman & Alsharqi, 2019). It marked a crucial milestone in the country's efforts to enhance its healthcare system. As part of this transformative process, the Cooperative Health Insurance (CHI) program was introduced, aiming to provide comprehensive coverage through a phased approach (CHI Rules and Regulations, 2022; Rahman & Alsharqi, 2019). The Unified Health Policy, introduced by the Council of Health Insurance, has significantly transformed the healthcare landscape in the country.

Researchers and policymakers widely acknowledge the crucial role played by the health insurance program in enhancing accessibility and ensuring the financial sustainability of the

Saudi healthcare system. The CHI program serves as a fundamental tool for improving individuals' access to quality healthcare services while alleviating the financial burden associated with healthcare expenses (Al-Hanawi et al., 2018; Hazazi et al., 2022).

The introduction of private health insurance through the CHI program signifies the commitment of policymakers to create a more comprehensive and sustainable healthcare system in Saudi Arabia. By embracing private health insurance, the country aims to enhance the overall well-being of its population by providing essential healthcare services in an accessible and affordable manner.

Though the Saudi government updated the Unified Health Policy with reforms implemented on October 1, 2022, (CHI Rules and Regulations, 2022) the present study is concerned with the effects of the previous update, implemented in 2018, by examining a period of 4 years before and after that version. This will provide insights into the impact of the policy during that period. Furthermore, we will also analyze the content of the updated version of the policy and compare it with the previous version. By doing so, we can assess the changes and improvements made in the new policy and evaluate its potential implications for the health insurance industry.

The findings of this research will contribute to the existing body of knowledge on the impact of health policies and health insurance systems. The study will provide valuable insights into the effectiveness of the updated Unified Health Policy in achieving its objectives and improving the health insurance industry in Saudi Arabia. It will also inform policymakers, healthcare professionals, and insurers about the strengths and weaknesses of the policy, facilitating evidence-based decision making for future policy developments.

METHODS

This study uses quantitative data obtained from official statistics, reports, and databases by the Saudi Central Bank and CHI. The research was conducted in accordance with ethical guidelines, ensuring data accuracy, reliability, and validity (CHI Rules and Regulations, 2022; Saudi Central Bank, 2013–2022).

The policy and its corresponding content for the years 2018 and 2022, during which the updated Unified Health Insurance Policy was introduced, were acquired from the official CHI website. These documents were reviewed and compared to provide an in-depth analysis of the changes and updates implemented during that period (CHI Rules and Regulations, 2022).

This research study also aimed to evaluate the impact of the updated Unified Health Insurance Policy, which took effect in mid-2018, on key indicators in the health insurance sector. Specifically, we investigated the effect on the average gross written premiums (GWPs), insurance penetration and density, and gross claims paid by health insurance. The analysis involved comparing data from the Years 2014 to 2017 (pre implementation period) with the Years 2019–2022 (post implementation period). The Year 2018 was excluded from the analysis as it served as the base year for the policy change (Saudi Central Bank, 2013–2022).

To assess the impact on these key indicators, we collected data on the annual GWPs in millions of riyals for each year within the selected periods, insurance penetration and density, and the annual gross claims paid in millions of riyals for the specified years. Subsequently, the average for the pre and post implementation periods was calculated.

In all analyses, we utilized a two-sample *t*-test to statistically compare the pre and post implementation periods. The *t*-test allowed us to determine if there were significant differences in the average values of the selected indicators between the two periods. The chosen significance level ($\alpha = 0.05$) represents the threshold for determining statistical significance. This α level is a commonly accepted standard in statistical hypothesis testing and signifies a 5% probability of committing a Type I error, which is the rejection of a true null hypothesis. By setting α at 0.05, we aimed to strike a balance between minimizing the risk of Type I errors while maintaining sensitivity to potential effects. This choice is in line with conventional practices in the field and ensures a rigorous evaluation of the impact of the updated Unified Health Insurance Policy.

By comparing the data and conducting statistical analyses, we aimed to determine whether the updated Unified Health Insurance Policy had a significant impact on the selected indicators within the health insurance sector. The findings from this study contribute to a better understanding of the effects of the policy change and provide insights for policymakers, insurance companies, and other stakeholders in the healthcare industry.

Unified healthcare insurance policy

The implementation of the Saudi Unified Health Insurance Policy by the CHI began in 2016, following a staged approach based on the size of the companies. The policy rollout occurred in four phases, each targeting specific company sizes. The first phase, starting in July 2016, focused on companies with more than 100 employees. The second phase, commencing in October 2016, encompassed companies with 50–99 employees. Subsequently, in January 2017, the third phase was initiated, targeting companies with 25–49 employees. Finally, starting in April 2017, the fourth phase covered companies with less than 25 employees. With the completion of phase 4, all employees working in the private sector and their dependents were brought under the umbrella of this comprehensive insurance coverage. Notably, the Unified Health Insurance Policy underwent subsequent updates in 2018 and 2020 to further enhance its provisions and cater to evolving healthcare needs.

The financial coverage limit of the current health insurance policy is SAR 500,000, which includes coverage for medical examination, diagnosis, treatment, medication, hospitalization expenses, surgeries, and 1-day surgery or treatment as specified in the policy schedule. The law strictly prohibits the issuance of health insurance policies with fewer benefits than those outlined in the policy.

Insurance companies determine the insurance premiums based on technical factors defined by actuarial experts, including medical history, age, risk ratio, and insurance category. The value of these premiums is determined considering past results and approved by the Saudi Arabian Monetary Authority. The prices and quality of health services are approved and monitored by the Ministry of Health. It is important to note that the CHI maintains a neutral position between health insurance companies and healthcare service providers. Furthermore, the implementing regulations of the Health Insurance Law prohibit insurance companies and health insurance claim management companies from owning or operating healthcare facilities, and private health facilities are not allowed to own health insurance companies, as stipulated in Article 117 of Chapter Eight of the regulations (CHI Rules and Regulations, 2022).

Updates in the 2018 version

The 2018 Unified CHI Policy implemented additional mandatory benefits, maintaining the maximum coverage limit at SAR 500,000, which remained unchanged since 2014. This policy encompasses a comprehensive package of benefits, including medical examination, diagnosis, treatment, medication, surgeries, and 1-day surgical procedures as outlined in the policy schedule. Notably, the 2018 policy introduced several new benefits, such as coverage for dental and periodontal diseases, including one-time dental cleaning, respiratory syncytial virus vaccines for children, early screening for hearing impairment, a program for critical congenital heart defects in newborns, sleeve gastrectomy surgeries for individuals with a body mass index of 45 or above (up to a maximum of SAR 20,000), treatment for severe and nonsevere psychological disorders (with a maximum of SAR 15,000 for serious disorders and SAR 5000 for nonserious disorders for four sessions along with medications), treatment for conditions requiring hospital isolation, psoriasis treatment, coverage of infant formula expenses for medically indicated cases up to 24 months of age, an increased limit of SAR 50,000 for autism care, and the introduction of impairment costs alongside disability costs with a total limit of SAR 100,000 (CHI Rules and Regulations, 2022).

Updates in the 2022 version in comparison to the 2018 version

The updated version of the Essential Benefits Package, effective from October 1, 2022, introduces various new benefits to improve and promote health in different areas. These areas include women's health, child health, dental care, family planning, and mental health. The package aims to enhance the functions and capabilities of beneficiaries by offering provisions such as visual care, rehabilitation, and surgical procedures. Additionally, it enables beneficiaries to access a wide range of healthcare services, including hospitalization, outpatient visits, and emergency treatment. Moreover, it provides protection through early detection and screening, vaccinations, and coverage for sexually transmitted diseases.

The Essential Benefits Package incorporates new benefits and updates to the existing benefits in private health insurance. The policy has seen several significant developments aimed at enhancing healthcare coverage and benefits for individuals. The policy includes a range of compulsory benefits designed to address various aspects of healthcare. These benefits encompass primary screenings and examinations for diseases such as breast cancer, colon cancer, cervical cancer, and osteoporosis. Additionally, the policy emphasizes adult vaccinations, including protection against common bacterial and viral infections, in accordance with the Ministry of Health guidelines. The coverage also extends to kidney transplantation surgeries, with a maximum limit of SAR 250,000. Furthermore, comprehensive care for diabetes patients is a key focus, encompassing specialized healthcare plans and access to specialists in ophthalmology, nephrology, podiatry, cardiology, psychiatry, and surgery as needed. The policy also supports telemedicine services provided by healthcare centers licensed by the Ministry of Health and approved by the CCHI. Home healthcare services are included to enable patients to receive necessary care at home, covering wound care after surgeries, intravenous medication administration, and medical care for urinary catheterization. The policy ensures comprehensive healthcare during menopause and premenopause stages, including hormonal therapy following best practices. Family planning is also addressed, covering temporary contraceptive methods such as hormonal and intrauterine methods. Treatment for sexually transmitted diseases, including chlamydia, gonorrhea, HIV/AIDS, syphilis, and others, is part of the policy. The document also separates medication payments from outpatient clinic visits. It allows for the dispensing of generic medications as alternatives to innovative drugs, based on the policy's medication formulary. Mental health services are covered, including the diagnosis and treatment of acute and chronic mental disorders, with a maximum coverage limit of SAR 50,000. Starting from 2023, a reduced co-payment rate applies to primary healthcare clinic visits. The policy also raises the coverage limit to SAR 1 million for large companies. It encompasses the treatment of congenital deformities that may pose a threat to current or future life, as well as heart valve disease treatment with coverage up to SAR 150,000. Patients requiring kidney dialysis benefit from an increased maximum limit of SAR 180,000, with coverage for in-center dialysis, peritoneal dialysis, and home dialysis. Weight loss surgeries are covered according to eligibility criteria and best practices, including gastric sleeve surgery for individuals with a body mass index over 40 or over 35 with documented medical history. The coverage for weight loss surgeries is capped at SAR 15,000 during the policy period. The policy exempts large institutions and corporations from filling out the medical declaration form and their specific insurance documents. Vision care includes coverage for prescription glasses for beneficiaries up to the age of 14. Dental care coverage encompasses basic and preventive dental care up to SAR 1200 without co-payment, while root canal treatment and emergency cases are covered up to SAR 800 with a 20% co-payment. These extensive provisions within the Unified Health Insurance Policy reflect a commitment to enhancing healthcare accessibility and improving the well-being of individuals in Saudi Arabia.

RESULTS

In the investigation of the effects of the updated Unified Health Insurance Policy, we examined various indicators in the health insurance sector, including GWP, insurance penetration, gross claims paid by health insurance, and insurance density. The data were obtained from the official annual reports of the Saudi Central Bank (2013–2022). The policy implementation occurred in mid-2018, and our analysis focused on comparing the years before and after 2018, excluding the base year itself.

Regarding GWP, a two-sample *t*-test revealed a significant difference in the average GWP between the pre implementation period (2014–2017) and the post implementation period (2019–2022), with a calculated *p* value of 0.0344 (Table 1). This finding suggests a notable shift in the financial landscape of the health insurance sector within the specified time frame. The significant *p* value indicates that the updated policy has had a discernible impact on GWP, reflecting changes in revenue generation, potentially driven by alterations in pricing strategies, coverage offerings, or overall market dynamics. These findings highlight the need for further investigation to understand the specific factors contributing to this observed shift and evaluate the policy's effectiveness.

TABLE 1 GWP (in millions of riyal) and gross claims paid by health insurance from 2014 to 2022.

Year	GWP (in millions of riyal)	Gross claims paid by health insurance
2014	15,720	0.98%
2015	18,966.8	1.09%
2016	18,630.3	1.04%
2017	19,035.5	1.04%
2018	19,883.4	1.03%
2019	22,474.9	1.11%
2020	22,836.8	1.13%
2021	25,109.3	1.14%
2022	31,829.8	1.25%
p Value	0.0344	0.0029

Abbreviation: GWP, gross written premium.

TABLE 2 Insurance penetration of nonoil GDP and insurance density from 2014 to 2022.

Year	Insurance penetration of nonoil GDP	Insurance density
2014	0.98%	511
2015	1.09%	616.40
2016	1.04%	586.09
2017	1.04%	584.77
2018	1.03%	595.07
2019	1.11%	656.82
2020	1.13%	644.76
2021	1.14%	717.14
2022	1.25%	933.13
p Value	0.0240	0.0877

Abbreviation: GDP, gross domestic product.

For insurance penetration, a statistically significant difference was found between the pre and post implementation periods, with a *p* value of 0.0240 (Table 2). This indicates a noteworthy divergence in the percentage of the population covered by health insurance. The implementation of the updated policy has played a role in driving changes in insurance penetration, potentially influenced by policy regulations, public awareness, or shifts in insurance product offerings. The findings underscore the importance of understanding the drivers of change in insurance penetration to inform policy adjustments and strategies for improving healthcare accessibility and affordability.

Regarding gross claims paid by health insurance, our analysis revealed a significant difference in the average amounts paid between the pre and post implementation periods, with a *p* value of 0.0029 (Table 1). This finding suggests substantial changes in the number of claims paid for different lines of business within the health insurance sector. Understanding the underlying factors contributing to this disparity is crucial for policymakers, insurers, and healthcare providers to manage costs, allocate resources effectively, and ensure the financial sustainability of the sector.

However, when examining insurance density, a *p* value of 0.0877 was obtained (Table 2), indicating a nonsignificant difference between the pre and post implementation periods. Although the *p* value does not reach the conventional threshold for statistical significance, the observed disparity in insurance density still merits attention. Further investigation is required to explore the factors contributing to this discrepancy and assess the potential implications for healthcare coverage and access.

DISCUSSION

The establishment of the CCHI and the subsequent implementation of the CHI program mark significant milestones in Saudi Arabia's pursuit of a robust and inclusive healthcare system. These endeavors reflect the nation's commitment to improving healthcare accessibility, financial sustainability, and the overall well-being of its population.

The implementation of the updated Unified Health Insurance Policy in 2018 has had a significant impact on the health insurance sector in Saudi Arabia. The findings of this study revealed that the policy led to a significant increase in GWP, insurance penetration, and gross claims paid by health insurance. These changes were likely driven by several factors, including adjustments in pricing strategies, coverage offerings, and overall market dynamics.

The increase in GWP suggests that the policy has led to an increase in revenue generation for health insurance companies. This may be due to a combination of factors, such as increased demand for health insurance, changes in pricing strategies, or the expansion of coverage offerings.

The increase in insurance penetration suggests that the policy has led to an increase in the percentage of the population covered by health insurance. This may be due to a combination of factors, such as increased awareness of the policy, changes in policy regulations, or subsidies for health insurance premiums.

The increase in gross claims paid by health insurance suggests that the policy has led to an increase in the amount of money paid out by health insurance companies to cover healthcare costs. This may be due to a combination of factors, such as changes in healthcare utilization patterns, the prevalence of specific medical conditions, or changes in the cost of healthcare services.

The findings of this study have important implications for policymakers, health insurance providers, and the general population. For policymakers, the findings suggest that the updated Unified Health Insurance Policy has been effective in increasing revenue generation, insurance penetration, and gross claims paid by health insurance. However, the policy has not had a significant impact on insurance density. Policymakers may need to consider additional measures to increase insurance density, such as making sure of the companies' commitment to the mandatory policy purchasing or providing subsidies to help people afford health insurance.

For health insurance providers, the findings suggest that the updated Unified Health Insurance Policy has created new opportunities for revenue generation. Providers may need to adjust their pricing strategies and coverage offerings to capture this new revenue. Providers may also need to invest in new technologies and processes to manage the increased volume of claims.

For the general population, the findings suggest that the updated Unified Health Insurance Policy has made health insurance more accessible and affordable. This is likely to have a positive impact on the health of the population. However, it is important to note that the policy has not been effective in increasing insurance density. This means that there are still a significant number of people who are not covered by health insurance. Policymakers and health insurance providers may need to take additional steps to increase insurance density to improve the health of the population.

While our study has provided valuable insights into the transformative effects of Saudi Arabia's updated Unified Health Insurance Policy, a key limitation that warrants emphasis is the reliance on a limited data set. The findings, while illuminating specific indicators within our defined time frame, should be interpreted with caution due to the inherent constraints of our data scope. This limitation underscores the need for careful consideration, acknowledging that the observed impacts may be influenced by factors not fully captured in our analysis. It serves as a call to action for future research endeavors to confirm and expand upon our findings, delving into the broader spectrum of the health insurance sector.

CONCLUSION

Saudi Arabia's updated Unified Health Insurance Policy, implemented in 2018, yielded transformative effects. GWPs surged, reflecting increased revenue generation for insurers due to heightened demand, adjusted pricing, and expanded coverage. Insurance penetration notably widened, indicating improved accessibility, driven by awareness campaigns and subsidies. Gross claims paid by health insurance increased significantly, indicating that insurers disbursed more funds to cover healthcare costs. However, the policy fell short in significantly affecting insurance density, highlighting the need for further strategies to extend coverage. These findings hold substantial policy implications, urging policymakers to refine healthcare policies and insurers to adapt to new revenue prospects. Enhanced health insurance accessibility promises better overall health outcomes for the population, but comprehensive research is essential to validate these conclusions fully and explore broader policy impacts.

ACKNOWLEDGMENTS

I would like to extend my heartfelt appreciation to Prof. Wadi B. Alonazi for his profound influence on my insurance industry knowledge.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

DATA AVAILABILITY STATEMENT

The data utilized in this study were sourced entirely from publicly available data sets. I ensured that these data were handled responsibly and in accordance with the ethical guidelines relevant to secondary data analysis.

ETHICS STATEMENT

In my research for the paper titled “Effect of Saudi's updated health insurance policy: 4-year comparative study pre and post implementation,” I adhered to the highest ethical standards. The nature of this study relied exclusively on open-source data and did not involve human or animal subjects.

ORCID

Abdulmajeed Saad AlHadlaq http://orcid.org/0000-0002-2105-891X

REFERENCES

Albejaidi, F. (2018). Emerging role of cooperative health insurance in achieving health system goals under Saudi Vision—2030. *Journal of Biology, Agriculture and Healthcare*, *8*, 1–8.

Al-Hanawi, M. K., Alsharqi, O., Almazrou, S., & Vaidya, K. (2018, February). Healthcare finance in the Kingdom of Saudi Arabia: A qualitative study of householders' attitudes. *Applied Health Economics and Health Policy*, *16*(1), 55–64. https://doi.org/10.1007/s40258-017-0353-7

Atun, R., de Andrade, L. O. M., Almeida, G., Cotlear, D., Dmytraczenko, T., Frenz, P., Garcia, P., Gómez-Dantés, O., Knaul, F. M., Muntaner, C., de Paula, J. B., Rígoli, F., Serrate, P. C. F., & Wagstaff, A. (2015, March 28). health system reform and universal health coverage in Latin America. *The Lancet*, *385*(9974), 1230–1247. https://doi.org/10.1016/S0140-6736(14)61646-9

Council of Health Insurance Rules and Regulations. (2022). https://www.chi.gov.sa/en/Rules/Pages/default.aspx

Dickman, S. L., Himmelstein, D. U., & Woolhandler, S. (2017, April 8). Inequality and the healthcare system in the USA. *The Lancet*, *389*(10077), 1431–1441. https://doi.org/10.1016/S0140-6736(17)30398-7

Hazazi, A., Wilson, A., & Larkin, S. (2022, November 16). Reform of the health insurance funding model to improve the care of noncommunicable diseases patients in Saudi Arabia. *Healthcare (Basel)*, *10*(11), 2294. https://doi.org/10.3390/healthcare10112294

Keisler-Starkey, K., & Bunch, L. N. (2020). *Health insurance coverage in the United States: 2019*. US Census Bureau. https://www.census.gov/content/dam/Census/library/publications/2020/demo/p60-271.pdf

Rahman, R., & Alsharqi, O. Z. (2019, January). What drove the health system reforms in the Kingdom of Saudi Arabia? An analysis. *The International Journal of Health Planning and Management*, *34*(1), 100–110. https://doi.org/10.1002/hpm.2584

Saudi Central Bank. (2013–2022). Annual report 2013–2022. https://www.sama.gov.sa

Wang, Z., Li, X., & Chen, M. (2015, January 20). Catastrophic health expenditures and its inequality in elderly households with chronic disease patients in China. *International Journal for Equity in Health*, *14*, 8. https://doi.org/10.1186/s12939-015-0134-6

AUTHOR BIOGRAPHY

Abdulmajeed Saad AlHadlaq is an assistant professor in plastic and reconstructive surgery; a member of the Central Committee for Quality; and the Head of the Faculty Standards Committee at the College of Medicine, IMISU. He is also the Head of the Quality Unit for the Surgery Department at IMISU. Dr. AlHadlaq has a rich professional background with significant contributions in the establishment of plastic surgery units and quality control within surgical departments. His education includes an Executive Master of Health Administration from King Saud University, a Fellowship in Breast Reconstruction and Microsurgery from CHU Amiens Picardie, France, and Board Certification in Plastic and Reconstructive Surgery from SCFHS, KSA. With a publication record reflecting 139 citations since 2019 and an H-index of 3 and an i10-index of 3, Dr. AlHadlaq's research interests span across Plastic Surgery, Medical Education, and Health administration. His ongoing research projects and active participation in international conferences further underscore his dedication to advancing healthcare. Dr. AlHadlaq is multilingual, speaking Arabic, English, and French, and is recognized for his teaching and leadership in medical education and health services programs. Outside his professional endeavors, Dr. AlHadlaq is passionate about padel, swimming, and hiking in nature.

How to cite this article: AlHadlaq, A. S. (2024). Effect of Saudi's updated health insurance policy: 4-Year comparative study pre and post implementation. *World Medical & Health Policy*, *16*, 343–352. https://doi.org/10.1002/wmh3.603

Received: 25 September 2023 | Revised: 12 December 2023 | Accepted: 4 January 2024

DOI: 10.1002/wmh3.604

RESEARCH ARTICLE

Food security in slow-onset disasters: A policy review in Southeast Asian regions

Hiep N. Le[1,2,3,4] | **Ernesta Sofija**[1] | **Neil Harris**[1] | **Thu Nguyen**[5] | **Hai Phung**[1]

[1]School of Medicine and Dentistry, Griffith University, Gold Coast, Queensland, Australia

[2]An Giang University, Long Xuyên, Vietnam

[3]Vietnam National University, Ho Chi Minh City, Vietnam

[4]Health and Agricultural Policy Research Institute, University of Economics Ho Chi Minh City, Ho Chi Minh City, Vietnam

[5]School of Government and International Relations, Griffith University, Gold Coast, Queensland, Australia

Correspondence

Hai Phung, School of Medicine and Dentistry, Griffith University, 1 Parklands Drive, Southport, QL 4222, Australia.
Email: hai.n.phung@griffith.edu.au

Funding information

Griffith University International Postgraduate Research Scholarship (GUIPRS)

Abstract

Slow-onset disasters, a neglected climatic event, affect the agricultural sector in Southeast Asia and threaten regional food security. Improving food security in slow-onset disasters requires policy development by both regional and national governments. Despite this articulated need, very little research on the national and regional food security policies in slow-onset disaster events has been undertaken. Focusing on Southeast Asia, this paper aims to (i) review existing policies to support food security in slow-onset disasters; (ii) identify strengths, weaknesses, and gaps in the existing policies; (iii) explain the policy window on food security in slow-onset disasters. An analytical framework of eight components of food security was adopted for the content analysis of 39 related policy documents collected from 11 countries in Southeast Asia and the Association of Southeast Asian Nations. The study found that none of the 39 policies directly targeted improving food security in slow-onset disasters. Existing policies to support food security in slow-onset disasters were incorporated in the context of climate change or national target programs on green development, agricultural development, nutrition, and famine. Our analysis also revealed that existing policies primarily focus on the first two pillars of the food security framework: food availability and access, with a predominant emphasis on availability. However, the third pillar, food utilization, is often overlooked. This study recommends developing a comprehensive policy to address protracted food insecurity, particularly among vulnerable populations in areas impacted by slow-onset disasters.

KEYWORDS
food security, policy, slow-onset disasters, Southeast Asia

Key points

- *Policy gap*: Southeast Asian regional organizations and governments lack specific policies for food security in slow-onset disasters.
- *Prioritization issue*: Existing policies primarily focus on food availability and access, neglecting the vital aspect of food utilization.
- *Calls for action*: Policymakers should include food utilization in their strategies to enhance dietary diversity among vulnerable populations in slow-onset disaster-affected areas. In addition, this study recommends that policymakers develop strategies exclusively for addressing slow-onset disasters, rather than incorporating them into climate change, agricultural development, and famine programs. Policymakers should also prioritize a multihazard approach in their policy design to enhance food security during slow-onset disasters in the region.

INTRODUCTION

In recent decades, the frequency and severity of natural and man-made disasters have increased alarmingly (Thomas & López, 2015). While catastrophic events such as earthquakes, tsunamis, and hurricanes often dominate headlines and capture public attention (Mamuji & Kchouk, 2018), there is a lesser-known category of disasters that unfolds over an extended period, gradually eroding lives, ecosystems, and economies (Ratti, 2017; Staupe-Delgado, 2019a; Yamori & Goltz, 2021). These events are referred to as "slow-onset disasters" and are characterized by their creeping nature and long-term impact on vulnerable populations and the environment (Kaneberg et al., 2023; Yamori & Goltz, 2021). Unlike sudden-onset disasters that strike swiftly and demand immediate emergency response, slow-onset disasters unfold gradually, often taking weeks, months, or even years to manifest fully (Mamuji & Kchouk, 2018; United Nations General Assembly, 2016). Examples of slow-onset disasters have been identified by the United Nations (UN) (United Nations, 2011), UN Office for Disaster Risk Reduction (2015), and the World Health Organization (2023), including droughts, increasing temperatures, desertification, loss of biodiversity, land and forest degradation, ocean acidification, sea level rise, and salinization. This gradual onset often obscures their potential severity and urgency, making it challenging for authorities, communities, and individuals to recognize and respond effectively (Staupe-Delgado, 2019b). Consequently, slow-onset disasters can exacerbate underlying vulnerabilities, leaving communities ill-equipped to cope with their long-term consequences on various aspects of society, including food insecurity (Food and Agriculture Organization [FAO], 2021a; Ngcamu & Chari, 2020).

Food insecurity refers to the lack of consistent access to sufficient, safe, and nutritious food that meets individuals' dietary needs for an active and healthy life (Anderson, 1990). Slow-onset disasters can lead to reduced agricultural productivity, loss of livelihoods, and limited access to food, resulting in food insecurity (Choularton et al., 2012; Ngcamu & Chari, 2020).

The gradual nature of these disasters presents a challenge for communities to adapt and recover, leading to prolonged periods of food insecurity (Staupe-Delgado, 2019a).

Southeast Asia comprises eleven countries and is a critical agricultural and food-producing region (Bhadrakom et al., 2022). The region is home to the world's two largest rice exporters (Thailand and Vietnam) and the world's leading exporters of several key internationally traded agricultural commodities (OECD-FAO, 2017). A significant portion of the rural impoverished population continues to rely heavily on agriculture for their livelihoods (Bhadrakom et al., 2022). Despite the region's sustained economic development over the past several decades, 600 million inhabitants continue to contend with food and nutrition insecurity (FAO, 2021b). In addition, Southeast Asian countries are geographically prone to various natural hazards, including slow-onset disasters (United Nations, Economic and Social Commission for Asia and the Pacific [ESCAP] 2020). Climate change plays a crucial role in exacerbating slow-onset disasters in Southeast Asia (Anschell & Tran, 2020). Rising temperatures and changing precipitation patterns contribute to frequent droughts, leading to crop failures, water scarcity, economic losses, and food insecurity (Brenton et al., 2022; Sheffield & Wood, 2008). Deforestation, illegal logging, and unsustainable land use practices contribute to the degradation of forests and the loss of valuable ecosystems (Hughes, 2017). Land degradation reduces soil fertility, increases the risk of erosion, and affects water quality and availability (Montanarella et al., 2016). These impacts have far-reaching consequences for agricultural productivity, biodiversity, and the overall sustainability of the region (Shrestha, 2011). Ocean acidification and sea level rise are slow-onset disasters that also affect coastal areas of Southeast Asian countries (Chou, 2014). The region is highly vulnerable to the impacts of rising sea levels, which lead to coastal erosion, saltwater intrusion, and the loss of coastal habitats (Chou, 2014). Ocean acidification, caused by the absorption of carbon dioxide by seawater, poses a threat to marine ecosystems and the livelihoods of coastal communities that depend on fisheries and tourism (Chou, 2014). Salinization, the process of increased salt content in soil and water, is an additional slow-onset disaster in Southeast Asia (Scheelbeek et al., 2016). It affects agricultural productivity, water quality, and the availability of freshwater resources, posing challenges to food security and water management in the region (Scheelbeek et al., 2016; United Nations, ESCAP 2020).

Since the Food and Agriculture Organization (FAO) published its definition of food security in 1996 (FAO, 1996), Southeast Asian governments have placed significant emphasis on policies that enhance food security in the context of sudden-onset disasters (ASEAN Secretariat, 2009; Lassa et al., 2019; National Nutrition Council, 2009). However, slow-onset disasters have received little attention (Mamuji & Kchouk, 2018), leading to a lack of knowledge of policies, action plans, and strategic programs in Southeast Asian countries to tackle food security during such events. Developing policies to enhance food security in slow-onset disasters is imperative due to the gradual but profound impacts these disasters have on agricultural systems and communities (Staupe-Delgado, 2019b). By outlining targeted action plans and programs, these policies may mitigate reduced productivity, prevent food shortages, and foster long-term resilience, contributing to social well-being amidst environmental challenges.

Therefore, reviewing and understanding existing policies to address food security in the context of slow-onset disasters can inform future policy efforts to achieve sustainable development in Southeast Asia. As such, this paper aims to (i) review existing policies to support food security in slow-onset disasters in Southeast Asia; (ii) identify strengths, weaknesses, and gaps in the existing policies; (iii) explain the policy window on food security in slow-onset disasters in Southeast Asia. By comprehensively examining the policies and strategies currently in place, this study aims to provide recommendations to tackle food security in slow-onset disasters.

Analytical framework for assessing food security in slow-onset disasters

This study adopted a pre-structured case methodology, with an existing analytical framework defining the data collection and analysis structure (Miles & Huberman, 1994). In addition, this study also adopted the comprehensive food security analytical framework from the study of Hadley et al. (2023) to guide the analysis of national and regional policies on food security in slow-onset disasters. The study acknowledges the existence of several interconnected food security frameworks. First, developed in 2008, the FAO's food security framework has been widely used as a foundational model for understanding food security (FAO, 2008). However, it has faced criticism for its limitations as overlooking sociocultural elements and its lack of specific concepts contributing to each overarching pillar (Chan et al., 2018; Musaiger, 1993; Myers et al., 2017). Recognizing the limitations of the FAO framework, Savary et al. (2020) then extended the conceptualization of food security. They introduced a six-component system that provided a more detailed breakdown of the pillars established by FAO. Availability, for example, was categorized into primary food production, food production and supply stability, and food reserves and stockpiles (Savary et al., 2020). Access was divided into physical and economic access, and utilization was reclassified into utility, safety, quality, and nutritional value (Savary et al., 2020). Despite this expansion, sociocultural factors remained overlooked in this framework. This limitation has been finally addressed in the study of Hadley et al. (2023), which features the influence of sociocultural factors on food consumption patterns and food security (Musaiger, 1993; Owino, 2019). Sociocultural factors include cultural norms, food preparation, consumption traditions, and religious practices that influence an individual's capacity to use or access food (Musaiger, 1993; Owino, 2019). Cultural norms often dictate what is considered acceptable or desirable to eat within a community. These norms can influence dietary choices and nutritional diversity. For example, in some cultures, meat is considered a staple and a symbol of affluence (Giacoman et al., 2021), while in others, vegetarianism may be the norm due to ethical or environmental concerns (Šmugović et al., 2021). The methods of food preparation and consumption traditions can also affect food security. In many cultures, traditional methods of preserving food, such as drying, smoking, or fermenting, play a crucial role in ensuring food availability throughout the year, especially in regions with limited access to modern preservation technology (Mandisvika et al., 2015). Religious beliefs often dictate specific dietary restrictions or fasting periods, which can impact nutritional intake and food security. For instance, the practice of fasting during Ramadan in the Islamic faith can affect food consumption patterns, shedding light on the impact of this religious practice on dietary habits and energy balance (Lessan et al., 2018). Therefore, sociocultural factors play a critical role in food security, especially food utilization. Addressing food security effectively requires a nuanced understanding of these sociocultural dynamics. Policies and interventions must be culturally sensitive and adaptable to local contexts to ensure they are effective and sustainable. By acknowledging and integrating these sociocultural aspects, food security strategies can be more inclusive, addressing the needs of diverse populations while respecting their cultural identities. The conceptual framework from the study of Hadley et al. (2023) with three pillars and eight components of food security is presented in Figure 1.

We adopt Hadley et al.'s (2023) framework in this study because it offers a comprehensive perspective on food security, incorporating three pillars and eight components. It also overcomes the limitations of previous frameworks, including those offered by FAO (2008) and Savary et al. (2020), which either neglected sociocultural factors or lacked specificity (Musaiger, 1993; Myers et al., 2017). Hadley et al.'s (2023) framework explicitly integrates sociocultural factors, making it well-suited for analyzing food security within the context of slow-onset disasters in Southeast Asia. Its detailed categorization of

FIGURE 1 Eight components of food security adopted from Hadley et al. (2023). based on the FAO framework (FAO, 2008) and Savary et al. (2020). FAO, Food and Agriculture Organization.

components aids in identifying which food security components are being addressed and which are lacking, thereby enabling the formulation of pertinent recommendations.

METHODS

Data collection

Given no universally accepted definition of policy exists that transcends all contexts, this study adopted the Centers for Disease Control and Prevention (CDC) (2023) broad definition of policy. It defined policy as a law, regulation, procedure, administrative action, incentive or voluntary practice of governments and other institutions (CDC, 2023). Accordingly, this study examines a wide range of policy documents developed by the Association of Southeast Asian Nations (ASEAN), including the ASEAN Framework and Regional Action Plan, and by the governments of Southeast Asian countries, including their national programs of action, national strategic plans, national master plans, national development plans, and sectoral roadmaps on food security in slow-onset disasters.

Policy documents that address slow-onset disasters and food security were identified through multiple sources, including: (1) 11 Southeast Asia countries' relevant ministry government websites (Ministry of Agriculture, Ministry of Environment, and Ministry of Health); (2) ASEAN database; (3) United Nations Office for Disaster Risk Reduction database; and (4) FAO of the United Nations (FAOLEX database). Search strategies used for each database are described in Appendix A. The inclusion criteria were as follows: (1) National policy documents of the 11 Southeast Asia countries OR Regional policy documents of Southeast Asia; (2) from any time-period, (3) available in English, and (4) publicly accessible. Publicly accessible documents were defined as documents free of charge in digital or print format, accessible through internet search or by request through in-country experts at the step of identifying the full text of policies. We excluded policies that addressed climate adaptation or other environmental aspects but did not link these to the eight components of food security. Hence, the exclusion criteria were as follows: (1) Not written by or in collaboration with country governments, (2) no policy relevance (international reports, communications, scientific publications, policy brief), (3) not applied nationally or regionally, (4) not relevant to slow-onset disasters and food security, (5) not available in full text, and (6) not written in English. As shown in Figure 2, searches initially retrieved 6042 hits at the identification phase. Through screening of titles, abstracts, and summaries, 247 relevant policies were retained from all sources. Then, 218 policies were maintained after duplicates were removed. Of the 218 documents identified for full-text screening, 179 were eliminated based on the exclusion criteria. Among of these eliminated policies, 91 policies were not relevant to food security, as these policies did not establish a direct connection with the eight components of the analytical food security framework. Instead, their primary focus was on enhancing aspects such as green growth, renewable energy, waste management, carbon inventory, or the reduction of greenhouse gas emissions. In addition, the remaining excluded policies were focused on sudden-onset disasters, ($n = 25$), food and nutrition only ($n = 38$), health policy adaptation ($n = 9$), agricultural adaptation ($n = 6$), and neither officially published by governments ($n = 7$) nor in English ($n = 3$). Finally, a total of 39 policy documents were included in the qualitative synthesis (Table 1).

Data analysis

This study adopted qualitative content analysis to identify “themes or coding frames” to categorize the collected 39 policy documents (Hall & Steiner, 2020; Hsieh & Shannon, 2005;

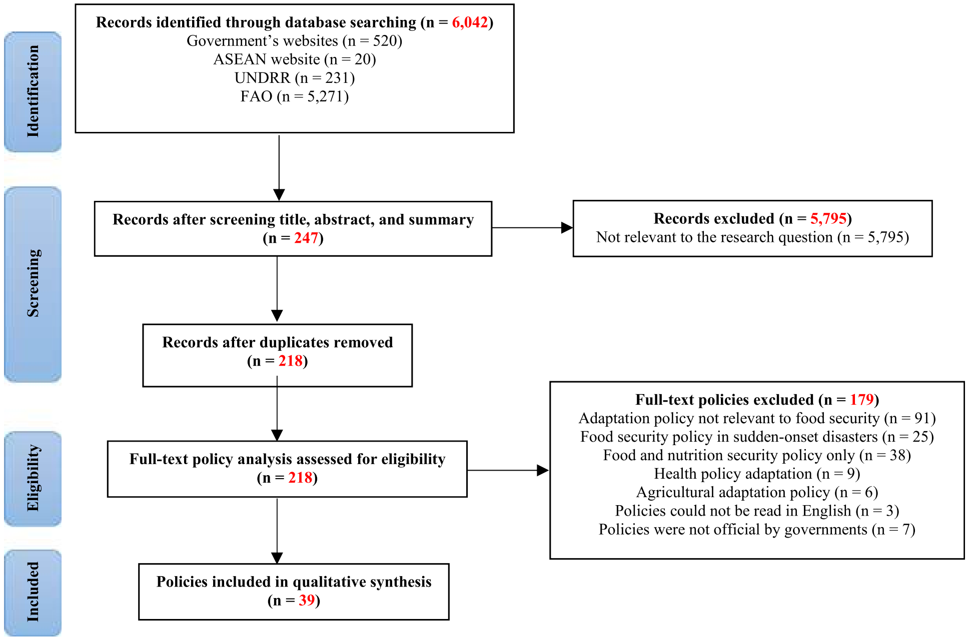


FIGURE 2 Results flow chart.

TABLE 1 List of all policy documents identified and analyzed.

Number	Country/region	Policy document name	Year of issued	References
1	Cambodia	National Adaptation Programme of Action to Climate Change (NAPA)	2006	Ministry of Environment (2006)
2		Strategic National Action Plan For Disaster Risk Reduction 2008–013	2008	National Committee for Disaster Management and Ministry of Planning (2008)
3		Plan of Action for Disaster Risk Reduction in Agriculture 2014–2018	2013	General Directorate of Agriculture (2013)
4		Cambodia Climate Change Strategic Plan 2014–2023	2013	(National Climate Change Committee (2013))
5		National Strategy for Food Security and Nutrition (NSFSN 2014–2018)	2014	Council for Agricultural and Rural Development (2014)
6		National Action Plan for the Zero Hunger Challenge in Cambodia (NAP/ZHC 2016–2025)	2016	Council for Agricultural and Rural Development (2016)
7		National Biodiversity Strategy and Action Plan	2016	National Council for Sustainable Development (2016)
8		Climate Change Action Plan 2016–2018	2016	Ministry of Environment (2016)
9	Indonesia	National Action Plan Addressing Climate Change	2007	State Ministry of Environment (2007)
10		Indonesia Climate Change Sectoral Roadmap—ICCSR	2009	Ministry of National Development Planning (2009)
11		National Adaptation Plan Executive Summary 2019	2019	Ministry of National Development Planning (2019)
12		Indonesia's Adaptation Communication	2022	Ministry of Environment and Forestry (2022)
13	Laos	National Strategy on Climate Change of the Lao PDR	2010	Government of Lao PDR (2010)
14		Plan of Action for Disaster Risk Reduction and Management in Agriculture (2014–2016)	2014	Ministry of Agriculture and Forestry (2014)
15		Agriculture Development Strategy to 2025 and Vision to the year 2030	2015	Ministry of Agriculture Forestry (2015)
16		National Green Growth Strategy of the Lao PDR till 2030	2018	Secretariat for Formulation of National Green Growth Strategy of the Lao PDR (2018)

(Continues)

TABLE 1 (Continued)

Number	Country/region	Policy document name	Year of issued	References
17		National Strategy on Disaster Risk Reduction (NSDRR) 2021–2030	2021	The Ministry of Labor and Social Welfare (2021)
18		National Plan of Action on Nutrition (NPAN) 2021–2025	2021	Ministry of Health DoHaHP, Centre of Nutrition (2021)
19	Myanmar	Myanmar Action Plan for Disaster Risk Reduction (MAPDRR)	2012	Ministry of Social Welfare Relief, and Resettlement, Relief and Resettlement Department (2012)
20		Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change	2012	National Environmental Conservation Committee (2012)
21		Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016–2030	2017	Ministry of Natural Resources and Environmental Conservation (2017)
22		Myanmar Sustainable Development Plan (2018–2030)	2018	Ministry of Planning Finance (2018)
23		Multi-sectoral National Plan of Action on Nutrition (MS-NPAN) 2018/19–2022/23	2018	National Nutrition Centre Department of Public Health, Ministry of Health and Sports (2018)
24		Myanmar Climate Change Master Plan (2018–2030)	2019	Ministry of Natural Resources and Environmental Conservation (2019a)
25		Myanmar Climate Change Strategy (2018–2030)	2019	Ministry of Natural Resources and Environmental Conservation (2019b)
26	Philippines	The Updated Philippine National Action Plan to Combat Desertification, Land Degradation and Drought (DLDD)	2010	Department of Agriculture (2010)
27		National Climate Change Action Plan 2011–2028	2011	Climate Change Commission (2011)
28		Philippine Development Plan 2017–2022	2017	National Economic and Development Authority (2017)
29	Timor-Leste	National Adaptation Programme of Action (NAPA) on Climate Change	2010	Ministry For Economy And Development (2010)
30		Zero Hunger Challenge—National Action Plan for a Hunger and Malnutrition Free Timor-Leste	2014	National Council for Food Security, Sovereignty and Nutrition in Timor-Leste (2014)

TABLE 1 (Continued)

Number	Country/region	Policy document name	Year of issued	References
31		National Food and Nutrition Security Policy	2014	The National Council on Food Security, Sovereignty and Nutrition (2014)
32		Timor-Leste's National Adaptation Plan—Addressing climate risks and building climate resilience	2021	Secretariat of State for Environment, Coordinating Minister for Economic Affairs (2021)
33	Thailand	Climate Change Master Plan 2015–2050	2015	The Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment (2015)
34		The 24-year agriculture and cooperative strategy (2017–2036) and the 5-year agriculture development plan under the twelfth national economic and social development plan (2017–2021)	2017	Ministry of Agriculture and Cooperatives (2017)
35		Thailand Country Program on Climate Change	2017	Climate Change Management and Coordination Division, Office of Natural Resources and Environmental Policy and Planning (2017)
36	Vietnam	National Action Plan For The Implementation Of The 2030 Sustainable Development Agenda	2017	Government of Viet Nam (2017)
37	ASEAN	ASEAN integrated food security (AIFS) framework and strategic plan of action on food security in the ASEAN region (SPA-FS) 2015–2020	2016	ASEAN Sectoral Working Group on Crops ASWGC and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (2016)
38		ASEAN Regional Plan of Action for Adaptation to Drought 2021–2025	2021	ESCAP-UN (2021)
39		ASEAN Framework on Anticipatory Action in Disaster Management	2022	Association of Southeast Asian Nations (ASEAN) (2022)

Abbreviation: ASEAN, Association of Southeast Asian Nations.

Schreier, 2012). In this study, both directed and conventional approaches of content analysis were used to identify themes and subthemes for analysis, respectively. While themes originate from the text in the conventional content analysis, themes in the directed content analysis can be derived from theories or research findings (Hsieh & Shannon, 2005). Accordingly, the framework of eight components of food security adopted by Hadley et al. (2023) informed the eight themes for analysis. Subthemes for analysis were developed through inductive text reading. In this step, two researchers (H. N. L. and T. N.) read the 39 policy documents line by line to look for strategies related to food security. Once the themes and subthemes were identified, the analysis continued with counting the number of policy documents that mention each subtheme. Findings are synthesized in Table 2 to draw conclusions about the strengths and areas for improvement of the current approach of 11 Southeast Asian Governments in ensuring food security in slow-onset disasters.

RESULTS

The analysis of 39 regional and national policies shows that eight of 11 Southeast Asian nations have adopted policies on food security in response to various slow-onset disasters, with Cambodia having the most such policies (eight), followed by Myanmar (seven) and Laos (six) while no policies were advanced by the governments of Brunei, Singapore, or Malaysia. All 39 policies were developed to address climate change, malnutrition, and famine (Table 2). This suggests that solutions for enhancing food security in slow-onset disasters were limited to the contexts of climate change, agricultural development, and hunger eradication. No food security policies in the exclusive context of slow-onset disasters were adopted by regional institutions ASEAN or the eleven Southeast Asian countries.

Figure 3 provides clear evidence that drought stands out, having the highest number of strategic policies designed to enhance food security in the region. Additionally, over half of the reviewed policies adopted a multihazard approach, addressing a spectrum of environmental challenges related to slow-onset disasters rather than focusing on a single issue.

As shown in Table 2, although all components of the food security pillars of the Hadley et al.'s (2023) framework were addressed in the reviewed policies, the majority of policies focused on the strategies for component 1—primary food production. Only about a third of policy documents addressed components 2, 3, and 4 and one policy proposed strategies to support the food utilization pillar (components 6, 7, and 8). While component 1 encompassed various strategies to improve food production and availability, dominant by climate-resistant varieties, water management, and integrated cropping techniques, component 2 focused on resilience and stability mainly through water supply and community-based management strategies. Component 3 proposed two main types of strategies, including establishing community seed banks and rice banks or food and seed reserves. Components 4 and 5 emphasized food access through infrastructure development and economic empowerment strategies. While component 4 included irrigation and rural infrastructure, component 5 concentrated on livelihood diversification, cash distribution, and social protection schemes to enhance financial access to food. Policy strategies for components 6, 7, and 8 were limited, including efforts to improve sustainable nutrition infrastructure, provide safe drinking water and sanitation, and promote gender equity in water use. However, due to variations in ecological and environmental conditions among ASEAN countries, a direct comparison was not recommended.

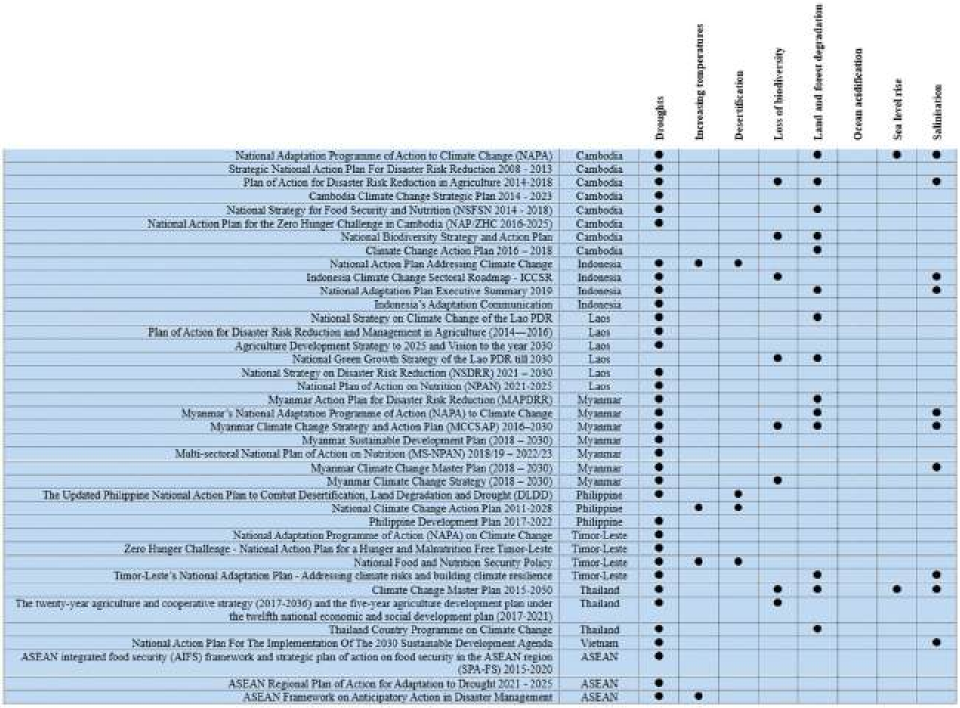
TABLE 2 Number of policies addressed and issued the strategy to support food security in slow-onset disasters.

Food security pillar	Component/themes	Number of policies addressed	Strategy/subthemes	Number of policies issued the strategy
Food availability	Component 1—primary food production	33	Climate resistant varieties	22
			Water management	16
			Climate smart agricultural technology	7
			Integrated cropping techniques	7
			Indigenous crop varieties and technology	5
			Regenerate degraded soil	5
			Eco-friendly crops	2
			Early warning system	2
			Farmer capacity building	2
			Forest restoration	1
			Planting schedule	1
			Erosion reduction	1
			Decrease input costs	1
			Building climate resilient ecosystems	1
			Provide technical advisory services	1
			Agricultural diversity	1
	Component 2—stability of food production	9	Water supply	4
			Community-based management	2
			Ecosystem-based approach	1
			Diversification of agriculture production	1
			Food independent village	1
			Climate smart village	1
			Home-gardens using climate smart approach	1
	Component 3—food reserves and stockpile	10	Seed bank	5
			Emergency food reserves	2
			Food and seed reserves	2
			Rice bank	1
Food access	Component 4—physical access	14	Irrigation infrastructure	8
			Protected infrastructure	4

(Continues)

TABLE 2 (Continued)

Food security pillar	Component/themes	Number of policies addressed	Strategy/subthemes	Number of policies issued the strategy
			Distribution water networks	3
			Rural infrastructure	2
			Infrastructure for stocking water	1
	Component 5—economic access	5	Livelihood diversification activities	2
			Cash distribution	1
			social protection schemes and public employment	1
			Public work programs	1
			Financial incentive mechanisms	1
Food Utilization	Component 6—diets	1	Increase sustainable infrastructure for nutrition	1
	Component 7—food safety	1	Safe drinking water	1
			Sanitation	1
	Component 8—sociocultural factors	1	Gender equity in water use	1



		Droughts	Increasing temperatures	Desertification	Loss of biodiversity	Land and forest degradation	Ocean acidification	Sea level rise	Salinization
National Adaptation Programme of Action to Climate Change (NAPA)	Cambodia	●				●		●	●
Strategic National Action Plan For Disaster Risk Reduction 2008 - 2013	Cambodia	●							
Plan of Action for Disaster Risk Reduction in Agriculture 2014-2018	Cambodia	●			●	●			●
Cambodia Climate Change Strategic Plan 2014 - 2023	Cambodia	●							
National Strategy for Food Security and Nutrition (NSFSN 2014 - 2018)	Cambodia	●				●			
National Action Plan for the Zero Hunger Challenge in Cambodia (NAP/ZHC 2016-2025)	Cambodia	●							
National Biodiversity Strategy and Action Plan	Cambodia				●	●			
Climate Change Action Plan 2016 – 2018	Cambodia					●			
National Action Plan Addressing Climate Change	Indonesia	●	●	●					
Indonesia Climate Change Sectoral Roadmap - ICCSR	Indonesia	●			●				●
National Adaptation Plan Executive Summary 2019	Indonesia	●				●			●
Indonesia's Adaptation Communication	Indonesia	●							
National Strategy on Climate Change of the Lao PDR	Laos	●				●			
Plan of Action for Disaster Risk Reduction and Management in Agriculture (2014—2016)	Laos	●							
Agriculture Development Strategy to 2025 and Vision to the year 2030	Laos	●							
National Green Growth Strategy of the Lao PDR till 2030	Laos				●	●			
National Strategy on Disaster Risk Reduction (NSDRR) 2021 – 2030	Laos	●							
National Plan of Action on Nutrition (NPAN) 2021-2025	Laos	●							
Myanmar Action Plan for Disaster Risk Reduction (MAPDRR)	Myanmar	●				●			
Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change	Myanmar	●				●			●
Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016–2030	Myanmar	●			●	●			●
Myanmar Sustainable Development Plan (2018 – 2030)	Myanmar	●							
Multi-sectoral National Plan of Action on Nutrition (MS-NPAN) 2018/19 – 2022/23	Myanmar	●							
Myanmar Climate Change Master Plan (2018 – 2030)	Myanmar	●							●
Myanmar Climate Change Strategy (2018 – 2030)	Myanmar	●			●				
The Updated Philippine National Action Plan to Combat Desertification, Land Degradation and Drought (DLDD)	Philippine	●		●					
National Climate Change Action Plan 2011-2028	Philippine		●	●					
Philippine Development Plan 2017-2022	Philippine	●							
National Adaptation Programme of Action (NAPA) on Climate Change	Timor-Leste	●							
Zero Hunger Challenge - National Action Plan for a Hunger and Malnutrition Free Timor-Leste	Timor-Leste	●							
National Food and Nutrition Security Policy	Timor-Leste	●	●	●					
Timor-Leste's National Adaptation Plan - Addressing climate risks and building climate resilience	Timor-Leste	●				●			●
Climate Change Master Plan 2015-2050	Thailand	●			●	●		●	●
The twenty-year agriculture and cooperative strategy (2017-2036) and the five-year agriculture development plan under the twelfth national economic and social development plan (2017-2021)	Thailand	●			●				
Thailand Country Programme on Climate Change	Thailand	●				●			
National Action Plan For The Implementation Of The 2030 Sustainable Development Agenda	Vietnam	●							●
ASEAN integrated food security (AIFS) framework and strategic plan of action on food security in the ASEAN region (SPA-FS) 2015-2020	ASEAN	●							
ASEAN Regional Plan of Action for Adaptation to Drought 2021 - 2025	ASEAN	●							
ASEAN Framework on Anticipatory Action in Disaster Management	ASEAN	●	●						

FIGURE 3 National and regional policies addressing food security in slow-onset disasters.

DISCUSSION

This study aimed to review the current policies addressing food security in slow-onset disasters across Southeast Asia, evaluating their strengths, weaknesses, and gaps, while elucidating the policy landscape within this context. Our findings reveal that none of the 39 policies identified and analyzed specifically targeted improving food security during slow-onset disasters, suggesting the presence of a significant gap in policy development at both the regional and national levels in Southeast Asia. However, eight Southeast Asian nations advanced policies to address food security linked with the types of slow-onset disasters in climate change or national target programs on green development, agricultural development, nutrition, and famine, with Cambodia being the most proactive. Most of these policies aimed at improving primary food production, with less emphasis accorded to other aspects of food security. Climate-resistant varieties and water management were the main strategies proposed to enhance primary food production. Drought leads in the number of national and regional policies for improving food security in the region, and notably, more than half of the reviewed policies adopt a multihazard approach, addressing various environmental challenges associated with slow-onset disasters rather than concentrating on a single issue. Components related to food reserves, physical access, and economic access were considered within the policies. On the other hand, the policies provided limited strategies for components associated with diet, food safety, and sociocultural factors.

This study's findings reflect the evolving nexus of food security, climate change, and disaster risk reduction in the literature. This nexus was first outlined in the policy brief titled “Reducing disaster risks to food security in South Africa: Towards integration and co-operation” published by the FAO Regional Disaster Risk Reduction and Management Office for Southern Africa (FAO, 2012). The connection between disaster risk reduction and food security revolves around the idea that disasters impact the availability and accessibility of food (FAO, 2012; Masipa, 2017). The intersection of climate change and food security is focused on the influence of climate change on agricultural productivity, thereby affecting food production (FAO, 2012). When it was first introduced in 2012, the nexus between food security, climate change, and disaster risk reduction was developed against the backdrop of sudden-onset disasters.

Despite growing calls for policymakers to incorporate the nexus between three issues into government policies to address food insecurity in sudden-onset disasters, it is important to recognize that each of these issues has distinct driving factors that do not overlap (Habiba et al., 2016; Zembe et al., 2022). For instance, food insecurity, particularly food access, is influenced by a variety of socioeconomic factors and disruptions to the food distribution system; climate change has some consequences that are separate from food security; and disaster risk reduction encompasses slow-onset disasters. Due to these distinct factors, integrating food security strategies for slow-onset disasters within broader policy contexts like climate change or agricultural development often results in a lack of targeted focus. For example, climate change policies tend to be broad, encompassing a wide range of environmental issues from emission controls to biodiversity conservation, and may not sufficiently address the unique challenges posed by slow-onset disasters such as long-term drought or soil degradation (Kļaviņš et al., 2009; Naser et al., 2019). Similarly, agricultural development policies are typically focused on enhancing productivity and famine relief efforts are usually reactive, addressing immediate food shortages rather than the underlying, gradual processes leading to food insecurity (Fuller, 2015; John et al., 2022). In contrast, policies exclusively targeting food security in the context of slow-onset disasters can be more nuanced and specific. These policies focus on the gradual and often less visible effects of these disasters, such as the incremental degradation of arable land, changes in rainfall patterns affecting crop cycles, or the slow diminishment of water resources.

By concentrating specifically on these aspects, such policies can develop long-term strategies that are proactive rather than reactive, focusing on building resilience and adaptive capacities in agricultural systems and local communities. Going beyond the existing literature on the nexus of food security, climate change and disaster risk reduction, this research strongly recommends Southeast Asian governments develop an extensive and comprehensive policy focused on specifically improving food security in the context of slow-onset disasters in Southeast Asia.

Furthermore, our findings highlight significant gaps in Southeast Asian policies, especially the modest number of strategies for the food utilization pillar. Most of the reviewed policies focused on improving the component of primary food production under the pillar of food availability and overlooked other components of food security such as diet, food safety, and sociocultural factors under the pillar of food utilization. It is widely accepted that the effects of climate change (including slow-onset disasters) on food shortages are indisputable, leading to low dietary diversity and undernutrition (Niles et al., 2021). Low dietary diversity is a key factor contributing to undernutrition (Fite et al., 2023; Kumar & Mohanty, 2023). When individuals have limited access to a variety of foods, their diets may lack essential nutrients, leading to under or mal-nutrition (Kumar & Mohanty, 2023). This is particularly concerning for vulnerable populations, such as pregnant women and children, who have higher nutrient requirements (Dessalegn et al., 2021; Fite et al., 2023; Gelebo et al., 2021). The existing modest strategies to enhance the food utilization pillar, particularly dietary diversity, possibly impede efforts to alleviate food insecurity in slow-onset disasters. Recognizing the evident risk of insufficient dietary diversity as one of the primary causes of undernutrition globally and in many nations (Zeinalabedini et al., 2023), this research proposes that existing national policies and action plans on the food utilization pillar be reinforced with additional strategies to promote dietary diversity and nutritional status, especially for vulnerable populations such as ethnic minorities, women, and children in slow-onset disaster-affected locations.

Additionally, the paramount importance of establishing and enforcing safe food consumption practices, particularly in regions prone to disasters, cannot be overlooked. Slow-onset disasters such as drought have the potential to jeopardize both water availability and food safety (Ghosh, 2019; Saha et al., 2021). The consumption of contaminated food and unsafe drinking water carries the risk of foodborne illnesses, which can have severe health implications, especially for vulnerable demographics such as children, the elderly, and individuals with compromised immune systems (Berry et al., 2007). To effectively tackle these challenges, food safety policies must extend their scope beyond the production phase. They should encompass comprehensive measures that guarantee safe food handling, storage, and preparation practices at the consumer level. This can be achieved by implementing public awareness campaigns to promote safe cooking techniques and appropriate food handling practices during slow-onset disasters.

Our study also highlights an additional significant gap in Southeast Asian food security policies related to the neglect of sociocultural factors in food utilization. This neglect goes beyond policy completeness, impacting the effectiveness and relevance of these policies within diverse sociocultural contexts. It underscores the profound influence of cultural norms, traditions, and religious beliefs on dietary preferences and practices in Southeast Asia, which extend to aspects of nutrition, health, and overall well-being. Our findings reveal that current policies fail to adequately consider these factors, leading to a disconnect from the actual dietary needs and practices of local communities. This issue becomes increasingly critical in the context of slow-onset disasters like droughts and land degradation, where the need for culturally cognizant and adaptable responses is essential. The current study suggests a need to reorient policy development, comprehensively integrating sociocultural factors into food security strategies, to guarantee cultural sensitivity and alignment with local dietary habits. This approach, coupled with engaging local communities to gather their insights and preferences, is vital for developing technically viable, socially acceptable, and sustainable strategies to effectively mitigate the impacts of slow-onset disasters on food security.

While the limitations in existing policies on food security for slow-onset disasters present an opportunity for policy development and improvement in Southeast Asia, we need to highlight that several existing policies are likely to contribute to and enable the reduction or amelioration of the food insecurity burden.

First, agriculture has been a traditional livelihood and contributes to food security for a large portion of the population in the region (Bhadrakom et al., 2022). Therefore, in the context of climate change and natural disasters (including slow-onset disasters), the agricultural sector is seriously affected and threatens food security by reduced primary food production and production instability (Thornton et al., 2014). To deal with this situation, Southeast Asian countries have launched many timely policies. The most chosen rapid adaptation strategy has been climate-resistant crop varieties, such as drought and salt-tolerant (ASEAN, 2022; Climate Change Commission, 2011; Council for Agricultural and Rural Development, 2016; General Directorate of Agriculture, 2013; Government of Lao PDR, 2010; Government of Viet Nam, 2017; Ministry of Agriculture and Forestry, 2014, 2015; Ministry of Environment, 2016; Ministry of National Development Planning, 2009, 2019; Ministry of Natural Resources and Environmental Conservation, 2017, 2019a, 2019b; Ministry of Planning Finance, 2018; Ministry of Social Welfare Relief, and Resettlement, Relief and Resettlement Department, 2012; National Economic and Development Authority, 2017; National Environmental Conservation Committee, 2012; Secretariat of State for Environment, Coordinating Minister for Economic Affairs, 2021; State Ministry of Environment, 2007; The National Council on Food Security, Sovereignty and Nutrition, 2014; The Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, 2015). Utilizing climate-resistant varieties can enhance the resilience of crops to slow-onset disasters by making them more able to withstand water stress, soil degradation, and saline intrusion, resulting in more stable yields and improved food security (Karri & Nalluri, 2023).

Second, water management is another strategy that has been utilized to mitigate the effects of drought by optimizing water use and ensuring efficient distribution among different sectors, including agriculture (Climate Change Management and Coordination Division, Office of Natural Resources and Environmental Policy and Planning, 2017; Council for Agricultural and Rural Development, 2016; Department of Agriculture, 2010; General Directorate of Agriculture, 2013; Ministry of Agriculture and Forestry, 2014; Ministry of Environment and Forestry, 2022; Ministry of National Development Planning, 2019; Ministry of Natural Resources and Environmental Conservation, 2017, 2019a, 2019b; Ministry of Social Welfare Relief, and Resettlement, Relief and Resettlement Department, 2012; National Council for Food Security, Sovereignty and Nutrition in Timor-Leste, 2014; Secretariat of State for Environment, Coordinating Minister for Economic Affairs, 2021; State Ministry of Environment, 2007; The Ministry of Labor and Social Welfare, 2021; The Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, 2015). This approach allows Southeast Asian countries to sustain agricultural activities, maintain ecosystems, and support communities' water needs during extended dry periods by conserving water (Shadeed et al., 2020). Moreover, proper water management plays a crucial role in controlling soil salinity by preventing water logging and excessive salt build-up, ensuring agricultural lands' continued productivity (Kumar & Sharma, 2020).

In addition, establishing a seed bank was another strength of the reviewed policies (Government of Viet Nam, 2017; Ministry of Agriculture and Cooperatives, 2017; Ministry of

Natural Resources and Environmental Conservation, 2017, 2019a; Ministry of Social Welfare Relief, and Resettlement, Relief and Resettlement Department, 2012). A seed bank is a repository for many crop seeds, encompassing traditional and climate-resistant varieties. By conserving diverse seed collections, the genetic diversity of crops is preserved (Honnay et al., 2007), ensuring the availability of resilient seeds capable of withstanding the impacts of slow-onset disasters. Seed banks store specially bred or selected seeds of climate-resistant varieties designed to tolerate various climatic stresses. When slow-onset disasters strike, farmers can access these climate-resilient seeds from the seed bank, enabling them to replant their fields and enhance their chances of maintaining crop productivity and food security despite adverse climate conditions.

Our findings also revealed a significant strength in the existing environmental policies across Southeast Asia, particularly in their strategic alignment to support food security amidst increasing drought conditions in the region (Zhang et al., 2021). According to ASEAN [2023], Southeast Asia has consistently faced severe droughts for a long time. In the last 5 years, the region has encountered the most formidable droughts in decades, affecting all ASEAN Member states. At the height of these events, more than 70% of the land area was impacted, exposing nearly 60% of the region's population. Hence, our findings are vital in providing strategic evidence for the region where agriculture plays a critical role in economies and sustenance. Furthermore, the analysis presented in this study brings to light a critical aspect of environmental policy-making in Southeast Asia: the adoption of a multihazard approach regarding slow-onset disasters by over half of the reviewed policies. This approach has been recognized as beneficial for designing effective disaster risk reduction policies (Bronfman et al., 2019). It allows decision makers to address climate-induced hazards and build resilience in infrastructure projects (Green & Chmutina, 2019). Furthermore, multi-hazard assessments help in exploring possible cascading impacts that may arise from the interaction of multiple hazards, thereby informing future hazard adaptation and reduction (Ihinegbu, 2021). Therefore, we urge policymakers and other stakeholders in Southeast Asia and beyond to prioritize the expansion and refinement of multihazard approaches in designing slow-onset disaster risk policies. The goal is to create a more resilient, adaptive, and sustainable approach to food security withstanding the complex challenges posed by slow-onset disasters in the region.

Limitations

Several limitations related to the scope of collected data can be identified within this study. First, the scope of the review was limited to publicly available online government policies on the critical components of the food security framework. Our analysis did not consider the policy's development, implementation, or outcome, rather it examined the content of policies as the manifestation of high-level government commitment and response to support food security in slow-onset disasters. This paves the way for future research to explore the effectiveness of Southeast Asian countries policies and assess the extent to which the policies are implemented in practice. In addition, as our study focuses on official government policy documents to analyze food security policies in slow-onset disasters in Southeast Asia, policy briefs and other policy documents published by regional agencies were beyond the scope of our study. Future research should consider including these elements to offer a more comprehensive understanding of policy development and food security strategies. This research direction opens the opportunities to examine the translation of the policy discourse led by research agencies and nongovernmental organizations on food security in slow-onset disasters into official national policies. Moreover, language limitation may have meant the exclusion of policy documents on food security, such as dietary diversity, during slow-onset disasters published in local languages. In fact, only three policies were eliminated because they were not written in English, according to the findings of this study. Last, the analysis within this study focuses on the national or regional government levels; future research on lower-level policy would add more comprehensive strategies that improve food security in response to slow-onset disasters in Southeast Asian countries.

CONCLUSION

This study reviews existing policies introduced by the regional organization ASEAN and the governments of Southeast Asian countries to support food security in slow-onset disasters. The key findings of this study indicate that no specific government policies were developed at the regional or national levels in Southeast Asia to directly address food security in slow-onset disasters. Existing policies primarily focus on the first FAO pillar of food availability, modestly consider the second pilar of food access, and overlooked the last pillar of food utilization. Further action should be taken by policymakers to consider the pillar of food utilization to improve the dietary diversity of vulnerable populations in areas impacted by slow-onset disasters.

ACKNOWLEDGMENTS

This research is supported by the Griffith University International Postgraduate Research Scholarship (GUIPRS) for the first author (Hiep N. Le). Open access publishing facilitated by Griffith University, as part of the Wiley - Griffith University agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

Not applicable.

ORCID

Hai Phung http://orcid.org/0000-0003-1533-8074

REFERENCES

Anderson, S. A. (1990). Core indicators of nutritional state for difficult-to-sample populations. *The Journal of Nutrition*, *120*, 1555–1598.

Anschell, N., & Tran, M. (2020). *Slow-onset climate hazards in Southeast Asia*. Stockholm Environment Institute.

ASEAN Secretariat. (2009). *SASOP: ASEAN standard operating procedure for regional standby arrangements and coordination of joint disaster relief and emergency response operations*.

ASEAN Sectoral Working Group on Crops (ASWGC) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (2016). *ASEAN integrated food security (AIFS) framework and strategic plan of action on food security in the ASEAN region (SPA-FS) 2015–2020*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

Association of Southeast Asian Nations (ASEAN). (2022). *ASEAN framework on anticipatory action in disaster management*.

Association of Southeast Asian Nations (ASEAN). (2023). *UNESCAP launch building resilience to drought in South-East Asia report*. https://asean.org/asean-unescap-launch-building-resilience-to-drought-in-south-east-asia-report/

Berry, E. D., Woodbury, B. L., Nienaber, J. A., Eigenberg, R. A., Thurston, J. A., & Wells, J. E. (2007). Incidence and persistence of zoonotic bacterial and protozoan pathogens in a beef cattle feedlot runoff control–vegetative treatment system. *Journal of Environmental Quality*, *36*, 1873–1882.

Bhadrakom, C., Boughton, D., Kitchaicharoen, J., Napasintuwong, O., Saiyut, P., Satsue, P., Punjatewakupt, P., Suebpongsang, P., Yotapakdee, T., & Satimanon, T. (2022). *Sustainable food system in Southeast Asia under and beyond COVID-19 policy evidence and call for action a conference synthesis*.

Brenton, P., Chemutai, V., & Pangestu, M. (2022). Trade and food security in a climate change-impacted world. *Agricultural Economics*, *53*, 580–591.

Bronfman, N. C., Cisternas, P. C., Repetto, P., & Castañeda, J. V. (2019). Natural disaster preparedness in a multi-hazard environment: Characterizing the sociodemographic profile of those better (worse) prepared. *PLoS ONE*, *14*(4), e0214249.

Centers for Disease Control and Prevention (CDC). (2023). *Definition of policy*. https://www.cdc.gov/policy/paeo/process/definition.html

Chan, H. M., Wesche, S. D., Fillion, M., & MacLean, J. (2018). *Supporting inuit food security: A synthesis of initiatives in the Inuvialuit Settlement Region, Northwest Territories*. Canadian Food Studies/La Revue Canadienne Des Études Sur L Alimentation.

Chou, L. (2014). *Climate change impcts on Southeast Asia's marine biodiversity* [Conference presentation]. The Asian Conference on Sustainability, Energy and the Environment Official Conference Proceedings. Citeseer.

Choularton, R., Krishnamurthy, P. K., & Lewis, K. (2012). *Climate impacts on food security and nutrition: A review of existing knowledge*.

Climate Change Commission. (2011). *National climate change action plan 2011–2028*. http://adaptationmarketplace.org/data/library

Climate Change Management and Coordination Division, Office of Natural Resources and Environmental Policy and Planning. (2017). *Thailand country programme on climate change*.

Council for Agricultural and Rural Development. (2014). *National strategy for food security and nutrition (NSFSN 2014–2018)*.

Council for Agricultural and Rural Development. (2016). *National action plan for the zero hunger challenge in Cambodia (NAP/ZHC 2016–2025)*.

Department of Agriculture. (2010). *The updated Philippine National Action Plan to Combat Desertification, Land Degradation and Drought (DLDD)*. Department of Agriculture, Department of Agrarian Reform, Department of Environment and Natural Resources, and Department of Science and Technology.

Dessalegn, N., Birhanu, S., Birhanu, M., Kassaw, A., Kindie, K., & Adugna, A. (2021). Undernutrition and its associated factors among human immunodeficiency virus infected children on follow up in Amhara Region referral hospitals, Ethiopia, 2020. *Global Pediatric Health*, *8*, 2333794X2110396.

ESCAP-UN. (2021). *ASEAN regional plan of action for adaptation to drought 2021–2025*. The ASEAN Secretariat Community Relations Division.

Food and Agriculture Organization (FAO). (1996). *Rome Declaration on World Food Security and World Food Summit Plan of Action: World Food Summit, 13–17 November 1996*.

Food and Agriculture Organization (FAO). (2008). *Food security information for action. Practical guides*. European Commission, FAO Food Security Program.

Food and Agriculture Organization (FAO). (2012). *Reducing disaster risks to food security in southern Africa: Towards integration and co-operation* (Vol. 4). FAO Regional Disaster Risk Reduction and Management Office for Southern Africa (REOSA).

Food and Agriculture Organization (FAO). (2021a). *Making agrifood systems more resilient to shocks and stresses*.

Food and Agriculture Organization (FAO). (2021b). *FAO Stat*.

Fite, M. B., Tura, A. K., Yadeta, T. A., Oljira, L., & Roba, K. T. (2023). Factors associated with undernutrition among pregnant women in Haramaya District, Eastern Ethiopia: A community-based study. *PLoS ONE*, *18*(3), e0282641.

Fuller, P. (2015). Changing disaster relief regimes in China: An analysis using four famines between 1876 and 1962. *Disasters*, *39*, 146–165.

Gelebo, D. G., Gebremichael, M. A., Asale, G. A., & Berbada, D. A. (2021). Prevalence of undernutrition and its associated factors among pregnant women in Konso District, Southern Ethiopia: A community-based cross-sectional study. *BMC Nutrition*, *7*, 32.

General Directorate of Agriculture. (2013). *Plan of action for disaster risk reduction in agriculture 2014–2018*. Kingdom of Cambodia, Ministry of Agriculture, Forestry, and Fisheries Phnom Penh.

Ghosh, K. G. (2019). Spatial and temporal appraisal of drought jeopardy over the Gangetic West Bengal, Eastern India. *Geoenvironmental Disasters*, *6*, 1.

Giacoman, C., Ayala Arancibia, P., & Alfaro, J. (2021). Choosing to stop consuming meat for environmental reasons: Exploring the influence of gender and social status variables in Chile. *British Food Journal*, *123*, 2996–3013.

Government of Lao PDR. (2010). *National strategy on climate change of the Lao PDR*.

Government of Viet Nam. (2017). *National action plan for the implementation of the 2030 sustainable development agenda*.

Green, A. L., & Chmutina, K. (2019). Building climate resilience of UK's rail network through a multihazard approach. *Proceedings of the Institution of Civil Engineers—Engineering Sustainability*.

Habiba, U., Abedin, M. A., & Shaw, R. (2016). Food security, climate change adaptation, and disaster risk. In J. I. Uitto & R. Shaw (Eds.), *Sustainable development and disaster risk reduction* (pp. 87–101). Springer.

Hadley, K., Wheat, S., Rogers, H. H., Balakumar, A., Gonzales-Pacheco, D., Davis, S. S., Linstadt, H., Cushing, T., Ziska, L. H., Piper, C., & Sorensen, C. (2023). Mechanisms underlying food insecurity in the aftermath of climate-related shocks: A systematic review. *The Lancet Planetary Health*, *7*, e242–e250.

Hall, D. M., & Steiner, R. (2020). Policy content analysis: Qualitative method for analyzing sub-national insect pollinator legislation. *MethodsX*, *7*, 100787.

Honnay, O., Bossuyt, B., Jacquemyn, H., Shimono, A., & Uchiyama, K. (2007). Can a seed bank maintain the genetic variation in the above ground plant population? *Oikos*, *117*, 1–5.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*, 1277–1288.

Hughes, A. C. (2017). Understanding the drivers of Southeast Asian biodiversity loss. *Ecosphere*, *8*, e01624.

Ihinegbu, C. (2021). Conceptualization and management of disasters and climate change events in Africa: A review. *SN Applied Sciences*, *3*, 848.

John, A. O., Emmanuel, A. O., Oye, A. A., Chidinma, N.-O. L., Adenike, S. B., & Oyewole, O. S. (2022). Determinants of technology adoption and intensity of adoption among rice farming households in Ogun State, Nigeria. *European Journal of Technology*, *6*, 26–36.

Kaneberg, E., Piotrowicz, W. D., Abikova, J., Listou, T., Schiffling, S. A., Paciarotti, C., Vega, D., & Adalgeirsdottir, K. (2023). Defence organizations in emergency networks: The early response to COVID-19 in Europe. *Journal of Humanitarian Logistics and Supply Chain Management*, *13*, 91–105.

Karri, V., & Nalluri, N. (2023). Enhancing resilience to climate change through prospective strategies for climate-resilient agriculture to improve crop yield and food security. *Plant Science Today*, *11*, 21–33.

Kļaviņš, M., Bruneniece, I., & Bisters, V. (2009). Development of national climate and adaptation policy in Latvia. *International Journal of Climate Change Strategies and Management*, *1*, 75–91.

Kumar, M., & Mohanty, P. C. (2023). Undernutrition and anaemia among Indian adolescents: Role of dietary diversity and hygiene practices. *Journal of Nutritional Science*, *12*, e33.

Kumar, P., & Sharma, P. K. (2020). Soil salinity and food security in India. *Frontiers in Sustainable Food Systems*, *4*, 533781.

Lassa, J. A., Teng, P., Caballero-Anthony, M., & Shrestha, M. (2019). Revisiting emergency food reserve policy and practice under disaster and extreme climate events. *International Journal of Disaster Risk Science*, *10*, 1–13.

Lessan, N., Saadane, I., Alkaf, B., Hambly, C., Buckley, A., Finer, N., Speakman, J. R., & Barakat, M. T. (2018). The effects of Ramadan asting on activity and energy expenditure. *American Journal of Clinical Nutrition*, *107*, 54–61.

Mamuji, A., & Kchouk, B. (2018). *Not all natural disasters are covered equal: A focus on Canadian media*. Revue Gouvernance.

Mandisvika, G., Chirisa, I., & Bandauko, E. (2015). Post-harvest issues: Rethinking technology for value-addition in food security and food sovereignty in Zimbabwe. *Advanced in Food Technology and Nutritional Sciences—Open Journal*, *1*, S29–S37. https://doi.org/10.17140/AFTNSOJ-SE-1-105

Masipa, T. S. (2017). The impact of climate change on food security in South Africa: Current realities and challenges ahead. *Jàmbá: Journal of Disaster Risk Studies*, *9*, 411.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

Ministry for Economy and Development. (2010). *National Adaptation Programme of Action (NAPA) on climate change*.

Ministry of Agriculture and Cooperatives. (2017). *The twenty-year agriculture and cooperative strategy (2017–2036) and the five-year agriculture development plan under the twelfth national economic and social development plan (2017–2021)*.

Ministry of Agriculture and Forestry. (2014). *Plan of action for Disaster Risk Reduction and Management in Agriculture (2014–2016)*. Government of Lao PDR, Ministry of Agriculture and Forestry.

Ministry of Agriculture and Forestry. (2015). *Agriculture development strategy to 2025 and vision to the year 2030*.

Ministry of Environment. (2006). *National Adaptation Programme of Action to Climate Change (NAPA)*.

Ministry of Environment. (2016). *Climate change action plan 2016–2018*.

Ministry of Environment and Forestry. (2022). *Indonesia's adaptation communication*.

Ministry of Health DoHaHP, Centre of Nutrition. (2021). *National Plan of Action on Nutrition (NPAN) 2021–2025*.

Ministry of National Development Planning. (2009). *Indonesia climate change sectoral roadmap (ICCSR)*.

Ministry of National Development Planning. (2019). *National Adaptation Plan Executive Summary*.

Ministry of Natural Resources and Environmental Conservation. (2017). *Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2016–2030*.

Ministry of Natural Resources and Environmental Conservation. (2019a). *Myanmar Climate Change Master Plan (2018–2030)*. Environmental Conservation Department.

Ministry of Natural Resources and Environmental Conservation. (2019b). *Myanmar Climate Change Strategy (2018–2030)*.

Ministry of Planning Finance. (2018). *Myanmar Sustainable Development Plan (2018–2030)*.

Ministry of Social Welfare Relief, and Resettlement, Relief and Resettlement Department. (2012). *Myanmar Action Plan for Disaster Risk Reduction (MAPDRR)*.

Montanarella, L., Pennock, D., McKenzie, N., Badraoui, M., Chude, V. O., Baptista, I., Mamo, T., Yemefack, M., Aulakh, M. S., Yagi, K., Hong, S. Y., Vijarnsorn, P., Zhang, G.-L., Arrouays, D., Black, H., Krasilnikov, P., Sobocká, J., Alegre, J., Henriquez, C. R., … Vargas, R. (2016). World's soils are under threat. *Soil*, *2*(1), 79–82.

Musaiger, A. O. (1993). Socio-cultural and economic factors affecting food consumption patterns in the Arab countries. *Journal of the Royal Society of Health*, *113*, 68–74.

Myers, S. S., Smith, M. R., Guth, S., Golden, C. D., Vaitla, B., Mueller, N. D., Dangour, A. D., & Huybers, P. (2017). Climate change and global food systems: Potential impacts on food security and undernutrition. *Annual Review of Public Health*, *38*, 259–277.

Naser, M. M., Swapan, M. S. H., Ahsan, R., Afroz, T., & Ahmed, S. (2019). Climate change, migration and human rights in Bangladesh: Perspectives on governance. *Asia Pacific Viewpoint*, *60*, 175–190.

National Climate Change Committee. (2013). *Cambodia climate change strategic plan 2014–2023*.

National Committee for Disaster Management and Ministry of Planning. (2008). *Strategic national action plan for disaster risk reduction—2013*. Ministry of Planning Phnom Penh.

National Council for Food Security, Sovereignty and Nutrition in Timor-Leste. (2014). *Zero hunger challenge—National Action Plan for a hunger and malnutrition free timor-leste*.

National Council for Sustainable Development. (2016). *National biodiversity strategy and action plan*.

National Economic and Development Authority. (2017). Philippine development plan–2022.

National Environmental Conservation Committee. (2012). *Myanmar's National Adaptation Programme of Action (NAPA) to climate change*. National Environmental Conservation Committee, Ministry of Environmental Conservation and Forestry.

National Nutrition Centre Department of Public Health, Ministry of Health and Sports. (2018). *Multi-sectoral National Plan of Action on Nutrition (MS-NPAN) /19–2022/23*. National Nutrition Centre, Department of Public Health, Ministry of Health and Sports, Republic of the Union of Myanmar.

National Nutrition Council. (2009). *Adopting the National Policy on nutrition management in emergencies and disasters*.

Ngcamu, B. S., & Chari, F. (2020). Drought influences on food insecurity in Africa: A systematic literature review. *International Journal of Environmental Research and Public Health*, *17*, 5897.

Niles, M. T., Emery, B. F., Wiltshire, S., Brown, M. E., Fisher, B., & Ricketts, T. H. (2021). Climate impacts associated with reduced diet diversity in children across nineteen countries. *Environmental Research Letters*, *16*, 015010.

OECD-FAO. (2017). *OECD-FAO agricultural outlook 2017–2026*. OECD Publishing.

Owino, F. (2019). Socio-cultural determinants of food security and consumption patterns in Kisumu, Kenya. *International Journal of Food Safety Nutrition and Public Health*, *9*, 119–124.

Ratti, M. L. (2017). The economics of natural disasters: An overview of the current research issues and methods. *SSRN Electronic Journal*.

Saha, S., Kundu, B., Paul, G. C., Mukherjee, K., Pradhan, B., Dikshit, A., Abdul Maulud, K. N., & Alamri, A. M. (2021). Spatial assessment of drought vulnerability using fuzzy-analytical hierarchical process: A case study at the Indian state of Odisha. *Geomatics Natural Hazards and Risk*, *12*, 123–153.

Savary, S., Akter, S., Almekinders, C., Harris, J., Korsten, L., Rötter, R., Waddington, S., & Watson, D. (2020). Mapping disruption and resilience mechanisms in food systems. *Food Security*, *12*, 695–717.

Scheelbeek, P. F. D., Khan, A. E., Mojumder, S., Elliott, P., & Vineis, P. (2016). Drinking water sodium and elevated blood pressure of healthy pregnant women in salinity-affected coastal areas. *Hypertension*, *68*, 464–470.

Schreier, M. (2012). *Qualitative content analysis in practice* (pp. 1–280). Jacobs University Bremen.

Secretariat for Formulation of National Green Growth Strategy of the Lao PDR. (2018). National green growth strategy of the Lao PDR till 2030.

Secretariat of State for Environment, Coordinating Minister for Economic Affairs. (2021). *Timor-Leste's national adaptation plan—Addressing climate risks and building climate resilience*.

Shadeed, S., Judeh, T., & Riksen, M. (2020). Rainwater harvesting for sustainable agriculture in high water-poor areas in the West Bank, Palestine. *Water*, *12*, 380.

Sheffield, J., & Wood, E. F. (2008). Global trends and variability in soil moisture and drought characteristics, 1950–2000, from observation-driven simulations of the terrestrial hydrologic cycle. *Journal of Climate*, *21*, 432–458.

Shrestha, R. P. (2011). Land degradation and biodiversity loss in Southeast Asia. In Trisurat, Y., R. P. Shrestha, R. Alkemade (Eds.), *Land use, climate change and biodiversity modeling: Perspectives and applications* (pp. 303–327). IGI Global.

Šmugović, S., Kalenjuk-Pivarski, B., Grubor, B., & Knežević, N. (2021). *Vegetarian Diet: Perceptions and Attitude of Hospitality Management*. Zbornik Radova Departmana Za Geografiju Turizam I Hotelijerstvo.

State Ministry of Environment. (2007). *National Action Plan: Addressing climate change*. Government of Indonesia Jakarta.

Staupe-Delgado, R. (2019a). Progress, traditions and future directions in research on disasters involving slow-onset hazards. *Disaster Prevention and Management: An International Journal*, *28*, 623–635.

Staupe-Delgado, R. (2019b). *Overcoming barriers to proactive response in slow-onset disasters*.

The Ministry of Labor and Social Welfare. (2021). *National Strategy on Disaster Risk Reduction (NSDRR) 2021–2030*.

The National Council on Food Security, Sovereignty and Nutrition. (2014). *National Food and Nutrition Security Policy*.

The Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2015). *Climate change master plan 2015–2050*.

Thomas, V., & López, R. (2015). *Global increase in climate-related disasters ADB Economics Working Paper Series*.

Thornton, P. K., Ericksen, P. J., Herrero, M., & Challinor, A. J. (2014). Climate variability and vulnerability to climate change: A review. *Global Change Biology*, *20*, 3313–3328.

United Nations. (2011). *Decision 1/COP.16, The Cancun Agreements: Outcome of the work of the ad hoc working group on long-term cooperative action under the convention*. Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 Addendum Part Two: Action taken by the Conference of the Parties at its sixteenth session.

United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP). (2020). *The disaster riskscape across South-East Asia: Key takeaways for stakeholders* (ST/ESCAP/2885).

United Nations General Assembly. (2016). *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*.

UN Office for Disaster Risk Reduction: Sendai framework for disaster risk reduction 2015–2030. Geneva, Switzerland; United Nations Office for Disaster Risk Reduction 2015.

World Health Organization. (2023). *Drought*. https://www.who.int/health-topics/drought#tab=tab_1

Yamori, K., & Goltz, J. D. (2021). Disasters without borders: The coronavirus pandemic, global climate change and the ascendancy of gradual onset disasters. *International Journal of Environmental Research and Public Health*, *18*, 3299.

Zeinalabedini, M., Zamani, B., Nasli-Esfahani, E., & Azadbakht, L. (2023). A systematic review and meta-analysis of the association of dietary diversity with undernutrition in school-aged children. *BMC Pediatrics*, *23*, 269.

Zembe, A., Nemakonde, L. D., & Chipangura, P. (2022). Policy coherence between food security, disaster risk reduction and climate change adaptation in South Africa: A summative content analysis approach. *Jàmbá: Journal of Disaster Risk Studies*, *14*, 1173.

Zhang, L., Chen, Z., & Zhou, T. (2021). Human influence on the increasing drought risk over Southeast Asian monsoon region. *Geophysical Research Letters*, *48*, 1–9.

How to cite this article: Le, H. N., Sofija, E., Harris, N., Nguyen, T., & Phung, H. (2024). Food security in slow-onset disasters: A policy review in Southeast Asian regions. *World Medical & Health Policy*, *16*, 353–375. https://doi.org/10.1002/wmh3.604

APPENDIX A

See Table A1

TABLE A1 Search strategy.

Sources	Search strategy
Government websites	Started by accessing the official government websites: Ministry of Environment, Ministry of Agriculture, and Ministry of Health of each country in Southeast Asia. On each ministry's webpage, searched each individual tab for relevant policies. Or on Webpage Search Bar: searched each term: "National Policy," "National Plan," "National Strategy," or "National Guidelines." Then, selected policies that have a title, abstract, or summary related to "slow-onset disasters," or "creeping disasters," or types of slow-onset disasters[a] or "food security," or "food insecurity." In the case of websites that did not exhibit English, the online artificial intelligence tool (Google Translate) was used to translate from the local language to English to identify appropriate policies.
ASEAN	Started by accessing the ASEAN website (https://asean.org/). Then, searched each individual tab for relevant policies. Or on Webpage Search Bar: searched each term: "Regional Policy," "Regional Plan," "Regional Strategy," "Regional Guidelines." Then, selected policies that have a title, abstract, or summary related to "slow-onset disasters," or "creeping disasters," or types of slow-onset disasters[a] or "food security," or "food insecurity."
United Nations Office for Disaster Risk Reduction	Started by accessing the website: https://www.preventionweb.net. Navigated to the Main webpage Information Tabs, then searched with the theme: policy and plans, then limited the Region and Country to Asia and chose policies that have a title, abstract, or summary related to "slow-onset disasters," or "creeping disasters," or types of slow-onset disasters[a] or "food security," or "food insecurity" in Southeast Asian countries and ASEAN.
Food and Agriculture Organization	Started by accessing the website: https://www.fao.org/faolex/country-profiles/en/. Then, searched each individual country's profile and read through Policies, Legislation, and International Agreements. Then, selected policies that have a title, abstract, or summary related to "slow-onset disasters" or "creeping disasters" or types of slow-onset disasters[a] or "food security" or "food insecurity." To search for ASEAN, the keyword "ASEAN" was typed into the webpage search bar. After that, selected policies that have a title, abstract, or summary related to "slow-onset disasters" or "creeping disasters" or types of slow-onset disasters[a] or "food security" or "food insecurity" within regional ASEAN.

Abbreviation: ASEAN, Association of Southeast Asian Nations

[a] Types of slow-onset disasters included droughts, increasing temperatures, desertification, loss of biodiversity, land and forest degradation, ocean acidification, sea level rise, and salinisation (United Nations, 2011; UN Office for Disaster Risk Reduction, 2015, p. 10). The glacial retreat was not included due to its inappropriate with the Southeast Asia region.

AUTHOR BIOGRAPHIES

Hiep N. Le is a PhD candidate at the School of Medicine and Dentistry, Griffith University, Australia.

Ernesta Sofija, PhD, is Senior Lecturer in Public Health and Health Promotion at the School of Medicine and Dentistry, Griffith University, Australia.

Neil Harris, PhD, is Director, Higher Degree Research for the Health Group and Professor of Public Health at the School of Medicine and Dentistry at Griffith University, Australia.

Thu Nguyen, PhD, is Associate Lecturer at the School of Government and International Relations, Griffith University, Australia.

Hai Phung, MD, MPH, PhD, is Program Director of Public Health (Postgraduate) and Senior Lecturer in Epidemiology, Research Methods and Global Health at the School of Medicine and Dentistry, Griffith University, Australia.

Received: 13 December 2023 | Revised: 10 February 2024 | Accepted: 13 February 2024

DOI: 10.1002/wmh3.605

RESEARCH ARTICLE

WMHP WILEY

Communicating socially acceptable risk judgments: The role of impression information insufficiency in the risk information seeking and processing model

Timothy K. F. Fung[1] | **Po Yan Lai**[1] | **Robert J. Griffin**[2]

[1]Department of Interactive Media, Hong Kong Baptist University, Kowloon Tong, Hong Kong

[2]Diederich College of Communication, Marquette University, Milwaukee, Wisconsin, USA

Correspondence
Timothy K. F. Fung, Department of Interactive Media, Hong Kong Baptist University, Communication and Visual Arts Bldg, Kowloon Tong, Hong Kong.
Email: tfung@hkbu.edu.hk

Funding information
Hong Kong Baptist University, Grant/Award Number: RC-FNRA-IG/19-20/COMM/02

Abstract

The COVID-19 pandemic has created uncertainty and controversy around risk-related issues such as vaccine mandates. People expressing their opinions on these issues to important others, such as employers, may face significant consequences, such as rewards or rejection. Therefore, people may try to find, avoid, or use information in a way that helps them express risk judgments that are socially acceptable in different social situations. This study investigated how people seek, avoid, and process risk information when they are concerned about their impression management. It also introduced the concept of *impression information insufficiency* (the perceived gap between the information one has and the information one needs to convey socially acceptable judgments and meet interpersonal needs in social situations) and examined its antecedents and outcomes within the risk information seeking and processing model. We conducted an online survey with 1673 Hong Kong adults during the COVID-19 pandemic. The results showed that fear and social norms related to greater impression information insufficiency, which thereby was associated with biased risk information seeking, avoidance, and processing.

KEYWORDS

impression management, impression motive, information avoidance, information processing, information seeking, policy mandates, risk communication, risk information seeking and processing model, risk information use behavior

INTRODUCTION

In response to public health emergencies, administrations in the public and private sectors often consider policy mandates as one of their intervention strategies to effectively curb any rapid surge in the number of infected cases and deaths. For example, during the COVID-19 pandemic, governments around the world and many organizations, profit and nonprofit, implemented policy mandates in various degrees regarding vaccination, isolation, infection testing, personal hygiene (e.g., facemasks), and restrictions on movement and access (An et al., 2021; Maurer, 2022). Even though many people might hold negative sentiments toward governmental and organizational policy mandates, surveys showed that nearly 99% of employees complied with the mandates (Farrington, 2021; Maurer, 2022). Of the myriad reasons people may have for deciding how to respond to policy mandates related to a health hazard, their concern for expressing socially acceptable risk judgments can be an important reason. Other than protecting themselves from the physical harm caused by a health hazard, interviewees indicated in news reports and other surveys that “going along with the stance of employers, parents, and children” (e.g., The de Beaumont Foundation, 2021), “being helpful and cooperative employees” (e.g., Yau & Magramo, 2021), and “being supportive of the government” (e.g., Tian, 2022) are their reasons for complying with policy mandates and for expressing socially acceptable judgments.

Policy mandates heighten individuals' concerns for expressing socially acceptable risk judgments when they are required to explicitly reveal their own risk judgments to others; expressing their personal judgments about policy mandates and related risk issues in social situations can result in important interpersonal consequences. For example, during the COVID-19 pandemic, companies that implemented vaccine and facemask mandates required people to wear a facemask and state whether they had fulfilled the vaccine requirement before entering the company's premises (Reuters, 2021). Employees who voice their opinions about the company's policy can convey to their supervisor a positive or negative impression which can affect their relationship as well as have implications for the employee's job security and advancement (Ellyatt, 2021; Henry et al., 2022). Refusing the company's vaccine mandate can convey to vaccinated colleagues an impression of being inconsiderate and irresponsible, which can result in workplace conflict (Ellyatt, 2021). In another situation, people who share news about vaccination, social distancing regulations, and personal protective equipment such as facemasks can thereby show care for their loved ones (e.g., parents, spouse, close friends), whereas expressing an opinion contradictory to their loved ones' views of COVID-19 related issues, such as the policy mandates, can lead to relational conflicts (Ellyatt, 2022). Therefore, expressing to others one's attitude and behavioral reaction toward policy mandates and related risk issues can have significant interpersonal consequences in professional and personal contexts.

Since expressing judgments in social situations can have significant effects on one's relationships, a person may want to convey judgments that are socially acceptable to fulfill their interpersonal needs. This can be a major motive for a person (Bohner et al., 1995) and is called “impression motive” (Eagly & Chaiken, 1993). By expressing judgments that they believe will be socially acceptable to their *evaluators* (e.g., employers, supervisors, colleagues, parents, in- laws, relatives, close friends) (Chaiken et al., 1989), impression-motivated people attempt to satisfy interpersonal needs such as obtaining material and social rewards from others or preventing rejection or isolation by others (Leary & Kowalski, 1990).

When people are impression-motivated, their goal is to express socially acceptable judgments that will result in positive relational outcomes in social situations. To achieve this goal they will endeavor to seek, avoid, and process risk information in a way that supports achieving that goal (Eagly & Chaiken, 1993; Griffin et al., 2013). That is, impression-motivated people will selectively look for and assess risk information that is consistent with their evaluator's viewpoints and avoid that which is in opposition. Such strategic risk information selection helps them fulfill an impression-motivated informational goal (Griffin et al., 2013).

The risk information seeking and processing (RISP) model is a theoretical framework that illuminates individuals' decisional processes that drive their risk information use behavior (see Figure 1). RISP recognizes that people have different motives (i.e., impression, accuracy, and defense) that influence how they engage in different modes of risk information seeking, avoidance, and processing (Griffin et al., 2013). RISP's key concept of "information insufficiency" explicates the underlying process of how people seek,

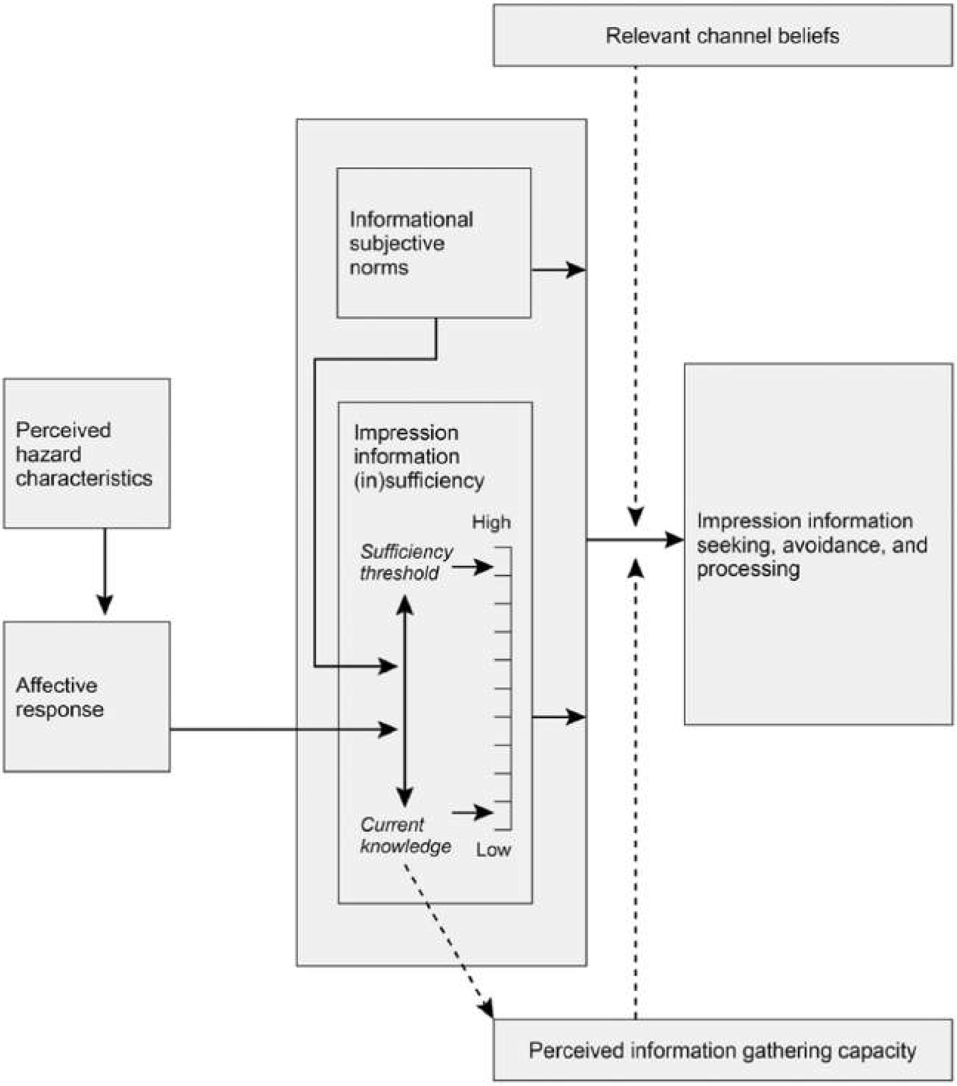


FIGURE 1 Based on risk information seeking and processing (RISP) model (Griffin et al., 2013). Based on Griffin et al. (2013), we added the impression information insufficiency into the full RISP model. Relationships represented by the dotted lines were not investigated in this study. Figure 1 does not show the "individual characteristics" block of the original model because this block is not the focus of the investigation. Yet, some individual characteristics are included as control variables in the analysis.

avoid, and process risk information in hopes of reaching various informational goals, including that of managing the personal impressions they give to others. Although the RISP model holds the potential to understand people's impression-motivated risk information use behavior and their potential impression-driven reaction to policy mandates and risk issues, no study, to date, has examined impression management as an informational goal within the RISP framework. Instead, research employing the RISP framework has, thus far, focused primarily on people's risk information use behavior for the accuracy goal of making valid judgments to protect themselves from the physical harm caused by a health hazard (Griffin et al., 2013). This study endeavors to fill this void in the RISP literature.

This study uses the global COVID-19 pandemic situation in Hong Kong as a case study. The purpose is twofold: (1) to conceptualize and operationalize impression information insufficiency, the subjectively perceived gap between the amount of knowledge an individual currently possesses and the amount desired to achieve sufficient confidence to communicate risk-related judgments that will address interpersonal needs in social situations, and (2) to explicate the precursors that give rise to people's impression information insufficiency and their influences on people's risk information seeking, avoidance, and processing. To examine the role of impression information insufficiency, heightening people's concern for expressing socially acceptable risk judgments is essential. In our survey, we employed the priming technique, a proven psychological research technique commonly applied in studying people's motives (Lundgren & Prislin, 1998), to increase respondents' concerns about the interpersonal consequences associated with expressing their judgment about the risks of COVID-19 and related issues.

To our knowledge, this study is the first theory-building effort to systematically examine the concept of impression information insufficiency. Given that people's risk information seeking and processing behavior plays a vital role in their decision to express socially acceptable risk judgments, the findings of this study can provide practical insights to policymakers in regard to understanding people's decisions about how to react to policy mandates, which is critical to policy formulation for future public health emergencies. Furthermore, our findings can reveal the potential of using impression management as a persuasive strategy in risk message design for explaining policy mandates to the public.

IMPRESSION MANAGEMENT AND EXPRESSING SOCIALLY ACCEPTABLE JUDGMENTS TOWARD POLICY MANDATES AND RELATED RISK ISSUES

Policy mandates are likely to heighten people's concern for the consequences associated with expressing socially acceptable risk judgments because policy mandates render three types of social situations in which expressing socially acceptable risk judgments becomes particularly salient. First, there are people (e.g., employees, students) who must explicitly state their risk judgments (e.g., vaccination) because they are either legally bound by the public authority or contractually obligated by the private authority to do so. Second, there are people who communicate their judgments to others with whom they have a highly valued professional or personal relationship (e.g., employers, supervisors, colleagues, parents, in-laws, relatives, and close friends). The last situation occurs when expressing judgments to real or imagined salient audiences (e.g., Winter & Neubaum, 2016); for example, a politician who establishes a Facebook page has known (e.g., personal friends) as well as unknown followers (e.g., voters). Before expressing an opinion on the page about vaccination, the politician is likely to consider how the audience, personal friends (real), and voters (imagined) would think of him/her. In these three scenarios, policy mandates heighten people's desire to convey a favorable impression by expressing socially acceptable judgments (Chaiken et al., 1989).

In social situations, impression management means considering the evaluator's views, attitudes, dispositions, and actions to communicate judgments that align with the evaluator's, and to project a favorable image by displaying the desired personal attributes for the evaluator to see (Bohner et al., 1995). Evaluators can be people in supervisory social roles (e.g., employers, managers), people with whom we have an intimate relationship (e.g., relatives, close friends) (Chaiken et al., 1989), or real or imagined salient audiences highly relevant to the focal topic (Winter & Neubaum, 2016). In the context of risk such as COVID-19, people may be prompted to express to their employers and supervisors (i.e., evaluators) a positive attitude toward the company's COVID-19 preventive measures and to demonstrate their supportiveness to the company (Yau & Magramo, 2021). To build a positive perception as a caring person for maintaining a harmonious relationship, people might discuss and share the news with their in-laws about how to protect themselves from the COVID-19 risks; conversely, they might be prompted to discuss the shortcomings of the policies with their in-laws who hold a negative attitude toward preventive measures. As such, impression-driven people are more likely to focus on their interpersonal needs to obtain tangible rewards (e.g., keep their job, advance their career, raise their salary), intangible rewards (e.g., better working and social relationships, good social standing), to avoid punishments (e.g., employment termination or suspension), or to avert social sanctions (e.g., rejection and isolation) from their evaluators (Leary & Kowalski, 1990). To manage one's impressions, gathering, and processing risk information that aligns with the evaluator's position on policy mandates and related risk issues enables individuals to express socially acceptable risk judgments.

Impression information insufficiency and the RISP model

The RISP model (Griffin et al., 1999, 2013) proposes that information insufficiency and informational subjective norms are the main motivational forces for individuals' risk information seeking, avoidance, and processing (see Figure 1). Specifically, the model proposes an array of perceived hazard characteristics that influence individuals' affective response toward a health hazard, which, in turn, influences information insufficiency. The model also suggests that informational subjective norms are another source of influence on information insufficiency. Subsequently, both informational subjective norms and information insufficiency are expected to influence risk information use behavior.

In the following, we conceptualize information insufficiency in the context of seeking to express to evaluators socially acceptable risk judgments (i.e., impression information insufficiency). Because the RISP model conceives both informational subjective norms and information insufficiency as motivators of risk information use behavior, in the section “Impression Information Insufficiency and Informational Subjective Norms,” we further discuss how these two motivators are related in the context of seeking to express socially acceptable risk judgments.

The concept of information insufficiency originates from the three conceptual components of the sufficiency principle in the heuristic systematic model (HSM): motives, sufficiency, and judgmental confidence (Griffin et al., 2013). To explain people's choice of processing modes and manner of processing, HSM outlines the sufficiency principle: “People will exert whatever effort is required to attain a sufficient degree of confidence that they have satisfactorily accomplished their processing goals” (Eagly & Chaiken, 1993, p. 330, emphasis added). The sufficiency principle embodies the idea that people must strike a balance between achieving their processing goals and minimizing their processing effort.

Eagly and Chaiken (1993) argued that people can process information for different reasons, one of which[1] is the impression motive (the desire to express socially acceptable judgments to potential evaluators). Impression motive gives rise to the processing goal of assessing the acceptability of messages while considering the potential evaluator's attitudinal position (Bohner et al., 1995; Chaiken et al., 1989). Therefore, particularly in the social interaction context, the sufficiency principle maintains that people will exercise whatever amount of effort is necessary to achieve sufficient confidence to judge the acceptability of messages to potential evaluators (Chaiken et al., 1996).

Following the logic of the sufficiency principle, information insufficiency is conceptualized as the perceived amount of risk information people feel they need to have to reach a satisfactory level of judgmental confidence toward achieving their informational goals (Griffin et al., 2004). Consistent with the sufficiency principle formulation (Bohner et al., 1995; Chaiken et al., 1996), individuals' motive and the correspondent informational goal comprise an essential and inseparable constituent in the conceptualization of information insufficiency (Griffin et al., 2004). That is, information insufficiency incorporates the idea that people must make a tradeoff between attaining their informational goals and minimizing their efforts in seeking (avoiding) and processing information. Based on the multimotive perspective of the HSM (Chaiken et al., 1996), impression information insufficiency is defined as the amount of information a person feels they need to express socially acceptable judgments about risk, thereby confidently achieving desirable interpersonal outcomes in social situations.

Below we review the precursors and outcomes of impression information insufficiency and provide the rationale for hypotheses and research questions. We present the hypotheses and research questions in Figure 2.

Precursors of impression information insufficiency

The RISP model postulates that people will cognitively evaluate a set of characteristics of a hazard, and such evaluations influence how they respond emotionally to the hazard (Griffin et al., 2013). These perceived hazard characteristics include risk judgment, institutional trust, and personal control. Fear is a typically affective response when people face an imminent threat. The RISP model postulates that people's risk judgment—a subjective assessment of the likelihood of harm (i.e., perceived susceptibility) from exposure to a risk combined with one's assessment of the potential severity (i.e., perceived severity) of harm caused by the risk—will positively affect their level of fear toward the risk (Griffin et al., 1999). The rationale is that people consider that their physical health and well-being are subjected to greater threats when they perceive greater risk; as a result, they are likely to experience greater fear toward a risky issue (Loewenstein et al., 2001; Yang & Chu, 2016). Evidence from the RISP studies (e.g., ter Huurne et al., 2009; Yang et al., 2010), including those focused on the COVID-19 risk (Ahn & Noh, 2020; Zhou et al., 2021), provided support for the positive relationship between risk judgment and fear. During the pandemic, Hong Kong had 2.8 million confirmed cases and more than 13,000 citizens died (The University of Hong Kong, 2022). It is reasonable to expect that citizens who perceive a greater risk of COVID-19 are likely to experience greater fear toward COVID-19.

Institutional trust refers to an individual's willingness to rely for protection on those institutions and agencies that have the responsibility to make decisions and to take action to manage risks (Griffin et al., 2008). The RISP model hypothesizes a negative relationship between people's institutional trust and fear toward a risk (Griffin et al., 1999). When responsible institutions fail to carry out their duties, such as taking the lead in managing the risky situation, and caring for people's interests (Hall et al., 2001), people are likely to feel nervous about the risk (ter Huurne & Gutteling, 2009) because the risk level of the threat is

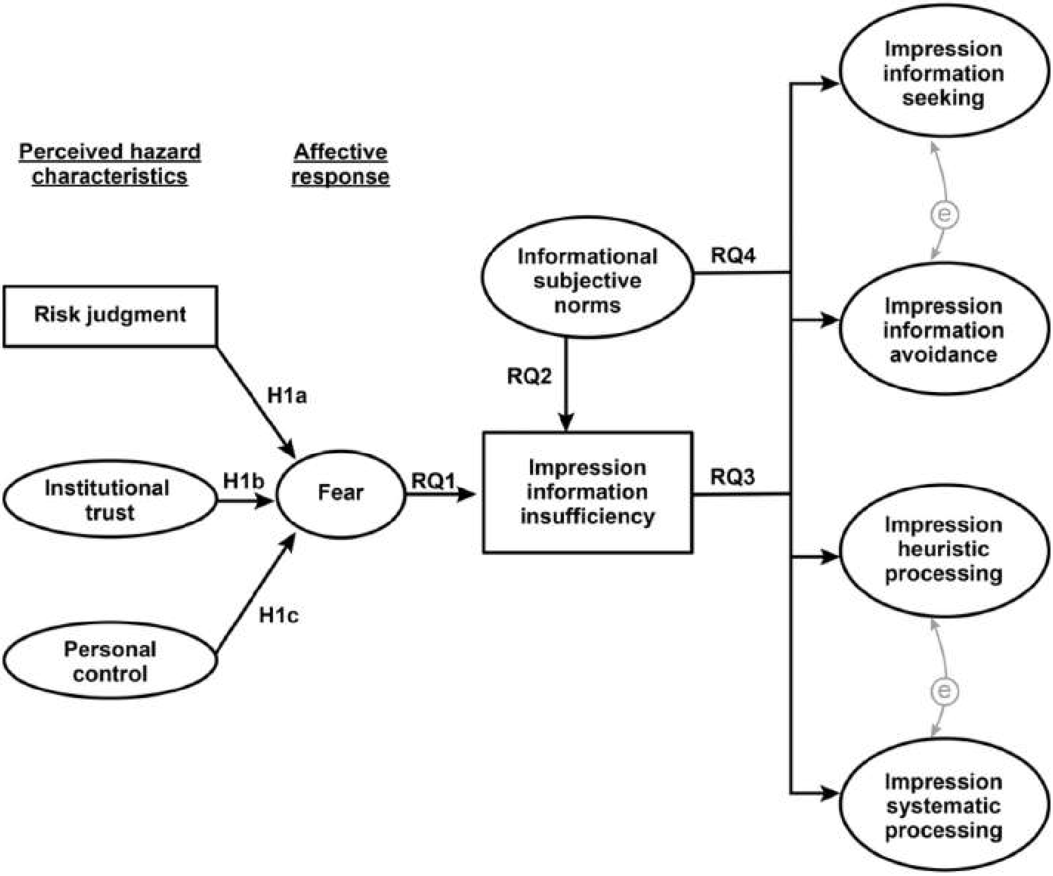


FIGURE 2 Hypothesized model. See endnote [2] for details about the residual correlations. e, correlation between error terms; H, hypothesis; RQ, research question.

heightened (Slovic, 1999). At the onset of the COVID-19 pandemic, public trust toward the government was at a historic low in Hong Kong (Wan et al., 2020). During the pandemic, some people doubted whether the government's measures to address the viral risks were effective, and they were discontent with regulatory measures (Barron, 2020). Therefore, we expected that people who had low institutional trust would experience a higher level of fear toward the COVID-19 risk.

Personal control refers to individuals' evaluation of their ability to protect themselves from a risk (Yang et al., 2014). The RISP model hypothesizes a negative association between personal control and fear, and evidence supports it (e.g., Ahn & Noh, 2020). People are more likely to experience fear toward a risk when they perceive themselves as lacking the ability to cope with it (Lazarus, 1991). As a newly emerged disease, people probably did not know much about the coronavirus at the early stage of the pandemic. When danger is imminent and people's perceived level of control is low, they are likely to experience a greater level of fear toward the danger and thus engage in controlling that fear (Witte, 1992). Panic buying to secure daily necessities and personal protective equipment at the early stage of the pandemic is consistent with individuals sensing a low level of personal control and having a high level of fear (Lufkin, 2020). We expect that the lower the perceived personal control, the higher the level of fear toward the COVID-19 risk. Based on the above, we posited the following hypotheses:

> **Hypothesis 1.** (a) Risk judgment will be positively related to fear toward the COVID-19 risk; however, (b) institutional trust and (c) personal control will be negatively related to fear.

In the context of seeking to satisfy interpersonal needs in social settings, we argue that such a positive relationship is also applicable between fear of a risk and the impression of information insufficiency. That is, the more that people experience fear of the COVID-19 risk, the more likely they are to sense a greater need for risk information to let them express socially acceptable risk judgments and fulfill related needs in interpersonal social settings. The rationale is that to address their fear, fearful people are likely to have a stronger affiliative need with others who are undergoing the same fear-invoking situation and with those who could assist them to get through the fearful situation (Casale & Flett, 2020; Schachter, 1959). Fear is associated with low certainty (Ellsworth, 1991; Smith & Ellsworth, 1985). Fearful people have a greater need for information about how others respond to the threat because that provides a frame of reference to make sense of their own reactions toward the threat (e.g., the attitude they have and the emotions they experience toward the threat) (Darley, 1966; Gerard & Rabbie, 1961). To enhance affiliation with others, such frames of reference are important means for individuals to evaluate and determine socially appropriate reactions. Another reason is that fear-provoking situations increase individuals' need to receive social support such as emotional support and tangible and intangible aid (Casale & Flett, 2020). To receive social support from others, an individual must maintain smooth interactions and relationships. With both reasons combined, fearful people are more likely to have a greater need for risk information to support their communicating socially acceptable judgments for building and maintaining harmonious interactions and relationships with their evaluators.

During the COVID-19 pandemic, the social distancing policy radically reduced face-to-face social interactions, which may have increased people's sense of isolation. Fear toward the COVID-19 risk most likely raised the level of alertness that people had (Casale & Flett, 2020; Whitley, 1992). Furthermore, their fear likely heightened their affiliative tendency, which inclines people to learn how others respond to risks and to make sense of their own decision to do what is socially acceptable in social settings (Gerard & Rabbie, 1961). As a result, Fearful people are sensitive to how others respond to the risk (e.g., "am I alone in my fear?"), and how others might respond to their comments about the risk and their fear of it (e.g., "If I tell others, and they don't share my fear, how will they respond to me? Will they think I am oversensitive, weak?"). To foster affiliation with others and to receive social support, fearful people are more likely to take into account others' opinions of COVID-19-related issues (particularly the evaluator's opinions) and more likely to be subject to the influence of the others' opinions (Darley, 1966). Therefore, fearful people may have greater risk information need to support their expressing to their evaluators socially acceptable COVID-19-related judgments. However, no empirical study to date has examined that relationship. Therefore, we posed the following research question.

> **RQ1**: *How does fear toward COVID-19 risk relate to impression information insufficiency?*

Impression information insufficiency and informational subjective norms

In addition to impression information insufficiency, the RISP model conceives informational subjective norms as another motivator of how people approach and employ risk information

(Griffin et al., 2013). Derived from Ajzen's (1988) notion of normative beliefs and subjective norms, informational subjective norms are defined as individuals' perceptions about what others, particularly those who are important to them, expect them to know (or not to know) about a risk topic. Such perceived social pressure stems from an individual's beliefs about whether their important others expect that he or she should (or should not) learn about a risk topic.

Both impression information insufficiency and informational subjective norms account for how social environment influences risk information use behavior, and both reflect people's desire to be liked and accepted through appeasing others. However, impression information insufficiency and informational subjective norms are conceptually different, and each tap into different aspects of social influence. Based on normative beliefs (Fishbein & Ajzen, 2011), informational subjective norms are characterized as individuals' own beliefs about what their important others prescribe or proscribe to do with risk information. The term *subjective* emphasizes that the beliefs people hold may or may not reflect what their important others actually do or actually think should be done with risk information (Fishbein & Ajzen, 2011). Moreover, the behavioral prescription and proscription of informational subjective norms function as rules and regulations to govern people's action (or inaction) to deal with risk information. As such, the underlying influence process of informational subjective norms on people's risk information use behavior is through compliance (Trafimow, 2020).

Impression information insufficiency, stemming from impression motive (Leary & Kowalski, 1990), depicts people's desire for risk information to manage the information, selectively and to use that selected information to present themselves favorably in social interactions, which serves to influence their evaluator's reactions to them. Because self-presentation is a tactical act, impression-motivated people are consciously attentive, during social encounters, to social cues related to their evaluator's attitudinal position on the risk-related issue (Leary & Kowalski, 1990). The desire for risk information among impression-motivated individuals is purposive and calculated, which could enable them to present themselves favorably in the eyes of their evaluator. Namely, their desire is for only certain types of risk information that would enable them to choose the information that expresses their judgment in alignment with their evaluator's attitudinal position on the risk-related issue. Therefore, the underlying influence process of impression information insufficiency on individuals' risk information use behavior is selecting relevant risk information for their self-presentation to achieve the impression management goal (Chaiken et al., 1989; Griffin et al., 2013).

According to the RISP model, informational subjective norms not only directly influence people's risk information use behavior but also influence information insufficiency (Griffin et al., 2004). That is, as perceived by an individual, important others' expectations that the individual will stay informed about a risky issue can induce in the self a greater need for risk information (ter Huurne et al., 2009). In the context of impression goal, we argue that informational subjective norms would positively influence impression information insufficiency, because informational subjective norms may widen the perceived gap between desired and actual levels of knowledge. Specifically, people's normative beliefs about what their important others (e.g., relatives, friends, employers, and colleagues) expect them to know about COVID-19-related issues and about the knowledge level their important others hold about COVID-19 issues can be inferred as social cues of their important others' COVID-19-related beliefs and attitudes.

Complying with the important others' expectation and emulating their stance can help people adopt to others' attitudes, and likely get approval. Therefore, to facilitate expressing to their important others socially acceptable COVID-19-related judgments, people's perceived normative pressure could increase their desired knowledge level about COVID-19-related issues. However, no empirical evidence exists to examine the relationship between informational subjective norms and impression information insufficiency. Therefore, we posed the following research question.

RQ2: *How do informational subjective norms relate to impression information insufficiency?*

Goal-directed risk information seeking, avoidance, and processing

Risk information seeking refers to a deliberative process of choosing to attend messages from selected information channels to achieve desired informational goals (Griffin et al., 2013); whereas risk information avoidance is defined as a volitional process of attaining desired informational goals by averting information channels and choosing not to attend some messages embedded on a particular channel (Griffin et al., 2013). Grounded in the HSM (Chaiken et al., 1996), risk information processing involves two complementary modes (Griffin et al., 2013): Heuristic processing relies on superficial cues to judge the acceptability of a message (e.g., an attractive or celebrity spokesperson, and/or one whom the individual already perceives to be like the self or possessing similar ideas and backgrounds), and systematic processing involves more engagement of one's critical faculties based on the ideas in the argument itself.

As part of the integral conceptual components of impression information insufficiency, what roles do people's impression motive[3] and its corresponding informational goal play in determining the modes and manner of information seeking and processing? According to the multimotive perspective of HSM (Bohner et al., 1995), motives can set and shift individuals' actual and desired judgmental confidence. To establish sufficient confidence for judgment, the RISP model asserts that people subjectively contrast the amount of information they have (i.e., current knowledge) and the amount of information they feel they need (i.e., sufficiency threshold) that would be enough for them to meet their goals. The size of the perceptual gap between information held and that needed for a judgment, "information insufficiency," determines the extent to which people are motivated to seek (avoid) and process risk information, superficially or effortfully.

The RISP model postulates that the larger the information insufficiency gap the more likely people are to engage in more effortful seeking and processing of risk information. An individual's motive, such as impression motive, can enlarge (reduce) the perceptual gap either by raising (lowering) the level of sufficiency threshold for expressing socially acceptable judgments or by weakening (strengthening) the level of actual confidence. As such, a person's motive determines the mode of RISP by maneuvering the size of the subjective gap between current knowledge and the sufficiency threshold. In the domain of satisfying interpersonal needs in social settings, the RISP model proposes that impression-motivated people will expend minimal effort for risk information processing when impression heuristic processing can achieve sufficient confidence to satisfy the impression-oriented goal (Chaiken et al., 1996; Griffin et al., 2013). In this sense, impression heuristic processing is the default processing mode, which involves using simple rules, such as "agreement facilitates liking" and "go along to get along," to guide the selection of risk information for processing. However, when impression heuristic processing is unable to provide sufficient confidence to satisfy interpersonal needs in a social situation, impression-motivated individuals would exercise greater effort to engage in impression systematic processing. That is, the impression-oriented goal is accomplished through selective and extensive consideration of risk information based on one's perception of the evaluator's opinion.

In addition to determining the mode of information seeking and processing, impression motive determines the manner in which people seek (avoid) and process risk information. Built on the HSM's sufficiency principle (Chaiken et al., 1989) and active audience research tradition (Perse & Courtright, 1993), the RISP model views risk information use as goal-directed behavior (Griffin et al., 1999). That is, regardless of the amount of effort invested in seeking, avoiding, and processing risk information, people employ these three forms of behavior to serve their informational goals. In the domain of satisfying interpersonal needs in social settings, people's informational goal is to communicate to their evaluator socially acceptable risk judgments. To achieve this impression-oriented informational goal, impression-motivated individuals would take into account their evaluator's attitudinal position on the risky issue, and then selectively seek, avoid, and process risk information in a biased manner to match or complement their evaluator's attitudinal position. For example, impression-motivated people whose goal is simply to get approval may selectively look for risk information that supports their evaluator's attitudinal position on COVID-19-related issues, or avoid what disconfirms their evaluator's position.

Research in psychology (e.g., Chen et al., 1996; Jonas et al., 2005; Lundgren & Prislin, 1998; Nienhuis et al., 2001), political communication (e.g., Winter, 2019), and risk communication (e.g., Kim & Paek, 2009) provide empirical support, within the HSM framework, that impression motive and its corresponding goal influence people to engage in biased information searching and processing to form attitudes that align with their social needs. Therefore, it is valuable to explore impression information insufficiency within the RISP framework. Thus far, no study has examined the relationship between impression information insufficiency and impression-based risk information use behavior. Hence, we posed the following research questions.

> **RQ3**: *How does impression information insufficiency relate to (a) impression information seeking, (b) impression information avoidance, (c) impression heuristic processing, and (d) impression systematic processing?*

We proposed that informational subjective norms are likely to have a positive influence on impression-based information seeking, avoidance, and processing because an evaluative standard is embedded in informational subjective norms, which encourages people to seek, avoid, and process heuristically and systematically, with bias and selectivity, to align with their evaluator's attitudinal position. Informational subjective norms involve an evaluative standard that characterizes what people should do (Christensen et al., 2004). Norms exert influence on people's behavior through reward and punishment associated with conforming to or violating the evaluative standard (Cialdini & Trost, 1998). For example, in the case of the COVID-19 pandemic, restaurant servers might believe their important others, such as employers, would stay informed about the government's policy on the vaccine mandate and on the digital contact tracing mobile app for restaurant entry, which implies the employers' evaluative judgment to adhere to the policy. The servers would anticipate their potential rewards by complying with the employers' expectations and their potential sanctions if they do not stay up to date about adhering to government's policy. As such, to comply with their belief about the employers' expectations to stay informed about adhering to the policy, they are likely to seek supportive information about the vaccine mandate and the contact tracing mobile app mandate and avoid contradictory information.

The evaluative standard embedded in informational subjective norms also serves as an evaluative standard to process risk messages systematically. Following from the above hypothetical example, in the case of the COVID-19 pandemic the servers' perception of employers' expectations would function as an evaluative standard for restaurant servers to scrutinize risk messages. Such standards are likely to lead servers to examine risk messages selectively to fit their perception of employers' expectations. Informational subjective norms also encompass beliefs about what the important others properly do. The actions of the important others (e.g., evaluators) thus also provide a heuristic cue for information processing and decision making (Cialdini, 2001). Therefore, informational subjective norms are likely to relate to impression heuristic processing. Given that no study has examined the relationship between informational subjective norms and impression-based risk information use behavior, we posed the following research questions.

> **RQ4**: *How do informational subjective norms relate to (a) impression information seeking, (b) impression information avoidance, (c) impression heuristic processing, and (d) impression systematic processing?*

Study context: Hong Kong's sociopolitical context during the pandemic

We chose Hong Kong as the research site because the city provided an appropriate context to examine impression information insufficiency. Specifically, Hong Kong's sociopolitical environment affords the three social situations induced by policy mandates as specified above.

Supporting our choice of study context is that Hong Kong's stringent COVID-19 policy and regulation require people to express their risk-related judgments to employers, supervisors, colleagues, relatives, and friends. Hong Kong adopted the zero-COVID policy (Yu & Mahtani, 2021), thereby employing intensive testing, tracing, travel curbs, and quarantines to control and suppress virus transmission and thus eradicate outbreaks (Li & Meng, 2022; Rodríguez-Giralt et al., 2020). Because these measures were legally binding and mandatory (The Government of the Hong Kong Special Administrative Region [HKSAR Government], 2021), Hong Kong citizens encountered ample social situations requiring them to communicate their COVID-19-related judgments. One example was the government's policy of using a digital contact tracing mobile app to record individuals' whereabouts (Choy, 2020). When people dined out with their relatives or colleagues, they had to record the restaurant's identification and their visiting time by using the app before entering. Because people had to express their decision to use or not use the app, which could influence their group's acceptance or denial to enter, their decision whether or not to use the tracing app could cause relational consequences with relatives and colleagues. The policy in regard to students' taking daily rapid antigen tests is another example: To attend classes in person, children (from kindergarten through high school) were required to conduct the test daily, and their parents had to confirm whether their child had completed the test (HKSAR Government, 2022). As such, parents might have been concerned about expressing doubts about the testing policy because that could have conveyed a negative impression to the principal, the teachers, and to the other students and their parents about what kind of parents they are, which, in turn, could affect how their child was treated at school. The last example is the facemask mandate, which required Hong Kong citizens to wear surgical masks wherever they went (Reuters, 2020). Expressing their judgment about wearing the facemask might reflect to others the type of person they are, thus affecting their daily social encounters, e.g., with neighbors and colleagues.

Another reason for choosing Hong Kong as an appropriate context for the study is that individuals' expressed opinions about the government's zero-COVID policy became a focus for evaluating how supportive and patriotic a person is to their mother country (Tian, 2022). As such, people's judgmental expression about the COVID policy to salient audiences in public situations was likely to imply their political stance; therefore, the expression became an attempt at impression management (Chan, 2021; Tong, 2020). At the onset of the pandemic, Hong Kong had undergone yearlong political unrest; the city's polarization and government distrust were at a historic high (Wan et al., 2020). Although the outbreak of the COVID-19 pandemic had put a forceful stop to the political unrest, political controversies persisted during the formulation and implementation of the pandemic policies (e.g., Ho, 2020). Because of the political instability, China passed a national security law for Hong Kong in 2020, and enforced the "patriots-governing Hong Kong" principle (Leung, 2022; Regan, 2020), which meant that people who hold public offices are expected to subscribe to the core values of "love the country and love Hong Kong." As Hong Kong's COVID response policy aligned with China's zero-COVID approach, people's judgmental position toward Hong Kong's COVID policy symbolized their support for the government and their patriotism. Therefore, people who publicly expressed their judgment of Hong Kong's COVID policy were likely to consider what impression they would be conveying to others within social situations.

We acknowledge that those who speak their minds about the COVID-19 policy in Hong Kong might well do so regardless of how other people might view them. However, our study focuses on the scenarios in which people's concern for expressing COVID-19-related issues was salient. To make people's impression concern more salient than other concerns, we employed the priming technique in our survey (see the measure of impression information insufficiency for details). The sociopolitical context in Hong Kong provided an appropriate study context.

METHODS

Data collection and sample

We conducted an online survey of adults aged 18 or above in Hong Kong from late December 2020 to early February 2021. The participants were recruited from a non-probabilistic online panel maintained by an independent, nonpartisan public opinion research organization. An email invitation was sent to all panel members yielding 1677 completed responses. However, four questionnaires were discarded in the analysis because the answers were not valid (e.g., had a fixed pattern of responses). The participants took around 20 min to complete the questionnaire. Table 1 presents the demographic characteristics of the sample.

Measures

Table 2 presents the question items, measurement scales, descriptive statistics, and reliability coefficients of the variables. All measures used a 7-point scale unless otherwise specified. Table 3 presents the correlations among the variables.

Risk judgment was an aggregated variable constructed by multiplying respondents' perceived susceptibility to, and perceived severity of, COVID-19 (Griffin et al., 2004). *Institutional trust*, a three-item measure, assessed respondents' belief in the government's ability to manage the pandemic (Poortinga & Pidgeon, 2003). *Personal control*, measured by three items, examined respondents' perception of their own ability to handle COVID-19-related risks (Griffin et al., 2004). *Fear*, the affective response of interest in this study, was measured by three items in which respondents indicated their level of fear of COVID-19 risks. *Informational subjective norms*, measured by three items, tapped into respondents' perceived normative pressure from their significant others to stay on top of COVID-19-related issues (Yang, 2012).

Impression information insufficiency was an aggregated variable constructed with the current knowledge and sufficiency threshold variables. This variable captured the respondents' perceived gap between the amount of information they currently possessed and the amount of information they needed to confidently express COVID-19-related

TABLE 1 Sample demographics and relevant hazard characteristics.

Variables	Sample percentage (*n*)	Variables	Sample percentage (*n*)
Gender		Education (highest level attended)	
Male	48.5% (811)	Primary school	0.4% (6)
Female	51.5% (862)	Secondary education	14.2% (238)
Age group		Postsecondary education:	16.0% (268)
19 or below	1.3% (22)	nondegree qualifications	
20–29	17.3% (289)	Postsecondary education:	40.3% (675)
30–39	25.3% (424)	degree courses	
40–49	23.3% (389)	Postgraduate education	27.0% (452)
50–59	19.4% (324)	Prefer not to say	2.0% (34)
60 or above	11.5% (192)	Political orientation	
Prefer not to say	2.0% (33)	Pro-Beijing camps	0.6% (10)
Monthly household income in HKD[a]		Moderate groups	3.2% (54)
Less than $10,000	3.9% (65)	Prodemocracy camps	44.5% (744)
$10,001 to $30,000	17.8% (298)	Advocates of Hong Kong's autonomy and	41.8% (700)
More than $30,000	61.2% (1024)	local lifestyles	
Prefer not to say	17.1% (286)	None/neither/impartial	9.8% (165)

Note: $N = 1673$.

[a] US$1 = HK$7.80.

judgments that will satisfy their impression goal. To increase the salience of the interpersonal implications of expressing one's views on COVID-19-related issues, we used a priming technique[4] adapted from previous studies on multimotive HSM (Chen et al., 1996; Lundgren & Prislin, 1998). We primed the respondents with a scenario of having a future interaction with their important others and the possibility of sharing their views on COVID-19-related issues with them. We selected the important others as the target of the priming because they are highly valued by the respondents and their feedback on the respondents' views can cause positive or negative impacts on the relationship through various forms of tangible or non-tangible rewards and sanctions (Chaiken et al., 1989).

Thus, we first explained to the respondents that important others are those whose relationships they highly value and those who could exert significant positive and negative impact on their physical, emotional, sociopsychological, mental, and financial well-being. We then asked the respondents to think of an important other and we proposed to them that they are likely to encounter that important other in the near future and plausibly communicate their judgment about COVID-19-related issues with that important other. To ensure an important other had been primed in the respondents' minds before they answered the questions related to current knowledge and sufficiency threshold of COVID-19 information, we designed two questions for manipulation check. We first asked the respondents to indicate which important others they had in mind from one of six categories (see Table 2 for details). Then we asked the respondents to indicate whether their important other's overall attitude toward COVID-19-related issues was consistent with theirs (measured in three categories: consistent with their

TABLE 2 Descriptive data for key variables.

Concepts (*M*, SD, reliability[a])	Measures and scales
1. Risk judgment[b] ($M = 24.30$, $SD = 20.22$)	[Perceived susceptibility] If a new wave of COVID-19 outbreak occurred in the community, in your estimation, how likely is it that you will be contracted with COVID-19? (0–100 scale: 0 = absolutely no chance whatsoever to 100 = certain to) [Perceived severity] If you become ill after contracting with COVID-19, how serious do you think your condition would be? (0–100 scale: 0 = not severe at all to 100 = as severe as it can possibly be).
2. Institutional trust ($M = 1.44$, $SD = 0.82$, $\alpha = 0.73$)	(Item1) The Hong Kong government is doing a competent job of handling the COVID-19 pandemic. (Item2) The Hong Kong government is acting in the interest of the Hong Kong people. (Item3) The Hong Kong government made fair and impartial policies regarding COVID-19 based on good reasons and evidence.
3. Personal control ($M = 4.65$, $SD = 1.34$, $\alpha = 0.89$)	(Item1) My immediate family and I are competent to avoid contacting diseases caused by COVID-19 in our life. (Item2) I could protect myself and my immediate family from the risks of COVID-19. (Item3) I have enough resources (e.g., protective gear and sterilizers) to control the risks of COVID-19 for myself and my immediate family.
4. Fear ($M = 3.63$, $SD = 1.77$, $\alpha = 0.97$)	To which extent do you have the following feelings when facing the COVID-19 risks? (Item1) Fearful; (Item2) frightened; (Item3) dreadful
5. Informational subjective norms ($M = 3.93$, $SD = 1.58$, $\alpha = 0.87$)	(Item1) People whom I value expect me to stay on top of the information about COVID-19. (Item2) My family and friends expect me to have a good understanding of the COVID-19 outbreak. (Item3) People who are important to me think I should seek information about COVID-19.
6. Impression information insufficiency	
a. Important other	Important others are those relationships with whom you place a high value. Their evaluation of you can often have a (positive or negative) impact on your physical, emotional, psychological, mental, and financial well-being. Now, think of one of your important others whom you are likely to encounter in the near future, and with whom you would possibly communicate your attitude toward COVID-19-related issues (e.g., vaccine mandate, contact tracing mobile app, vaccine pass for public access). Which important other did you think of? (Employer/Supervisor, Parent, Spouse, Adult Child, Close Friend, Others, please specify: ___)
b. Important other's attitude toward COVID-19-related issues	Does your important other's overall attitude toward COVID-19 related issues agree, or oppose yours? (Similar, Opposing, Unknown)
c. Current knowledge ($M = 61.18$, $SD = 27.41$)	How much do you think you currently know about COVID-19 to confidently express judgments that will be acceptable to that important other? (0–100 scale: 0 = knowing nothing 100 = knowing everything you could possibly know about this topic)

TABLE 2 (Continued)

Concepts (M, SD, reliability[a])	Measures and scales
d. Sufficiency threshold ($M = 49.95$, SD = 33.49)	Using the same scale, how much COVID-19-related knowledge do you think you would need to confidently express related judgments that will be acceptable to that important other? (0–100 scale: 0 = needing nothing more 100 = needing everything you could possibly know about this topic)
7. Impression information seeking ($M = 2.78$, SD = 1.77, $\alpha = 0.98$)	(Item1) To communicate judgments that will be approved by my important other, I find COVID-19-related information consistent with his/her views. (Item2) To have smooth interactions and relationships with my important others, I selectively search for COVID-19-related information that aligns with his/her views. (Item3) To express judgments that will be acceptable to my important others, I selectively look for COVID-19-related information that supports my important others' attitude.
8. Impression information avoidance ($M = 2.25$, SD = 1.48, $\alpha = 0.95$)	(Item1) To avoid putting myself in a negative light, I avoid COVID-19 information that is contradictory to my important other's attitude. (Item2) I tune out COVID-19 information that can cause relational tension with the person who is important to me. (Item3) To avoid getting myself into difficult social situations, I keep away from COVID-19 information that is unacceptable to my important others.
9. Impression heuristic processing ($M = 2.49$, SD = 1.46, $\alpha = 0.90$)	(Item1) As a guide to selectively skim through the COVID-19-related information, I rely on the viewpoints of the person who is important to me. (Item2) When reading the COVID-19 messages to make a decision on COVID-19-related issues, I simply base it on the important other's attitude. (Item3) When I encounter information about COVID-19, I selectively pay attention to the portions that can help me to get along with my important others.
10. Impression systematic processing ($M = 3.12$, SD = 1.65, $\alpha = 0.90$)	(Item1) When I encounter information about COVID-19, I carefully examine what ideas would be accepted or rejected by my important other. (Item2) From what I read about COVID-19, I tried to relate the information to my important other's attitude. (Item3) When reading the COVID-19 messages to decide which issues will be acceptable to my important others, I carefully follow the COVID-19-related information that my important other pays attention to.

Note: 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) was used unless otherwise specified.

[a] Cronbach's alpha (α).

[b] For analysis purpose, the score of perceived susceptibility and that of perceived severity was first divided by 10, before being multiplied together to construct the variable.

own attitude, inconsistent with their own attitude, and do not know the important other's attitude; see Table 2). The reason for asking respondents whether they were aware of their important other's overall attitude toward COVID-19-related issues is that people are more sensitive to expressing judgments that align with the important others' view when knowing their important other's attitude than not knowing it (Chaiken et al., 1996; Chen et al., 1996).

TABLE 3 Correlations of the variables.

	1	2	3	4	5	6	6a	6b	7	8	9	10
1	1											
2	−0.09***	1										
3	−0.39***	0.08**	1									
4	0.45***	−0.13***	−0.27***	1								
5	0.03	0.05*	0.08***	0.14***	1							
6	0.21***	−0.05*	−0.14***	0.19***	0.13***	1						
6a	0.05*	0.03	0.03	0.05*	0.30***	–	1					
6b	0.21***	−0.03	−0.11***	0.19***	0.26***	–	0.48***	1				
7	0.14***	0.05	0.03	0.16***	0.39***	0.32***	0.28***	0.42***	1			
8	0.08**	0.06*	0.02	0.16***	0.24***	0.20***	0.10***	0.22***	0.49***	1		
9	0.05	0.07**	0.04	0.15***	0.33***	0.20***	0.14***	0.24***	0.47***	0.47***	1	
10	0.05*	0.05*	0.02	0.14***	0.45***	0.21***	0.21***	0.28***	0.46***	0.39***	0.59***	1

Note: Two-tailed test. $N = 1673$. 1 = risk judgment, 2 = institutional trust, 3 = personal control, 4 = fear, 5 = informational subjective norms, 6 = impression information insufficiency, 6a = current knowledge (impression information insufficiency), 6b = sufficiency threshold (impression information insufficiency), 7 = impression information seeking, 8 = impression information avoidance, 9 = impression heuristic processing, 10 = impression systematic processing.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

We subsequently asked respondents to indicate the level of knowledge they *currently possess* about COVID-19 specifically to *confidently express related judgments that will be accepted by that important other* (i.e., current knowledge); finally, we asked the respondents to indicate the level of knowledge they *would need* about COVID-19 to *confidently express related judgments that will be accepted by that important other* (i.e., sufficiency threshold). The impression information insufficiency variable was created using the residual approach by regressing the sufficiency threshold values on current knowledge estimates (Cronbach & Furby, 1970; Griffin et al., 2004).

Measures of *impression heuristic processing* and *impression systematic processing* assessed respondents' depth of processing and how they process risk information in service of their impression informational goal. Each processing strategy was measured by three items. As noted in the literature review, people's informational goals and the manner in which people engage in risk information seeking, avoidance, and processing should be reflected in the operationalizations. The impression-oriented informational goal primarily centers on considering the interpersonal consequences resulting from expressing their risk judgments, and their ways of seeking, avoiding, and processing information would be marked by selective bias. Thus, we developed a measure of the goal-driven processing strategy based on the idea that information selection and goal pursuit are the key features of this strategy. We adapted the heuristic and systematic processing scale from Griffin et al. (2008), Kahlor et al. (2003), and Neuwirth et al. (2002) by incorporating characteristics of selective processing and goal pursuit. Specifically, we measured impression heuristic processing by assessing how much the respondents superficially examine COVID-19-related information by relying on heuristic cues (e.g., important others' attitude toward COVID-19, "go along to get along") to process COVID-19-related information with the goal of meeting their social needs (e.g., gaining the approval of important others). Similarly, we measured impression systematic processing by assessing how much the respondents carefully scrutinized the COVID-19-related information with the goal of meeting their social needs (see Table 2 for details).

Measures of *impression information seeking* and *impression information avoidance* tapped respondents' level of agreement with a series of statements related to COVID-19 information seeking and avoidance. Each variable was measured by three items. When operationalizing the concepts of impression information seeking and avoidance, we emphasized selectively searching and avoiding COVID-19 information to serve the goal of getting accepted by their important others. We modified the measures based on Griffin et al. (2008) and Yang and Kahlor (2013) (see Table 2 for details).

Control variables included demographic characteristics (see Table 1 for details). The demographic questions asked respondents about their gender, age group, education level, and monthly household income. The informational goal of impression-motivated individuals is to align with their evaluator's issue position; therefore, we controlled for the respondents' political orientation, and the consistency of the overall attitude toward COVID-19-related issues between the respondents and their important others. We controlled for political orientation because it relates to people's stance on COVID-19-related policy issues (Inmediahk, 2023; Kerr et al., 2021).

RESULTS

To examine the model fit of the data, we used a maximum likelihood estimation with robust standard errors in Mplus 8.3. We found missing data only in demographic variables, which we handled by using listwise deletion. The aggregate variables (risk judgment and impression information insufficiency) were treated as observed variables by fixing the error variance at zero. All other variables were treated as latent variables. We used one-tailed tests for directional hypotheses and two-tailed tests for answering research questions (Hayes, 2009).

As shown in Table 4, the measurement model achieved a good fit and the structural model also achieved an acceptable fit. Figure 3 presents the structural model.

Impression information insufficiency and its precursors

Hypothesis H1a, which proposed a positive relationship between risk judgment and fear, was supported ($\beta = 0.39$, $p < 0.001$). Institutional trust was found negatively related to fear ($\beta = -0.11$, $p < 0.001$); therefore, H1b was supported. Results also supported H1c, which predicted a negative relationship between personal control and fear ($\beta = -0.09$, $p < 0.01$).

RQ1 and RQ2 asked whether fear and informational subjective norms were related to impression information insufficiency. The analysis revealed that both fear (RQ1: $\beta = 0.17$, $p < 0.001$) and informational subjective norms (RQ2: $\beta = 0.12$, $p < 0.001$) were positively associated with impression information insufficiency.

Consequences of informational subjective norms and impression information insufficiency

RQ3 was interested in how impression information insufficiency was related to impression information seeking (RQ3a), impression information avoidance (RQ3b), impression heuristic processing (RQ3c), and impression systematic processing (RQ3d). Findings revealed that

TABLE 4 Model fit statistics for measurement model and structural model.

Model fit statistics	Measurement model	Structural model
χ^2	556.56*** (224, $N = 1673$)	1181.54*** (411, $N = 1673$)
χ^2/degrees of freedom (*df*)	2.48	2.87
Root mean square error of approximation (RMSEA)	0.030, 90% CI [0.027, 0.033]	.037, 90% CI [0.035, 0.039]
Comparative fit index (CFI)	0.99	0.97
Standardized root mean squared residual (SRMR)	0.03	0.05

Note: The model fit guidelines (Hu & Bentler, 1995) recommend that a value of the RMSEA below 0.06 indicates a good fit and a value less than or equal to 0.08 is considered an adequate fit with the upper bound of the 90% RMSEA confidence interval less than 0.10. A value of CFI greater than 0.90 suggests an adequate fit, and a value greater than 0.95 is considered as a good fit. The value of an SRMR of less than 0.08 would be acceptable. A nonsignificant χ^2 distributed test statistic is a good fit; however, this statistic is sensitive to sample size (Hu & Bentler, 1995). Thus, χ^2/df was reported, and a value less than 5 is considered a good fit (Kline, 2005).

Abbreviation: CI, confidence interval.

***$p < 0.001$.

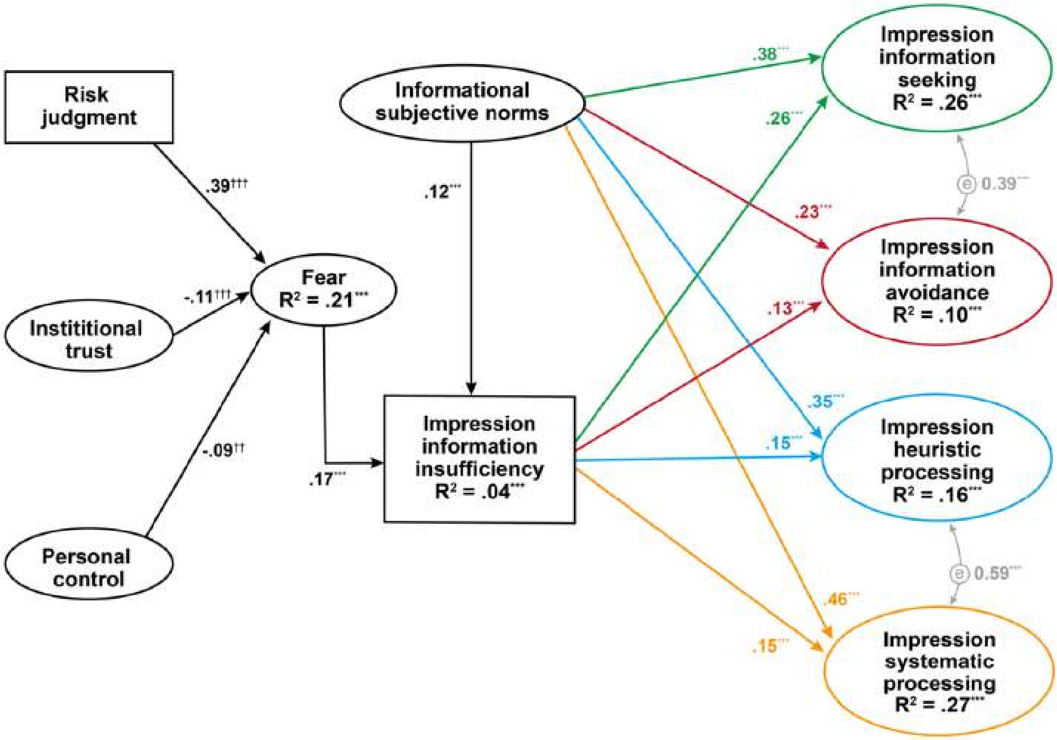


FIGURE 3 Structural model. $N = 1673$. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, two-tailed test. $^{\dagger}p < 0.05$, $^{\dagger\dagger}p < 0.01$, $^{\dagger\dagger\dagger}p < 0.001$, one-tailed test. See endnote 2 for details about the residual correlations. e, correlation between error terms.

impression information insufficiency was positively related to impression information seeking (RQ3a: $\beta = 0.26$, $p < 0.001$), impression information avoidance (RQ3b, $\beta = 0.13$, $p < 0.001$), impression heuristic processing (RQ3c: $\beta = 0.15$, $p < 0.001$), and impression systematic processing (RQ3d, $\beta = 0.15$, $p < 0.001$).

Lastly, RQ4 asked whether informational subjective norms would be related to impression information seeking (RQ4a), impression information avoidance (RQ4b), impression heuristic processing (RQ4c), and impression systematic processing (RQ4d). We observed significant positive relationships between informational subjective norms and impression information seeking (RQ4a: $\beta = 0.38$, $p < 0.001$), impression information avoidance (RQ4b: $\beta = 0.23$, $p < 0.001$), impression heuristic processing (RQ4c: $\beta = 0.35$, $p < 0.001$), as well as impression systematic processing (RQ4d: $\beta = 0.46$, $p < 0.001$).

DISCUSSION

This study develops the concept explication of impression information insufficiency and explores its antecedents and apparent effects on risk information seeking, avoidance, and processing. By conceptualizing impression information insufficiency, this research contributes a significant theoretical advancement to the RISP model. The conceptualization expands the explanatory capacity of the model in the domain of satisfying interpersonal needs in social settings. It also advances our understanding of how impression motive and its correspondent informational goal could influence people's choice and manner of risk information seeking, avoidance, and processing. Furthermore, this study makes an important theoretical contribution to developing a measurement of impression information insufficiency. Furthermore, this study makes an important theoretical contribution to developing a measurement of impression information insufficiency. In our study's survey, employing the HSM's priming technique (Winter, 2019) shows promise as a means of prompting respondents' concerns about interpersonal consequences when expressing, to their evaluator, their COVID-19-related judgments. In addition, our proposed measurement items broaden the roles of risk information seeking, avoidance, and processing in the RISP model to reflect people's impression goals and impression-oriented selectivity. The findings support the usefulness of our proposed measurement items.

Explication of the impression insufficiency concept lays important groundwork for understanding people's use of risk information beyond the accuracy goal. This study's findings provide empirical support to impression information insufficiency as an important motivational force that drives people's risk information seeking, avoidance, and processing. Our findings corroborate the RISP model's assertions that people seek, avoid, and process risk information for different purposes, and that people's risk information use behavior serves their informational goals: in this case that people are likely to employ risk information selectively to express socially acceptable risk judgments in social settings to satisfy their interpersonal needs. Driven by the impression motive and its correspondent informational goals, people seek, avoid, and process risk information in a selective and biased manner. As such, impression information insufficiency not only delineates *how much* effort people are motivated to invest in seeking and processing risk information but also describes *why* the people are so engaged.

Our findings on impression information insufficiency add to the RISP literature by providing several nuanced understandings of how impression-motivated risk information use behavior differs from accuracy-motivated risk information use behavior. First, the RISP literature (Griffin et al., 2013; Yang et al., 2014) shows that, in the domain of protecting themselves from the physical harm posed by a health hazard (i.e., accuracy motive—a motive (see endnote 1) commonly studied in the RISP literature), people's informational goal is to make valid and impartial decisions that square with relevant facts and evidence about the hazard. To achieve this accuracy-oriented informational goal, accuracy-motivated people will objectively assess the validity of risk information to distinguish well-founded from specious arguments when seeking, avoiding, and processing it. It is not surprising that, in the context of seeking to express socially acceptable risk judgments, our findings show that impression information insufficiency is positively related to impression risk information seeking. When pursuing an impression goal, people search for COVID-19 information in a biased manner. Second, the RISP literature (Griffin et al., 2013) shows that, in the context of seeking protection from physical harm caused by health hazards (i.e., accuracy goal), the RISP model posits a negative relationship between information insufficiency and information avoidance.[5] However, in the context of seeking to express socially acceptable risk judgments, our findings show a positive relationship between impression information insufficiency and impression information avoidance, which is reasonable because people avoid COVID-19 information incongruent with their evaluator's opinion. Avoiding those kinds of contradictions serves people's impression goal. Third, our findings reveal a difference in heuristic processing behavior when pursuing the informational goal of impression and accuracy. The RISP literature suggests that, when pursuing to make valid judgments about risk, people who have greater information insufficiency are less likely to rely on heuristic processing (Griffin et al., 2013). However, our study shows that, when pursuing to convey a favorable impression to important others, people who have greater information insufficiency, are more likely to rely on heuristic processing. This finding makes sense because impression-motivated people employ their important others' issue stance as a heuristic cue for processing. Finally, consistent with the HSM literature (Chen et al., 1996), our findings show that people concurrently engage in biased and selective heuristic and systematic processing when they perceive a higher need for information to express socially acceptable risk judgments. When the heuristic processing mode (e.g., based on cues such as "agreement facilitates liking," "following my interaction partner's opinion") cannot provide one with sufficient confidence to express socially acceptable risk judgments, people are more likely to devote more effort to process risk messages systematically, guided by their beliefs about their evaluator's opinions. As such, the essence of heuristic and systematic processing between the contexts of seeking to protect from harms caused by risk and seeking to express socially acceptable risk judgments remain the same, but the purpose and manner of heuristic and systematic processing shift according to people's informational goals (Chaiken et al., 1989).

Our findings show that informational subjective norms are a significant, positive predictor of impression information insufficiency. That is, people who perceive stronger normative pressure to stay informed about the COVID-19 risk are likely to perceive a greater need to communicate, to their evaluator, socially acceptable COVID-19-related judgments. Our results support that informational subjective norms may influence impression information insufficiency by raising the level of desired confidence to express, to their evaluator, socially acceptable COVID-19-related judgments (i.e., sufficiency threshold). Although informational subjective norms and impression information insufficiency correlate ($r = 0.13$, $p < 0.001$), it is not a strong correlation, which suggests that the two concepts do not substantially overlap. Therefore, to account for the influence of the social environment, it is valuable to include both of these two variables in the RISP model.

Consistent with the RISP model's premises, our findings show that, in the impression goal context, informational subjective norms appear to be a significant, positive motivational force related to individuals' impression-oriented risk information seeking, avoidance, and processing. In the accuracy goal context, informational subjective norms have a proven record of explanatory power related to people's risk information use behavior in the RISP literature (Liu et al., 2022; Yang et al., 2014). The findings of this study show that the evaluation standard embedded in informational subjective norms could lead people to seek, avoid, and process systematically in a biased and selective manner. Furthermore, their perception of important others' behavior to keep up with COVID-19-related issues may serve as heuristic cues that guide people to process risk messages in a biased and selective manner, according to what important others appear to consider appropriate regarding COVID-19.

The measures of the informational subjective norms in this study not only possess consistency with those measures being used in the accuracy goal context from the RISP literature for comparing the findings but also show consistent and fairly strong relationships with all four seeking and processing measures. Nonetheless, their explanatory value and even the strength of the relationships could be improved by adjusting the informational subjective norms measures to clearly tie to the context of seeking to express socially acceptable risk judgments (e.g., “People whom I value expect me to stay on top of the information about COVID-19 that is consistent with their attitude toward COVID-19”).

The findings also show that fear of the COVID-19 risk is another significant predictor of impression information insufficiency. That is, to express socially acceptable COVID-19-related judgments to their evaluator, people who experience a higher level of fear toward the COVID-19 risk are more likely to perceive a greater need for risk information. Consistent with the RISP model's predictions, our findings show that higher risk judgments, lower institutional trust, and lower personal control induced higher levels of fear toward COVID-19 risk.

Policy implications

Our research shed insights for policymakers on formulating policy mandates in future public health emergencies. Our findings show that people may seek, avoid, and process risk information for impression management purposes. Therefore, to gain compliance with policy mandates during public health emergencies, policymakers and health officials should render support for the mandates from evaluators in social roles (e.g., employers, corporate administrators, managers, school principals, and teachers) (Chaiken et al., 1989), because their employees and subordinates might attempt to align with their attitude toward the risky issues for impression purpose. Support for the mandates can take different forms ranging from a soft approach, such as encouraging compliance or providing incentives, to a hardline approach, such as terminating employment. Regardless of its form, evaluators' support is important because it can heighten people's concern for the interpersonal consequences associated with expressing risk judgments. Furthermore, our findings show informational subjective norms are a good predictor of impression information insufficiency, impression risk information seeking, avoidance, and processing. Informational subjective norms contain normative information about what the evaluators consider as the right thing to do (Cooper & Voronov, 2021). Therefore, to develop the norms, policymakers, and health officials should seek support for policy mandates from as many evaluators as possible. As such, the norms are likely to exert influence on people to engage in risk information use for impression purposes.

The results of this study also provide practical suggestions for risk communicators on risk information dissemination and risk message design. When designing risk messages, risk communicators could frame the advocated position and behavior of a risky issue as a way to be socially accepted and liked by important others. For instance, risk communicators should emphasize in messages that vaccination can convey an impression to others (e.g., colleagues, child's teachers) as a caring, considerate, and responsible person (Ellyatt, 2021). Furthermore, persuasive messages related to policy mandates can be distributed by evaluators (e.g., employers, corporate administrators, managers, school principals, teachers). As such, employees and subordinates are more likely to be aware of their evaluator's stance on the mandate for impression management purpose.

Limitations and future research

When interpreting the findings, it is important to point out the limitations of this study. First, the findings of this study may not be generalizable to other communities. Using the COVID-19 pandemic as a case study, this investigation was conducted in Hong Kong where the survey respondents were recruited through an online panel based on a nonrandom sampling procedure. Future research should consider conducting surveys based on probabilistic samples and conducting similar surveys on impression motives in other societies.

Second, the RISP model proposes that the effects of informational subjective norms and information insufficiency on risk information seeking, avoidance, and processing would be moderated by perceived information gathering capacity and relevant channel beliefs. Neither of these RISP variables was included in this analysis. Further research should examine the moderating effects of perceived information-gathering capacity and relevant channel beliefs. Finally, this study had not taken individual differences in responsiveness to social situations into account. HSM research on impression motive suggests that people with a high self-monitoring trait are more prone to social influence. Thus, future research should examine individual differences in impression information insufficiency.

ACKNOWLEDGMENTS

This article is dedicated to the memory of our colleague, collaborator, mentor, and role model, Professor Sharon Dunwoody. She was one of the founders of the risk information seeking and processing model and was part of this research team when the project was started in 2020. Her passion for science communication research, intellectual curiosity, and enthusiasm were truly inspiring. This article is dedicated to honoring her memory and the valuable insights she brought to our research. This study was supported by Hong Kong Baptist University, Research Committee, Initiation Grant—Faculty Niche Research Areas (RC-FNRA-IG/19-20/COMM/02).

ETHICS STATEMENT

Ethical approval was obtained from the Hong Kong Baptist University Research Ethics Committee (REC/20-21/0077) and all participants provided informed consent before data collection.

ORCID

Timothy K. F. Fung http://orcid.org/0000-0003-2710-0282
Po Yan Lai http://orcid.org/0000-0002-8610-5836

ENDNOTES

[1] The other two types of motives (Chaiken et al., 1996) are accuracy motive (the desire to form judgments that square with relevant facts), and defense motive (the desire to defend a particular judgmental position).

[2] We specified two sets of correlations between error terms in the hypothesized path model (see Figures 2 and 3): (1) error terms between impression information seeking and impression information avoidance and (2) error terms between impression heuristic processing and impression systematic processing. Methodologists (Jöreskog & Sörbom, 2006) advised that correlating error terms should be based on meaningful interpretation from a theoretical perspective. In this study, impression information seeking and impression information avoidance are two types of impression information use behaviors. Meanwhile, impression heuristic processing and impression systematic processing are two modes of impression information processing. Therefore, we argued that specifying, in advance, these two sets of error terms correlation are theoretically meaningful and empirically explainable.

[3] Some may consider treating people's impression motive as a moderator. However, we argue that conceptualizing impression motive as an integral part of the information insufficiency concept is more

theoretically sound in the RISP framework. First, motives and their corresponding informational goals are inseparable constituents in the concept of information insufficiency because they form a person's perceived levels of current knowledge and sufficiency threshold. In the domain of achieving positive relational outcomes in social situations, consider this hypothetical example of the social environment of some restaurant employees. Restaurant employees' impression motive may be related to a desire to express a judgment consistent with their employer's negative attitude toward the COVID lockdown restriction. Such a desire would set the employee's perceived level of knowledge they *actually have* (i.e., current knowledge) and the desired level of knowledge (i.e., sufficiency threshold) about lockdown restriction and social distancing. As such, the employee's impression motive would also set the perceived amount of information about lockdown restriction and social distancing they feel they need to have to confidently express a negative judgment that aligns with their employer's attitude (i.e., information insufficiency—the perceptual gap between current knowledge and sufficiency threshold). Therefore, conceptualizing motives and its corresponding goals as an integral part of the information insufficiency concept is theoretically more appropriate.

Furthermore, conceptualizing impression information insufficiency as one of the three types of information insufficiency (i.e., accuracy information insufficiency and defense information insufficiency) is theoretically substantial, because a person's perceived need to make satisfactory judgments for risk information is derived from a specific motive, and only certain types of information would satisfy that informational goal. In the case of impression motive, a person's desire is to express socially acceptable risk judgments to achieve positive relational outcomes in a social situation. Therefore, their perceived need for risk information is drawn from such a desire. Using the restaurant employee as an example, their impression-motivated need for information related to lockdown restriction and social distancing derives from the motive of presenting themselves in a positive light, from the employer's perspective. As a result, only the risk information that opposes the lockdown restriction and social distancing (e.g., drawbacks of the lockdown restriction on the economy) can satisfy the employee's impression-oriented informational goal. In contrast, if the restaurant employee is driven by the accuracy motive (i.e., the desire to make valid judgments to protect from COVID-19 harm), the employee only needs facts and evidence to satisfy their accuracy-oriented informational goal to judge the validity to contain the spread of COVID-19 through lockdown restriction and social distancing. Hence, differentiating impression information insufficiency from accuracy and defense information insufficiency allows this study to examine how impression information insufficiency influences risk information use behavior, and to see the differences in risk information use behavior in previous studies that employed accuracy information insufficiency. Other researchers can examine how the accuracy information insufficiency and defense information insufficiency influence risk information use behavior in future research. In short, differentiating information insufficiency into three types is conceptually more appropriate.

[4] The priming technique has been commonly used by HSM researchers to examine how different motives influence people's heuristic and systematic processing behavior (Lundgren & Prislin, 1998). The technique has proven to be effective in activating people's impression motive for information processing (e.g., Kim & Paek, 2009; Winter, 2019). When designing the impression information insufficiency priming instructions for the respondents, we referred to the priming procedure as described in previous relevant studies. To ensure the priming technique works as intended, we employed two strategies. First, we defined what "important others" means and explained how important others can exert positive and negative impacts on the respondents. Then, we used two questions as manipulation checks: one asked the respondents to indicate which important other they imagined expressing, in a near future social encounter, their COVID-19-related risk judgments; the other asked the respondents to indicate whether their important other's overall attitude toward COVID-19 related issues was consistent with theirs. To guide the respondents to consider the potential interpersonal consequences, we provided the vaccine mandate, the vaccine pass for public access, and the contact tracing mobile app as examples for the respondents to contemplate what potential interpersonal consequences are likely to occur after expressing their judgments about the policy mandates and its related issues.

Second, to ensure the respondents consider the heightened interpersonal consequences resulting from expressing their risk judgments to important others, we conducted a pretest of the priming technique with 15 Hong Kong adult residents. Following the priming instructions, all participants were able to verbally describe the potential consequences associated with expressing their risk judgments about the policy mandates and their related issues when imagining voicing those judgments to their important other. They also indicated that they had considered those verbally described consequences, with their important other, when answering the survey questions related to impression information insufficiency. Referring to the participants' pretest feedback, to improve clarity for fielding the survey, we modified the wording in the explanations and questions.

To emphasize, our primary focus of the priming technique is to increase the respondents' concern for the potential consequences associated with expressing COVID-19-related judgments. Some may argue that the concerns for expressing risk judgments to parents and to employers are different. Although their concerns may differ from one important other to another, that is not the focus of this study. What is significant is that our priming technique increased respondents' concerns when expressing the policy mandates judgments to their important other.

[5] In the context of seeking protection from physical harm caused by health hazards (i.e., accuracy goal), for two reasons the RISP model hypothesizes a negative relationship between information insufficiency and information avoidance (Griffin et al., 2013). One, when people consider they already know enough about a given risk, they are likely to avoid additional information; two, people will avoid risk information if they anticipate it will produce fear or worry that they cannot handle (Witte, 1992).

REFERENCES

Ahn, J., & Noh, G.-Y. (2020). Determinants of environmental risk information seeking: An emphasis on institutional trust and personal control. *Health, Risk & Society*, *22*(3–4), 214–230. https://doi.org/10.1080/13698575.2020.1813261

Ajzen, I. (1988). *Attitudes, personality, and behavior*. Dorsey Press.

An, B. Y., Porcher, S., Tang, S. Y., & Kim, E. E. (2021). Policy design for COVID-19: Worldwide evidence on the efficacies of early mask mandates and other policy interventions. *Public Administration Review*, *81*(6), 1157–1182. https://doi.org/10.1111/puar.13426

Barron, L. (2020, February 4). 'This Shouldn't Be About Politics.' Hong Kong medical workers call for border shutdown amid coronavirus outbreak. *TIME*. https://time.com/5777285/hong-kong-coronavirus-border-closure-strike/

Bohner, G., Moskowitz, G. B., & Chaiken, S. (1995). The interplay of heuristic and systematic processing of social information. *European Review of Social Psychology*, *6*(1), 33–68. https://doi.org/10.1080/14792779443000003

Casale, S., & Flett, G. L. (2020). Interpersonally-based fears during the COVID-19 pandemic: Reflections on the fear of missing out and the fear of not mattering constructs. *Clinical Neuropsychiatry*, *17*(2), 88–93. https://doi.org/10.36131/CN20200211

Chaiken, S., Giner-Sorolla, R., & Chen, S. (1996). Beyond accuracy: Defense and impression motives in heuristic and systematic information processing. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behaviour* (pp. 553–578). Guilford.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the Persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212–252). Guilford.

Chan, C. (2021, February 11). Does Hong Kong patriotism mean loving China and the party or just saying you do? *South China Morning Post*. https://www.scmp.com/comment/letters/article/3121238/does-hong-kong-patriotism-mean-loving-china-and-party-or-just

Chen, S., Shechter, D., & Chaiken, S. (1996). Getting at the truth or getting along: Accuracy-versus impression-motivated heuristic and systematic processing. *Journal of Personality and Social Psychology*, *71*(2), 262–275. https://doi.org/10.1037/0022-3514.71.2.262

Choy, G. (2020, November 16). Privacy, usage issues mark lukewarm response to Hong Kong's Covid-19 contact-tracing app 'Leave Home Safe'. *South China Morning Post*. https://www.scmp.com/news/hong-kong/health-environment/article/3110080/privacy-usage-issues-mark-lukewarm-response-hong

Christensen, P. N., Rothgerber, H., Wood, W., & Matz, D. C. (2004). Social norms and identity relevance: A motivational approach to normative behavior. *Personality and Social Psychology Bulletin*, *30*(10), 1295–1309. https://doi.org/10.1177/0146167204264480

Cialdini, R. B. (2001). The Science of Persuasion. *Scientific American*, *284*(2), 76–81. https://www.jstor.org/stable/26059056

Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 151–192). McGraw-Hill.

Cooper, M., & Voronov, M. (2021, September 3). Why business leaders need to mandate the COVID-19 vaccine. *Harvard Business Review*. https://hbr.org/2021/09/why-business-leaders-need-to-mandate-the-covid-19-vaccine

Cronbach, L. J., & Furby, L. (1970). How we should measure "change": Or should we? *Psychological Bulletin*, *74*(1), 68–80. https://doi.org/10.1037/h0029382

Darley, J. M. (1966). Fear and social comparison as determinants of conformity behavior. *Journal of Personality and Social Psychology*, *4*(1), 73–78. https://doi.org/10.1037/h0023508

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. HBJ College Publishers.

Ellsworth, P. C. (1991). Some implications of cognitive appraisal theories of emotion. In K. T. Strongman (Ed.), *International review of studies on emotion* (Vol. 1, pp. 143–161). Wiley.

Ellyatt, H. (2021, September 13). As many return to the office, tension flare between the "vaxxed and unvaxxed". CNBC. https://www.cnbc.com/2021/09/13/office-tensions-rise-between-the-vaccinated-and-unvaccinated-.html

Ellyatt, H. (2022, January 21). Arguing with your partner over COVID? You're not alone, with the pandemic straining many relationships. CNBC. https://www.cnbc.com/2022/01/21/covid-has-put-pressures-and-strains-on-relationships.html

Farrington, D. (2021, September 29). Lots of people they'll quit over vaccine mandates, but research shows few do. NPR. https://www.npr.org/2021/09/29/1041500566/vaccine-mandate-quit-research

Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*. Taylor & Francis.

Gerard, H. B., & Rabbie, J. M. (1961). Fear and social comparison. *The Journal of Abnormal and Social Psychology*, *62*(3), 586–592. https://doi.org/10.1037/h0048524

Griffin, R. J., Dunwoody, S., & Neuwirth, K. (1999). Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental Research*, *80*(2), S230–S245. https://doi.org/10.1006/enrs.1998.3940

Griffin, R. J., Dunwoody, S., & Yang, Z. J. (2013). Linking risk messages to information seeking and processing. *Annals of the International Communication Association*, *36*(1), 323–362. https://doi.org/10.1080/23808985.2013.11679138

Griffin, R. J., Neuwirth, K., Dunwoody, S., & Giese, J. (2004). Information sufficiency and risk communication. *Media Psychology*, *6*(1), 23–61. https://doi.org/10.1207/s1532785xmep0601_2

Griffin, R. J., Zheng Yang, Y., ter Huurne, E., Boerner, F., Ortiz, S., & Dunwoody, S. (2008). After the flood: Anger, attribution, and the seeking of information. *Science Communication*, *29*(3), 285–315. https://doi.org/10.1177/1075547007312309

Hall, M. A., Dugan, E., Zheng, B., & Mishra, A. K. (2001). Trust in physicians and medical institutions: What is it, can it be measured, and does it matter? *The Milbank Quarterly*, *79*(4), 613–639. https://doi.org/10.1111/1468-0009.00223

Hayes, A. F. (2009). *Statistical methods for communication science*. Routledge. https://doi.org/10.4324/9781410613707

Henry, D., Hussain, N. Z., & Sen, A. (2022, January 8). No jab, no job: Citigroup to fire unvaccinated staff this month—Memo. Reuters. https://www.reuters.com/business/finance/citi-terminate-employees-unv…2

Ho, K. (2020, February 17). Coronavirus: Hong Kong confirms 2 new local infections after 23 consecutive days with only imported cases. *Hong Kong Free Press*. https://hongkongfp.com/2020/05/13/breaking-coronavirus-hong-kong-confirms-2-new-local-infections-after-23-consecutive-days-with-only-imported-cases/

Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76–99). Sage.

ter Huurne, E. F. J., Griffin, R. J., & Gutteling, J. M. (2009). Risk information seeking among U.S. and Dutch residents: An application of the model of risk information seeking and processing. *Science Communication*, *31*, 215–237. https://doi.org/10.1177/1075547009332653

ter Huurne, E. F. J., & Gutteling, J. M. (2009). How to trust? The importance of self-efficacy and social trust in public responses to industrial risks. *Journal of Risk Research*, *12*(6), 809–824. https://doi.org/10.1080/13669870902726091

Inmediahk. (2023, January 5). One quarter pan pro-democratic supporters dissatified with preventive measures. https://www.inmediahk.net/node/

Jonas, E., Schulz-Hardt, S., & Frey, D. (2005). Giving advice or making decisions in someone else's place: The influence of impression, defense, and accuracy motivation on the search for new information. *Personality and Social Psychology Bulletin*, *31*(7), 977–990. https://doi.org/10.1177/0146167204274095

Jöreskog, K. G., & Sörbom, D. (2006). *LISREL 8.80*. SSI.

Kahlor, L., Dunwoody, S., Griffin, R. J., Neuwirth, K., & Giese, J. (2003). Studying heuristic-systematic processing of risk communication. *Risk Analysis*, *23*(2), 355–368. https://doi.org/10.1111/1539-6924.00314

Kerr, J., Panagopoulos, C., & van der Linden, S. (2021). Political polarization on COVID-19 pandemic response in the United States. *Personality and Individual Differences*, *179*, 110892. https://doi.org/10.1016/j.paid.2021.110892

Kim, J., & Paek, H. J. (2009). Information processing of genetically modified food messages under different motives: An adaptation of the multiple-motive heuristic-systematic model. *Risk Analysis*, *29*(12), 1793–1806. https://doi.org/10.1111/j.1539-6924.2009.01324.x

Kline, T. J. (2005). *Principles and practice of structural equation modeling* (2 ed.). Guilford Press.

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press.

Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin*, *107*(1), 34–47.

Leung, K. (2022, December 23). Xi reaffirms China's governing principle for Hong Kong. AP News. https://apnews.com/article/politics-xi-jinping-hong-kong-covid-national-security-83b6adc847399c2994e0efc70116fd52

Li, Y., & Meng, K. (2022). Understanding China's COVID zero strategy: The opening-up trilemma. *Global Policy*, *13*(2), 300–303. https://doi.org/10.1111/1758-5899.13041

Liu, Z., Yang, J. Z., & Feeley, T. H. (2022). Reduced risk information seeking model (RISK): A meta-analysis. *Science Communication*, *44*(6), 787–813. https://doi.org/10.1177/10755470221144453

Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychological Bulletin*, *127*(2), 267–286. https://doi.org/10.1037/0033-2909.127.2.267

Lufkin, B. (2020, March 5). Coronavirus: The psychology of panic buying. *BBC Worklife*. https://www.bbc.com/worklife/article/20200304-coronavirus-covid-19-update-why-people-are-stockpiling

Lundgren, S. R., & Prislin, R. (1998). Motivated cognitive processing and attitude change. *Personality and Social Psychology Bulletin*, *24*(7), 715–726. https://doi.org/10.1177/0146167298247004

Maurer, R. (2022, January 12). Number of workers under vaccine orders levels off. Society for Human Resource Management. https://www.shrm.org/hr-today/news/hr-news/pages/number-workers-under-vaccine-mandate-levels-off-scotus-osha-ets.aspx

Neuwirth, K., Frederick, E., & Mayo, C. (2002). Person-effects and heuristic-systematic processing. *Communication Research*, *29*(3), 320–359. https://doi.org/10.1177/0093650202029003005

Nienhuis, A. E., Manstead, A. S. R., & Spears, R. (2001). Multiple motives and persuasive communication: Creative elaboration as a result of impression motivation and accuracy motivation. *Personality and Social Psychology Bulletin*, *27*(1), 118–132. https://doi.org/10.1177/0146167201271010

Perse, E. M., & Courtright, J. A. (1993). Normative images of communication media mass and interpersonal channels in the new media environment: Mass and interpersonal channels in the new media environment. *Human Communication Research*, *19*(4), 485–503. https://doi.org/10.1111/j.1468-2958.1993.tb00310.x

Poortinga, W., & Pidgeon, N. F. (2003). Exploring the dimensionality of trust in risk regulation. *Risk Analysis*, *23*(5), 961–972. https://doi.org/10.1111/1539-6924.00373

Regan, H. (2020, June 30). China passes sweeping Hong Kong national security law. CNN. https://edition.cnn.com/2020/06/29/china/hong-kong-national-security-law-passed-intl-hnk/index.html

Reuters. (2021, August 26). Factbox: Major U.S. companies making masks, vaccines mandatory. https://www.reuters.com/business/healthcare-pharmaceuticals/major-us-companies-making-masks-vaccines-mandatory-2021-07-30/

Reuters. (2020, July 22). *Hong Kong mandates masks in all indoor public areas*. https://www.reuters.com/article/uk-health-coronavirus-hongkong-masks/hong-kong-mandates-masks-in-all-indoor-public-areas-idUKKCN24N0ML/

Rodríguez-Giralt, A., Fité, A., Álamo, L., de la Torre, L., Redondo, A., Callau, M., & Guinovart, C. (2020). What is zero-COVID strategy. Barcelona Institute for Global Health. https://www.isglobal.org/documents/10179/7943094/26_ISGlobal+COVID19+y+COVIDCero+o+Maxima+Supresion+EN/0a4e83bb-6257-4f5d-8960-16c323b464b2

Schachter, S. (1959). *The psychology of affiliation: Experimental studies of the sources of gregariousness*. The University of Chicago Press.

Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis*, *19*(4), 689–701. https://doi.org/10.1023/A:1007041821623

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*, 813–838. https://doi.org/10.1037/0022-3514.48.4.813

The de Beaumont Foundation. (2021, September 8). Poll—Unvaccinated Americans consider vaccine requirements a greater health threat than COVID-19: Findings on values and priorities suggest mandates may be the only thing that will change minds. https://debeaumont.org/news/2021/unvaccinated-adults-vaccine-mandates-are-a-greater-threat-than-covid-19/

The Government of the Hong Kong Special Administrative Region (HKSAR Government). (2021, December 7). Government announces latest social distancing measures under Prevention and Control of Disease Ordinance. *Press Release*. https://www.info.gov.hk/gia/general/202112/07/P2021120700740.htm

The Government of the Hong Kong Special Administrative Region (HKSAR Government). (2022, June 17). Education Bureau announces continuation of daily rapid antigen test arrangements for schools. Press Release. https://www.info.gov.hk/gia/general/202206/17/P2022061700740.htm

The University of Hong Kong (HKU). (2022). Coronavirus disease (COVID-19). School of Public Health. https://covid19.sph.hku.hk/dashboard

Tian, F. (2022, February 14). Qing ling shi kang yi: "Ai guo zhe zhi gang" de guan jian ce shi [Zero-COVID: a key test for 'patriots ruling Hong Kong']. AM730. https://www.am730.com.hk/column/

Tong, J. (2020, September 16). Quan min jian ce shi fou lang fei jin qian? [Is universal testing a waste of money?]. *Ming Pao*. https://news.mingpao.com/pns

Trafimow, D. (2020, September 24). Normative beliefs. National Cancer Institute. https://cancercontrol.cancer.gov/brp/research/constructs/normative-beliefs

Wan, K. M., Ka-Ki ho, L., Wong, N. W. M., & Chiu, A. (2020). Fighting COVID-19 in Hong Kong: The effects of community and social mobilization. *World development*, *134*, 105055. https://doi.org/10.1016/j.worlddev.2020.105055

Whitley, G. (1992). Concept analysis of fear. *Nursing Diagnosis*, *3*(4), 155–161. https://doi.org/10.1111/j.1744-618X.1992.tb00531.x

Winter, S. (2019). Impression-motivated news consumption. *Journal of Media Psychology*, *31*(4), 203–213. https://doi.org/10.1027/1864-1105/a000245

Winter, S., & Neubaum, G. (2016). Examining characteristics of opinion leaders in social media: A motivational approach. *Social Media + Society*, *2*(3), 1–12. https://doi.org/10.1177/2056305116665858

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, *59*, 329–349. https://doi.org/10.1080/03637759209376276

Yang, Z. J. (2012). Too scared or too capable? Why do college students stay away from the H1N1 vaccine? *Risk Analysis*, *32*(10), 1703–1716. https://doi.org/10.1111/j.1539-6924.2012.01799.x

Yang, Z. J., Aloe, A. M., & Feeley, T. H. (2014). Risk information seeking and processing model: A Meta-Analysis. *Journal of Communication*, *64*(1), 20–41. https://doi.org/10.1111/jcom.12071

Yang, J. Z., & Chu, H. (2016). Who is afraid of the Ebola outbreak? The influence of discrete emotions on risk perception. *Journal of Risk Research*, *21*(7), 834–853. https://doi.org/10.1080/13669877.2016.1247378

Yang, Z. J., & Kahlor, L. (2013). What, me worry? The role of affect in information seeking and avoidance. *Science Communication*, *35*(2), 189–212. https://doi.org/10.1177/1075547012441873

Yang, Z. J., McComas, K. A., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010). Information seeking related to clinical trial enrollment. *Communication Research*, *38*(6), 856–882. https://doi.org/10.1177/0093650210380411

Yau, C., & Magramo, K. (2021 May 14). 'Vaccine bubble' trouble? rules fatigue, app cynicism, sour mood are among customer hurdles for Hong Kong's restaurants, bars. *South China Morning Post*. https://scmp.com/news/hong-kong/hong-kong-economy/article/3133358/vaccine-bubble-trouble-rules-fatigue-app-cynicism

Yu, T., & Mahtani, S. (2021 December 27). Hong Kong is clinging to 'zero covid' and extreme quarantine. Talent is leaving in droves. *The Washington Post*. https://www.washingtonpost.com/world/2021/12/27/covid-hong-kong-quarantine-omicron

Zhou, X., Roberto, A. J., & Lu, A. H. (2021). Understanding online health risk information seeking and avoiding during the COVID-19 pandemic. *Health Communication*, *38*(3), 1–11. https://doi.org/10.1080/10410236.2021.1958981

AUTHOR BIOGRAPHIES

Timothy K. F. Fung (PhD, University of Wisconsin–Madison) is an associate professor in the Department of Interactive Media at Hong Kong Baptist University. With a focus on health, environmental, and science issues, his research delves into the intricate ways in which individuals seek, process, and respond to information. His work has been published in *Health Communication*, *Science Communication*, *Journal of Health Communication*, *International Journal of Public Opinion Research*, and *Mass Communication and Society*. His research has been honored with Top Faculty Paper Awards and the Article of the Year Award from the Association for Education in Journalism and Mass Communication's Division of Communicating Science, Health, Environment, and Risk.

Po Yan Lai (MS, KAIST) was a research assistant in the Department of Interactive Media at the Hong Kong Baptist University. She is interested in media and communication research, especially in using a data-driven approach to investigate the connections which lie between communication technology and society.

Robert J. Griffin (PhD, University of Wisconsin–Madison) is a professor emeritus in the Diederich College of Communication at Marquette University in Milwaukee, Wisconsin, United States. He is one of the founders of the risk information seeking and processing model. He focused much of his teaching and research on communication about environment, energy, health, science, and risk. He is an elected Fellow of the American Association for the Advancement of Science and the Society for Risk Analysis. He served on the US National Science Foundation's Decision, Risk, and Management Sciences program and on the National Research Council's Committee on Emerging Issues and Data on Environmental Contaminants (part of the US National Academy of Sciences).

How to cite this article: Fung, T. K. F., Lai, P. Y., & Griffin, R. J. (2024). Communicating socially acceptable risk judgments: The role of impression information insufficiency in the risk information seeking and processing model. *World Medical & Health Policy*, *16*, 376–404. https://doi.org/10.1002/wmh3.605

Received: 21 February 2023 | Revised: 10 August 2023 | Accepted: 26 September 2023

DOI: 10.1002/wmh3.589

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Making multisectoral committees work: Lessons from tobacco control in two Pacific small island developing states

Dori Patay[1,2] | **Ashley Schram**[1] | **Sharon Friel**[1]

[1]Australian Research Centre for Health Equity, School of Regulation and Global Governance, College of Asia and the Pacific, The Australian National University, 8 Fellows Rd, Australian Capital Territory, Australia

[2]Menzies Centre for Health Policy & Economics, Faculty of Medicine and Health, Sydney School of Public Health, The University of Sydney, Sydney, New South Wales, Australia

Correspondence

Dori Patay, Menzies Centre for Health Governance, The School of Regulation and Global Governance, College of Asia and the Pacific, The Australian National University, Canberra, ACT, Australia.
Email: dori.patay@sydney.edu.au

Funding information

Australian National University

Abstract

The consumption of harmful commodities drives the noncommunicable disease (NCD) epidemic globally and in Pacific small island developing states. Multisectoral committees are commonly chosen avenues to facilitate policy coherence across government sectors in regulating the commercial determinants of health (CDoH), but these committees often fail to function as intended. This paper aims to explore the institutional conditions that enable or constrain multisectoral committees in facilitating policy coherence for tobacco control in Fiji and Vanuatu. An exploratory, qualitative research design was applied, incorporating a two-case study design with within-case analysis and cross-case synthesis. Data collection consisted of 70 in-depth interviews in 2018 and 2019. Data collection and analysis were informed by an analytical framework drawn from the institutional collective action framework. The results show that the current amount of authority behind the investigated multisectoral committees in Fiji and Vanuatu is inadequate to meaningfully bring stakeholders together for an issue with high complexity. Moreover, multisectoral discussions on tobacco control have a high risk to break down, as the collaboration may generate unwanted impacts to one or more actors and the net benefits are perceived to be low. The authority behind multisectoral committees might be strengthened by the chairmanship of a cross-sectoral, high-level government official and the allocation of more resources for managing intersectoral engagement. Divergent preferences might be brought closer together by showcasing the socioeconomic costs of NCDs and policies affecting the availability, affordability, accessibility, and desirability of tobacco and raising awareness about CDoH in nonhealth sectors.

KEYWORDS

commercial determinants of health, multisectoral committees, Pacific, small island developing states, tobacco control

INTRODUCTION

The consumption of harmful commodities, such as tobacco, alcohol and ultra-processed foods, drives the noncommunicable disease (NCD) epidemic globally (Vos et al., 2020). Tobacco use alone is responsible for 8 million deaths every year (WHO, 2021). The systems, practices and pathways through which commercial actors increase the availability, affordability, accessibility and demand for harmful commodities are called the commercial determinants of health (CDoH) (Gilmore et al., 2023). Regulation of the CDoH requires a multisectoral government approach: the coordination and/or collaboration of government sectors that have a role in any aspect of the regulation of harmful commodity industries (Buse et al., 2017; Lencucha & Thow, 2020; OECD, 2021). However, government agencies responsible for governing the relevant sectors, such as health, trade, industry, agriculture, and economy, often have conflicting priorities and mandates, and their policies might negatively affect the goals of other sectors. This phenomenon is called policy incoherence and is often observed in CDoH governance (Collin, 2012; Knai et al., 2018; Lencucha & Thow, 2020; OECD, 2021).

The existence of conflicting mandates within governments should not necessarily constrain the control of CDoH; certain institutional conditions, such as the attributes and structures of governance systems, can potentially ensure that health objectives are not undermined by the objectives of other government department policies. Several intersectoral mechanisms are promoted to facilitate better coordination and the establishment of common ground, such as health in all policies, whole-of-government and whole-of-society approaches are seen to support policy coherence (de Leeuw, 2017; Dubé et al., 2014; Kickbusch et al., 2014; Lencucha et al., 2015). This paper focuses on multisectoral committees because these mechanisms are commonly chosen to facilitate policy coherence in NCD prevention and governing CDoH (FCTC Secretariat, 2022).

Establishing effective intersectoral mechanisms to facilitate policy coherence in CDoH governance is particularly important for low- and middle-income countries (LMICs), where 80% of global NCD deaths happen (Vos et al., 2020). However, the narrow interpretation of neoliberal economic norms, emphasizing the role of free markets, deregulation, and the "wealth creates health" rhetoric, is still dominant globally. Consequently, economic and trade interests are often prioritized over long-term public health interests (Lencucha et al., 2018; Schrecker, 2019). This phenomenon in tobacco governance has been documented in multiple LMICs, where tobacco use and the consequential rise in NCDs place a significant socioeconomic burden on societies (Appau et al., 2019; Drope & Lencucha, 2014; Labonté et al., 2018; Lencucha, Drope, & Labonte, 2016; Lencucha et al., 2018). The World Health Organization Framework Convention on Tobacco Control (WHO FCTC) explicitly recommends establishing multisectoral coordination for policy coherence, but governments struggle with implementing such mechanisms (FCTC Secretariat, 2018; WHO, 2003).

Similar to other LMICs, Pacific small island developing states (PSIDS) face difficulties in putting coherent policies in place to regulate harmful commodity industries and maintaining effective multisectoral collaboration (FCTC Secretariat, 2022; Win Tin et al., 2020). However, PSIDS have additional difficulties: distinctive vulnerabilities arising from their "islandness," such as small land, population and economy size, geographic isolation from other countries and within provinces, resulting in structural and political challenges (Fernandes & Pinho, 2017). While health sector actors in PSIDS are committed to multisectoral action to tackle NCDs, for example, by ratifying FCTC, limited engagement from nonhealth government agencies and the priority of economic interests continue to be major barriers for policy coherence in CDOH governance (Martin & de Leeuw, 2013; Mounsey et al., 2022; Phillips et al., 2019; Ravuvu et al., 2017; Snowdon, Waqa, et al., 2013; Thow et al., 2021; Waqa et al., 2017; World Bank, 2014). This results in alarming rates of harmful commodity consumption; for example, smoking prevalence can reach as high as 74% among males in PSIDS (Ministry of Health and Medical Services of Kiribiati and WPRO, 2018). The increased availability, accessibility, affordability, and demand for harmful commodities, such as tobacco, have been recognized as key drivers of the NCD crisis in PSDIS (Ravuvu et al., 2017; Sahal Estimé et al., 2014; Santos et al., 2019; Snowdon & Thow, 2013; Snowdon, Raj, et al., 2013). In 2020, 70% of mortality in PSIDS occurred due to NCDs, inhibiting these countries from fulfilling their Healthy Island Vision and Sustainable Development Goals (UN, 2021; Vos et al., 2020; WHO, 2018).

Understanding what institutional conditions enable or constrain multisectoral committees in facilitating policy coherence to address CDoH requires drawing on research disciplines with the necessary theoretical and methodological tools. The issue of intersectoral governance amidst conflicting mandates and interests has been in the focus of social science scholarship. Therefore, this research takes an interdisciplinary lens to investigate multisectoral committees tasked with facilitating policy coherence in tobacco governance (from a public health perspective) by drawing on the social science theory of collective action. Tobacco was chosen as the harmful commodity in focus, as, because of the adoption of FCTC, the responsibilities of PSIDS governments to control tobacco are the most binding compared to alcohol or ultra-processed foods.

The institutionalist scholarship has been occupied with the idea of individual and institutional collective action. Olson believed that either coercion or ideological motivations could make individuals act for the common good (Olson, 1971). Following this logic, institutions will naturally advance their own interests, which they prioritize over the collective good of other institutions. However, the theory of institutional collective action (ICA) explains that institutions are willing to cooperate if certain conditions are present (Feiock, 2013; Hubbard & Fowler, 2021). While multiple theories focus on collaboration between governance actors (Ansell & Gash, 2007; Bryson et al., 2006; Lubell, 2013), the ICA framework is unique because it analyzes collaboration risk (i.e., the risk of the collaboration breaking down) as a major contributor to the failure or success of solving an institutional collective problem (Feiock, 2013). This angle is particularly useful for investigating CDoH governance as conflicting mandates and interests, and the limited commitment of nonhealth government agencies are common issues in this space (Buse et al., 2017; Collin, 2012; Knai et al., 2018; Lencucha & Thow, 2020; OECD, 2021).

This study aims to explore the institutional conditions that enable or constrain multisectoral committees in facilitating policy coherence for tobacco control in PSIDS. To achieve the study aim, we applied an exploratory, qualitative research design, informed by the ICA framework.

METHODS

Theoretical perspectives

We drew from the ICA framework to develop our analytical framework that informed data collection and analysis. The ICA framework "seeks to explain how policy actors respond to dilemmas that arise directly from the division or partitioning of authority in which decisions by one government [agency] in one more specific functional areas impact other government [agencies] and other governmental functions" (Feiock, 2013). The framework investigates intersectoral collaboration by focusing on three factors: applied intergovernmental mechanisms, collaboration risk, and perceived net benefits (Feiock, 2013). This framework was successfully used in prior studies to analyze multisectoral collaboration on health-related issues (Greer et al., 2020; Hubbard & Fowler, 2021). The analytical framework drawn from the ICA framework is presented in Table 1.

Is the applied intersectoral mechanism appropriate?

Whether a given intersectoral mechanism is appropriate to resolve a particular issue depends on two conditions. First, the (strength of) authority that make actors work together (i.e., authority behind the intersectoral mechanism): are they socially embedded, or work together because of a legal or contractual agreement, or because of a political authority? Second, the complexity of the mechanism: the more actors and policy areas need to be aligned, the more challenging the collaboration becomes, therefore stronger incentives or authority are needed to make actors collaborate (Feiock, 2013).

TABLE 1 The analytical framework drawn from the ICA framework (Feiock, 2013).

Theoretical construct	Subconstruct	Definition
Applied intergovernmental mechanism	Authority behind the intersectoral mechanism	Actors are socially embedded, work together because of a legal or contractual agreement, or because of a political authority
	Range of complexity	Range of policies or policy areas and number of involved actors
Collaboration risk	Type of dilemma	
	Coordination problem	Government agencies need to organize their activities to align with each other
	Division problem	The share of tasks and benefits needs to be decided while the interests of the actors are aligned
	Negative externality problem	Parties have opposing interests, and the decisions made through the collaboration can result in unwanted impacts for one or more participating actors
	Distribution of preferences	Economic, demographic, and ideological similarity of actors and divergence of their interests
	Political, legal, and institutional structures	Structures defining the strategies available and incentives for each government agency to advance their interests and minimize their costs
Perceived net benefits	Expected gain	Benefits resulting from collective action
	Transaction costs	Expenses of collective action

How high is the collaboration risk?

Whether actors choose to work together to solve their collective problem depends on the collaboration risk and the anticipated net benefits (Feiock, 2013). Collaboration risk, the risk that the collaboration breaks down, is defined by three conditions: (i) the nature of dilemma, (ii) the distribution of preferences among actors, and (iii) the political and institutional structures (Feiock, 2013).

Three types of dilemma are distinguished by the ICA framework: (a) a coordination problem when the actors need to organize their activities to align with each other; (b) a division problem when the share of tasks and benefits needs to be decided while the interests of the actors are still aligned; and (c) a negative externality problem when actors have opposing interests; thus, the decisions made through the collaboration can result in unwanted impacts for one or more actors. The severity of the collaboration risk increases from (a) to (c). The higher risk the collaboration carries, mechanisms with stronger authority are likely to be more effective in ensuring that the collaboration does not break down (Feiock, 2013).

The distribution of preferences indicates the divergence of the actors' interests and the economic, demographic, and ideological similarities. The more homogeneity there is between the actors, the easier it is for them to work together (Feiock, 2013).

Political, legal, and institutional structures define the strategies available and incentives for each actor to advance their interests and minimize costs. For example, centralized government structures often do not give space to voluntary collaboration, while decentralized structures facilitate it (Feiock, 2013).

How high are the anticipated benefits?

The net benefit gained from participation—the gains minus the transaction costs—is the primary incentive for actors to collaborate. The more formally imposed the mechanism, the more centralized decision-making powers are set, and the more actors it involves, the higher the transaction costs become, but the more likely it will be that it effectively solves the ICA dilemma even when the collaboration risk is high. However, when the collaboration risk is low, there is no need for costly and complex mechanisms (Feiock, 2013).

Study design, data collection and analysis

We applied an exploratory, qualitative case study approach with Fiji and Vanuatu as case study countries. The study design incorporated within-case analysis and cross-case synthesis (Cruzes et al., 2015; George & Bennett, 2004; Mills et al., 2010). Within-case analysis is "the in-depth exploration of a single case as a stand-alone entity" (Mills et al., 2010). Cross-case synthesis is the combination of the results arising from the two cases (Cruzes et al., 2015). This study design was chosen as it is efficient to explore institutional conditions behind policy making (Brady & Collier, 2010). Earlier studies used a similar approach to investigate tobacco and food policy-making in PSIDS (Anderson, 2012; Latu et al., 2018; Martin & de Leeuw, 2013; Mounsey et al., 2022; Waqa et al., 2017). Our paper expands these studies by applying the social science theory-informed analytical framework described above.

The case selection followed two criteria to identify PSIDS which could potentially provide positive lessons on multisectoral committees for tobacco control. First, PSIDS with recent progress in implementing multisectoral tobacco control measures were identified, based on the WHO MPOWER reports (WHO TFI, 2019). Second, to identify cases where a conflict of interest was likely present before the implementation of multisectoral tobacco control policies (thus multisectoral coordination was likely necessary), a PSIDS was identified with existing tobacco industry, and another where interests to establish a local tobacco industry was reported. We used Google Search to find SIDS that fulfill this criterion. Fiji and Vanuatu were identified as optimal case studies.

The data collection consisted of in-depth interviews with key stakeholders in Fiji and Vanuatu. We purposively selected participants based on their current or past, direct or indirect role in any aspect of tobacco governance, through a snowball selection process and online search. Participants included government officials from multiple sectors, civil society organizations, academic institutions, development partners (intergovernmental organizations, international nongovernmental organizations, and governmental agencies of donor countries), and the tobacco industry. (Nongovernment actors were involved as they have a role in shaping governance through formal and informal channels of influence, such as stakeholder consultations during policy making.) The interviews were conducted in person (with the exception of four that were done over the phone) by the lead author between April 2018 and August 2019, until saturation was reached (i.e., no new data arose). Interviews were audio recorded after written informed consent was obtained. (In those cases when the participant did not give consent for audio recording, detailed notes were taken.) Interviews lasted 60 min on average, used open-ended, semi-structured questions, such as “What multisectoral committees are tasked with tobacco-related issues?” or “What makes it challenging to meaningfully engage with nonhealth sector actors through multisectoral committees?” Ethics approval was obtained from the Fiji National Health Research and Ethics Review Committee, the Vanuatu Cultural Centre, and the Australian National University Human Research Ethics Committee (protocol number: 2017/945).

The interview recordings were transcribed by the lead author and uploaded to NVivo for thematic coding. Initially deductive coding was applied, using the theoretical constructs identified in the analytical framework; this was followed by inductive coding to allow the identification of new themes that were originally not captured in the analytical framework (i.e., theme derivation). The credibility of the analysis was enhanced through (i) source triangulation by interviewing multiple participants on the same questions and conducting follow-up interviews, and (ii) analyst triangulation by discussing the results with the other authors (Patton, 1999).

Study setting

The Republic of Fiji, with its population of 884,887 and 332 islands is one of the largest of PSIDS (CIA, 2022). In Fiji, almost every second man regularly consumes tobacco, while 14% of Fijian women smoke (Snowdon et al., 2011). Fiji's commercial tobacco production is dominated by British American Tobacco, and tobacco farming is considered highly profitable by locals (BAT, 2005; Bolanavanua, 2017). Although tobacco growing and manufacturing is negligible in supporting the Fijian economy (ReportLinker, 2023), British American Tobacco and high-level officials in the Ministry of Economy and Agriculture have been reportedly close, indicating the potential presence of pro-tobacco industry influence over key policy makers (Patay, Schram, Collin, et al., 2022; Patay, Schram, & Friel, 2023). Fiji ratified FCTC in 2005; the Tobacco Control Act 2010 and the Tobacco Control Regulations 2012 regulate advertising and promotion of tobacco products; labeling; tar and nicotine content; restrictions on the sale, advertising and smoking (The Government of Fiji, 2010, 2013).

The Republic of Vanuatu has a population of 288,000 and 80 islands (CIA, 2022). Smoking prevalence among men is 46% and 4% among women (WPRO, 2013). Vanuatu does not have commercial tobacco production to date; however, the interest in investing in tobacco production and manufacturing is high (Aru, 2020; McGarry, 2019). In 2005, Vanuatu ratified FCTC, after which the Tobacco Control Act 2008 and Tobacco Control Regulations 2013 were introduced, regulating tobacco advertising, promotion, and marketing; labeling; reporting and limitations of contents; expanded smoke-free places including public places, restaurants, licensed premises, health and education institutions, public transport and flights; ban on sale to minors, in single sticks, and through vending machines (The Government of Vanuatu, 2008, 2013).

RESULTS

Seventy in-depth interviews were completed in Fiji and Vanuatu; 21 invitations were declined (including the tobacco industry). Table 2 summarizes the participants' background by stakeholder type, policy sector and country. To ensure confidentiality in the small social context of Fiji and Vanuatu, the participants' organizational affiliations are not disclosed in this paper when quotes are presented.

This section presents the results in the following order: first, the ICA dilemma is confirmed (i.e., whether policy coherence is an issue in tobacco governance that requires institutional collective action), and the attendance and operational issues with multisectoral committees working on tobacco-related policies in Fiji and Vanuatu are presented. This is followed by the presentation of institutional conditions that enable or constrain multisectoral committees in facilitating policy coherence for tobacco control in Fiji and Vanuatu, following the theoretical constructs of the analytical framework.

The institutional collective action dilemma: Policy incoherence in tobacco governance

While a comprehensive policy and legal analysis to determine the extent of policy coherence in tobacco governance was outside the scope of this study, the interviewee data suggest

TABLE 2 The distribution of in-depth interviews.

	Fiji	Vanuatu
Type of actor		
Government agencies	25	21
Civil society organizations and academic institutions	3	1
Development partners	14	6
Policy sector		
Health	21	10
Trade/Industry	3	5
Agriculture	1	1
Finance/Economy	4	1
Education	2	2
Foreign affairs	2	1
Multisectoral	9	8

that the ICA dilemma in tobacco governance in Fiji and Vanuatu is the issue of policy incoherence: while the Ministry of Health (MoH) aims to reduce the demand and supply of tobacco through implanting FCTC measures, other government agencies encourage tobacco farming.

> The Ministry of Health is trying its best to implement FCTC, while the Ministry of Agriculture gives grants to farmers to grow tobacco. And the commerce [Ministry of Trade], I assume is casual with BAT [British American Tobacco], who is a rich company, providing grants to farmers, free seedlings, free fertilisers, so there is no coherence. (Development partner, F28)

Moreover, in Fiji, besides the tobacco control regulations of MoH, one other law is concerned with tobacco: the Foreign Investment Regulations 2009 of the Ministry of Trade and Industry (MoT) requires domestic tobacco manufacturing to use locally grown tobacco (The Government of Fiji, 2009). This legislation supports tobacco farming in the country by encouraging manufacturers to buy local crops. This measure is contrary to Article 17 of FCTC, which requires a shift from tobacco farming to viable alternatives (WHO, 2003).

Government officials (V01, V02, V16, and V17) in Vanuatu also confirmed that MoT and the Ministry of Agriculture (MoA) support tobacco investment. During the time of data collection, regulations to facilitate tobacco farming were developed; this will be the first legal instrument besides the Tobacco Control Act and the Excise Tax Act affecting tobacco governance (The Government of Vanuatu, 2015). While the latter two align with the aim of supporting tobacco control, the former will run counter to tobacco control efforts. In addition, MoT had a vital role in the negotiations of the Pacific Agreement on Closer Economic Relations (PACER) Plus agreement between Vanuatu, Australia and New Zealand, a treaty with potentially significant implications for tobacco control as Vanuatu agreed to drop the duties on tobacco products from 55% to zero until 2052 (DFAT, 2012). If these provisions enter into force, imported tobacco products will likely be cheaper in Vanuatu. This is contrary to the efforts of MoH in tobacco control and a classic example of policy incoherence.

Progressing policy coherence in tobacco governance in Fiji and Vanuatu is a collective action dilemma, and more precisely, a negative externality problem, because the policies of the different government agencies responsible for aspects of tobacco governance have a detrimental impact on each other's work. Furthermore, the involved actors' opposing mandates raise a defection problem—there is a high likelihood that certain actors will decide to not participate in the collaboration. According to the ICA framework, these types of issues are the most difficult to solve, and thus the risk of collaboration breaking down is high. Therefore, the intersectoral mechanism to resolve this problem requires significant authority to ensure that the parties maintain meaningful collaboration.

Attendance and organizational issues of multisectoral committees

In Fiji and Vanuatu, multisectoral NCD committees are dedicated to facilitate policy coherence for tobacco control, convened by MoH. Due to their small size and resource constraints, PSIDS rarely have a dedicated unit or working group solely for tobacco control; instead, NCD prevention and the regulation of harmful commodities are usually discussed together [paraphrased, F27].

In Fiji, this multisectoral committee is called the National Multisectoral Taskforce on NCDs, and it is organized by MoH. It involves the Customs and Revenue Service (Customs), Ministry of Economy (MoE), MoT, the Ministry of Local Government, Housing and Community Development, WHO and the Pacific Community. The task force is set to meet twice a year. However, the committee struggles to bring all necessary actors together: nonhealth sector actors often do not attend the meetings.

> When MoH calls for a multisectoral meeting, MoT does not go. […] The same for Finance [MoE]; especially them. (Development partner, F28)
>
> Trade [MoT] is the problem. […] They refuse to come. (Government, F02)

In Vanuatu, a multisectoral NCD task force was established to facilitate policy coherence in tobacco control, but the committee meetings are not organized:

> We have a national NCD task force. It is supposed to be a multisectoral working group that meets every month and discusses matters relating to NCD prevention and control. So, obviously, we do not only talk about tobacco because we want to do things in an integrated manner. (Government, V17)
>
> In the NCD plan phase 1 and 2 during the review there was a multisectoral committee, but in the last one there is not. So in the past year and this year I do not see this committee functioning. (Government, V12)
>
> I'm not sure that a multisectoral collaboration ever really took off. There was one meeting but after that, I'm not sure if anything's been undertaken. (Government, V15)

Vanuatu has another multisectoral committee intended to harmonize trade policies with other sectors: the National Trade Development Committee (NTDC), organized by MoT, serves as a multisectoral mechanism where decisions are made on trade priorities, including tobacco trade (World Trade Organization [WTO], 2019). When asked if the health sector is involved in this multisectoral forum, a participant explains: "MoH… we missed them somehow… They never attend the NTDC." A high-level MoH official (V17) and MoT official (V24) confirm this statement.

Institutional conditions behind attendance and organizational issues

Authority and complexity

The Fijian multisectoral NCD committee can be classed as a multilateral mechanism encompassing an intermediate range of actors, according to the interviewees: six government agencies from the health, economy, trade and industry, tourism, and local government sectors, and two development partners. In Vanuatu, participants were unable to give an account of all potential participants, and thus, it is difficult to estimate the complexity of multisectoral NCD committees when/if they were to happen.

Regarding the range of issues, within tobacco control at least five policy areas need to be covered in Fiji and Vanuatu according to the Tobacco Control Act: price and tax measures; smoke-free policies; contents and packaging of products; advertising, promotion, sponsorship; and point of sale measures (The Government of Fiji, 2010; The Government of Vanuatu, 2008; WHO, 2003). However, participants explain that food and alcohol policies need to be discussed as well in these NCD committees (C-POND, 2014; MoH, 2016); thus, altogether a high number of issues are to be handled by this intersectoral mechanism.

Regarding integration, these committees do not legally compel committee members to attend the sessions [paraphrased, F26]; they function as working groups rather than official partnerships. This is confirmed by the language used by MoH officials who call these meetings a “working group” (e.g., see quote above from V17).

In summary, the multisectoral NCD committee in Fiji (and possibly in Vanuatu) encompasses a medium range of actors while is not very strong at compelling them to participate. The data confirms this assessment: MoH does not have the authority to compel nonhealth government agencies, such as MoT, to attend the sessions. An interviewee suggests that MoT, MoA and MoE will not work together with MoH “unless there is leadership coming from the top-top level, from Prime Minister (PM) level, cabinet level, who says, “I want you guys to work together, coordinate together, and I want coherence between your policies'” (Government, F28).

Perceived transaction costs and net benefits

High transaction costs are not necessarily barriers for a collaboration to be successful, but the parties need to believe that the benefits gained are worth the expense (Feiock, 2013). However, as the data demonstrates below, the actors in Fiji and Vanuatu often seem to find the net benefits too low for collaboration, while the transaction costs are likely to be medium to high based on the complexity of collaboration.

According to participants, a common reason that multisectoral collaboration does not often happen in Vanuatu is that it requires extra financial resources:

> Multisectoral collaboration stalls when it comes to the conversation of who's funding it. Because there's a bit of that idea that whoever raises the idea of multisectoral collaboration should be funding whatever it's done. (Government, V15)

The expected transaction cost can be other than financial resources, like the cost of losing autonomy: officials both in Fiji and Vanuatu are afraid that working together with other government agencies endangers their jobs, which results in territorialism—guarding one's mandate in their own policy field:

> We need to make sure we do not step over and do the work of others. And also not Agriculture [MoA] coming and doing the work of MoH. (Government, V21)

> The main hindrance in multisectoral approaches is territorialism. (Government, F07)

Regarding the perceived benefits, often MoT, MoE, or MoA do not recognize the benefit of engaging with MoH for NCD prevention:

> As for intersectoral cooperation, what I found that when it was fortuitous and beneficial for both sectors, that worked really well. But when it came to things like encouraging [the Ministry of] Internal Affairs or someone to look at how we could tax or change behaviour around the consumption and production of Tusker beer, it was a lot harder to do, because we were directly contradicting what another sector was doing, and asked him to help us without having really any kind of carrots to swing over them. (Government, V15)

Distribution of preferences

The distribution of preferences among actors is a critical defining factor in solving an ICA problem (Hubbard & Fowler, 2021). Collaboration on tobacco control in Fiji and Vanuatu is problematic from this perspective for two reasons. First, the prohealth and the procommercial tobacco interests directly oppose each other, with MoH seeking to control tobacco: “Apart from Health [MoH] I do not think that anyone else is lobbying for tobacco control” (Government, F06). In contrast, the interests of the trade, industry, agriculture, and economy sectors lie in maintaining or increasing the current rates of tobacco consumption: “We are not supposed to decline support from [tobacco farmers], because it's a livelihood thing” (Government, F15), “Tobacco is a powerhouse for the government to generate revenue. And it will not be easy for the government to just give this up very easily.” (Government, V22). This wide divergence of interests and mandates is likely to contribute to the reluctance of MoT, MoA, and MoE to attend multisectoral NCD committee meetings.

Second, there are significant differences in the ideas which lead the two groups of actors in their approach to tobacco governance. MoE, MoT, and MoA seem to have adopted a narrow interpretation of neoliberal economic norms: believing that economic development will inherently improve health outcomes or simply that economic interests need to be prioritized.

> They [MoE] are in an economic curve, and they are saying ‘wealth is health’. (Government, F02)

> The benefit is that if we can produce something for export, then it is a good idea. It will provide employment. If the industry comes and helps people to grow tobacco, then it's good for the economy. Tobacco is not good for the health, but many people smoke. But it would be a good revenue for Vanuatu, if we could export it. (Government, V16)

In contrast, many health sector actors believe in the need to prioritize health interests over economic and commercial interests, recognizing the socioeconomic burden of NCDs.

> We get things that are leading to these diseases [NCDs] to be more expensive. This is a pro-active approach to try to combat NCDs. For someone to say that we should worry about the amount of taxation they pay, that person does not want people in this country to be well. When you do that, you are encouraging NCDs, so what are we here for? We are here for our country and its people. (Parliament of the Republic of Fiji, 2017)

Political and institutional context

Management issues

Weaknesses in the management of multisectoral committees may result in the committees not meeting. The data indicates that in Vanuatu, often the responsible actors do not organize the multisectoral committee meetings as they should.

> It depends on whoever is taking leadership on NCD coordination. It's not a matter of resources. It just needs to be facilitated. (Government, V12)

> We need to strengthen it [MoH] first, before we can start having MoH reach out and coordinate amongst the other government line ministries and departments, because if they are themselves fractured and cannot work effectively and efficiently within themselves as a unit, then it's going to affect how they associate and cooperate with other units to make something work. (Government, V27)

Issues of assigned representatives

The data shows that the delegates sent on behalf of the invited agencies often do not have the necessary skills or authority; they are most likely sent to fulfill the agency's obligation to attend the meeting.

> When they say that they invited the right stakeholders, it does not necessarily mean that the person that actually comes is the right person that will be carrying out this. Sometimes the person is just there for participation issues to show that they showed up. (Government, V27)

> When MoH calls Finance, Trade, Planning to come for a meeting, these guys do not even come or they send a small officer who cannot take any decision. (Development partner, F28)

Imbalance of authority

The imbalance of authority between the organizer (MoH) and relevant nonhealth sector invitees (MoT, MoE, and MoA) seems to be a reason why they often do not participate, or send an inadequate delegate to the meetings: MoH is not perceived as a government agency with enough authority to request other ministries to attend meetings on an issue that is perceived as a predominantly health problem. A participant explains that MoT and MoE "say 'Who is MoH to call us for a meeting'" (F28).

> All along through the FCTC, it just came through to MoH. I think if we tried to have a committee that had Customs and that, I felt like there was not enough mandate. (Government, V29)

Historical path dependency

An interviewee suggests that in Fiji there is a reluctance for intersectoral outreach because during the reign of the military government (between 2008 and 2014) gatherings of officials were seen as a sign of potential political unrest (ABC News, 2014):

> Under the military government there was a prohibition on a group meeting together as a leadership group. The concern was that public service, at least from the view of government, was highly politicised, and those individuals were not necessarily supportive of the government, and if you get those people together, they will essentially collude and will take down the government. (Development partner, F34)

DISCUSSION

This paper presented a theory-informed analysis of institutional conditions that constrain the ability of multisectoral committees in facilitating policy coherence for tobacco control in Fiji and Vanuatu. Although the study aimed to uncover enabling conditions as well, the data primarily explained the constraining conditions. However, our results shed lights to opportunities to strengthen the existing multisectoral committees in both countries.

The data showed that the multisectoral committees in Fiji and Vanuatu have issues in facilitating policy coherence for tobacco control, as the meetings either fail to happen or some of the important members do not attend. Our analysis reveals four institutional conditions behind this. First, the issue of tobacco governance carries a high collaboration risk because the involved parties have opposing mandates and interests, resulting in a high risk of defection. Second, these committees are characterized by low authority for integration, which is not enough to bring together a medium range of actors to discuss a high number of conflicting issues. Third, a multisectoral collaboration on tobacco control would result in medium to high transaction costs, while at the same time the perceived benefits are low, particularly for nonhealth sector actors. Fourth, the political and institutional context of these countries tend not to be supportive of intersectoral work on tobacco control: MoH is perceived to have insufficient authority to induce meaningful engagement from nonhealth sector actors; the weakness of performance management and accountability results in failure to organize the meetings; and in Fiji, the historical remnants of the prohibition on gatherings cause further issues.

The 2020 FCTC implementation reports confirm that Fiji and Vanuatu need to strengthen their intersectoral coordination (FCTC Secretariat, 2022), and both countries are committed to improving multisectoral action to tackle NCDs (C-POND, 2014; MoH, 2016). Two other studies found that the implementation of FCTC is constrained by the political and socio-cultural context of tobacco policy making in Fiji and Vanuatu. In Fiji, the centralization of authority within the hands of the political elite is an important barrier, especially as the close connection between this elite and the tobacco industry is well documented (Patay, Schram, Collin, et al., 2022; Patay et al., 2023). In Vanuatu, the clientelism and patronage weakens the accountability of high-level government officials to ensure that public health interests are considered above the interests of the tobacco industry (Patay et al., 2023). Despite the relevance of this issue and these countries' commitments, to date, no study has been published that provides an in-depth analysis of intersectoral mechanisms in tobacco control or CDoH governance in these countries or other PSIDS. Our study took an important step to fill this gap.

While this study explored a previously understudied area, some of our findings are aligned with prior research on SIDS. The result that Fiji and Vanuatu struggle to maintain multisectoral action corresponds to earlier research in tobacco control in Vanuatu (Martin & de Leeuw, 2013), food policy in Fiji (Latu et al., 2018; Snowdon, Waqa, et al., 2013; Waqa et al., 2017), and NCD policies in SIDS in general (Win Tin et al., 2020). Snowdon, Waqa, et al. (2013) and Waqa et al. (2017) report that the Fijian multisectoral NCD committee does not meet regularly, and MoH is left alone to drive any action to tackle NCDs. Similar to our findings, Waqa et al. (2017) reported on the difficulty of getting the right people from nonhealth sectors involved in multisectoral NCD committee meetings.

Snowdon, Waqa, et al. (2013) state that limited financial and human capacity is a barrier to organizing multisectoral meetings—a constraint confirmed by our data. Additionally, Latu et al. (2018) cite poor coordination efforts from MoH to engage nonhealth sectors in Fiji, which resonates with our findings that performance management and accountability issues are barriers to managing multisectoral committees. Our results also confirm a report on Caribbean SIDS (HCC, 2020) suggesting that the small size of bureaucracy—common in SIDS—allows the operation of a small NCD unit only, leaving relatively few officials to deal with a wide range of duties. This can explain why multisectoral NCD committees are not managed as planned.

Furthermore, our analysis of the role of diverging preferences in constraining intersectoral collaboration aligns with findings from Phillips et al. (2019), Thow et al. (2021), and Waqa et al. (2017), who explain that dominant neoliberal ideologies in Fiji constrain policy coherence in food governance.

Only one study has been published that investigated intersectoral governance in-depth in the Western Pacific region that included PSIDS (Friel et al., 2015); it focused on health in all policies in general. While this research has not explicitly concentrated on intersectoral action on CDoH or NCDs, many of its insights are aligned with our findings. The study reports that political leadership and engagement were important facilitators of multisectoral collaboration in Fiji and Palau, a point corresponding to our finding that due to the high collaboration risk, a high-level political or governmental authority needs to support the intersectoral mechanism. Moreover, Friel et al. found that a shift from the biomedical, curative agenda to a social determinants of health agenda was an important enabler of intersectoral action (Friel et al., 2015). This finding aligns with our results indicating the importance of bringing diverging ideas together through adopting the idea of CDoH as the driver of NCDs.

Implications for public health

Our study carries several insights that may benefit efforts to strengthen multisectoral committees for tobacco control. These insights might be useful for professionals working in government departments, development partners and civil society actors in PSIDS. Moreover, some of the insights might be transferable to other LMICs where multisectoral collaboration proves to be challenging. Finally, the CDoH scholarship may benefit from expanding the critical public health approach with a social science theory-informed angle.

The glue of authority

Our first insight relates to the importance of high-level political or government support as the “glue” that compels different government agencies to work together, despite their divergent interests, mandates, and ideas. The study of Friel et al. (2015) confirms this point by emphasizing that political leadership and engagement was an important facilitator of multisectoral collaboration in Fiji and Palau. Similarly, Reeve et al. (2021) suggest that high-level political leaders' “cross-ministerial championship” can facilitate intersectoral collaboration in the Western Pacific region. In the case of Fiji and Vanuatu, chairmanship by the Prime Minister or placing the mechanism under the remit of the Prime Minister's Office could be an option to strengthen the authority behind multisectoral NCD committees. In the recent years, Fijian policy makers have been working on a multisectoral mechanism to improve food security and nutrition with a similar approach (FAO, 2022). Vanuatu is also in the process of establishing a multisectoral mechanism for a whole-of-food systems approach that will be located under the Prime Minister's Office (FAO, 2022). While the feasibility and effectiveness of these approaches for multisectoral collaboration remain to be seen, these mechanisms showcase the possibility of intersectoral work above sectoral siloes.

Closing the gap between preferences

Our second insight is the opportunity to bring divergent preferences closer to each other by (i) changing the ways nonhealth government agencies think about NCDs and CDoH and by (ii) improving the perception of the benefits of collaboration. A shift from the narrow conceptualization of neoliberal economic norms and the biomedical approach to NCDs to adopting the idea of CDoH among all stakeholders could benefit multisectoral collaboration. A recent study by Patay, Schram, & Friel (2022) offers an in-depth analysis of the ways the framing of NCDs place most responsibility to act on the health sector and the public, which leaves the tobacco industry, the trade, economic and agriculture sectors without responsibility to act. Adopting the idea of CDoH would facilitate the recognition, acknowledgment, and consideration of the health impact of agricultural, trade, and economic policies, in addition to the objectives of these nonhealth sectors. However, this would provide opportunities to develop a more balanced approach to economic and health considerations than currently observed to tackle the NCD crisis that considers not only the benefits of tobacco production to the economy but its consequent socioeconomic costs, including those that arise from the growing burden of chronic diseases. The aim would be to develop an approach to assessing costs and benefits that extends beyond any single sector. A shift in ideas has been recommended by Friel et al. (2015) when they suggested that moving from a biomedical agenda to a social determinants of health agenda was helpful in facilitating a health-in-all-policies approach within governments in the Western Pacific. Such need for a shift in ideas in Fiji was also reported by Waqa et al. (2017). Moving away from the narrow interpretation of neoliberal norms has been suggested by other studies on food policy in PSIDS (Phillips et al., 2019), in tobacco control in other LMICs (Labonté et al., 2018; Lencucha et al., 2018), and for the governance of CDoH in general (Ayo, 2012; Glasgow & Schrecker, 2015; Lencucha & Thow, 2019, 2020; Rushton & Williams, 2012; Townsend et al., 2020).

The understanding of the benefits of collaboration may be improved by showcasing the socioeconomic cost of CDOH—not only of the NCD burden but the cost of investing in or supporting harmful commodity industries. The importance of current and PSIDS specific data on the socioeconomic impact of NCDs and measures impacting the availability, affordability, and accessibility of tobacco and food policies has been recognized by health sector actors and development partners alike, as it is demonstrated by a growing amount of studies on this field (Anderson, 2012; Chand et al., 2020; Health Technology Analysts, 2021; Martin & de Leeuw, 2013; Osornprasop, 2018; Ravuvu et al., 2017; Thow et al., 2021). A health impact assessment of harmful commodity industries has not been conducted yet in PSIDS but could help highlight the dire consequences of CDoH (Schram & Townsend, 2020). These studies could be complemented by country-specific assessments about the contribution of tobacco farming and production to farmers' livelihoods and the Fijian economy. Studies in other tobacco producing LMICs have proven that despite the reputation of tobacco as a highly-profitable crop, tobacco farmers struggle to set out of poverty because of the hidden costs imposed by the tobacco industry (Goma et al., 2017; Lencucha, Drope, Labonte, Zulu, et al., 2016; Lencucha et al., 2020; Li et al., 2019; Magati et al., 2016; Makoka et al., 2017).

Strengthening the management of multisectoral committees

Our third insight is enabling better management of multisectoral committees. The increase in financial capacity is a key point made by our study and other research in the region (Friel et al., 2015). Additionally, raising the number of officials working on NCDs and, more specifically, dedicating full-time staff to multisectoral engagement may be useful; this would require increasing the priority of this area within the government, and support from development partners could help make this happen (Snowdon, Waqa, et al., 2013). In addition, strong high-level leadership that keeps medium-level and operational staff accountable for engaging across government sectors could be beneficial.

LIMITATIONS

This study was part of a doctoral project with inherent funding constraints that incurred two limitations. First, no local Fijian or ni-Vanuatu researchers were involved in the research team; this was mitigated by the guidance of government officials in MoH in both states. Second, only two case studies were conducted. While a larger case number would further strengthen the conclusions by creating more reliable and robust evidence, a two-case design ensures sufficient analytical strength for this study because the results arising from the two cases can be contrasted, improving the accuracy and generalizability of the findings and reducing uncertainty (George & Bennett, 2004; Yin, 2018). Moreover, this design allowed the exploration multisectoral committees in two countries with similar contexts (Yin, 2018). Further limitation of the study is that more health sector actors participated in the study than nonhealth sector actors. In addition, investigating PSIDS with well-functioning multisectoral committees tasked with tobacco issues would have been optimal; however, at the time of case selection, no reports were available that would evaluate and compare PSIDS based on such criteria (Win Tin et al., 2020).

CONCLUSIONS

Despite the commitment to multisectoral action to tackle NCDs and govern CDoH, the dedicated multisectoral committees are constrained by several institutional conditions in Fiji and Vanuatu. In their current design, multisectoral committees do not facilitate policy coherence for tobacco control; however, several opportunities were raised by this paper to strengthen the way they operate. Our study highlights the importance of high-level, cross-sectoral government authority in validating multisectoral committees and holding all relevant actors accountable. Furthermore, the gap of conflicting interests, mandates, and ideas between government actors may to be closed by shifting ideas from the narrow interpretation of neoliberal norms to a wider recognition of CDoH and by showcasing the cost of inaction.

AUTHOR CONTRIBUTIONS

Dori Patay: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Validation; Visualization; Roles/Writing—original draft. **Sharon Friel**: Supervision; Writing—review & editing. **Ashley Schram**: Supervision; Writing—review and editing. All authors read and approved the final manuscript.

ACKNOWLEDGMENTS

We thank the government officials in the Ministry of Health of Vanuatu and the Ministry of Health and Medical Services of Fiji for their guidance in this project. The Australian National University provided funding for Dori Patay to undertake this doctorate research under its University Research Scholarship, ANU HDR Fee Remission Merit Scholarship, ANU Vice Chancellor's Travel Grant schemes. Open access publishing facilitated by Australian National University, as part of the Wiley - Australian National University agreement via the Council of Australian University Librarians.

ETHICS STATEMENT

Research Ethics approval was granted for this study by the Fiji National Health Research and Ethics Review Committee, the Vanuatu Cultural Centre, and the Australian National University Human Research Ethics Committee (protocol number: 2017/945).

ORCID

Dori Patay http://orcid.org/0000-0001-5927-1006

REFERENCES

ABC News. (2014, September 12). Fiji election: From 2006 coup to 2014 poll, eight years under interim PM Frank Bainimarama. *ABC News*. Retrieved January 8, 2023, from https://www.abc.net.au/news/2014-09-12/fiji-elections-timeline/5736654?utm_campaign=abc_news_web&utm_content=link&utm_medium=content_shared&utm_source=abc_news_web

Anderson, I. P. S. (2012). *The economic costs of noncommunicable diseases in the Pacific Islands: A rapid stocktake of the situation in Samoa, Tonga, and Vanuatu*. World Bank. Retrieved January 8, 2023, from http://elibrary.worldbank.org/doi/book/10.1596/27219

Ansell, C., & Gash, A. (2007). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. https://doi.org/10.1093/jopart/mum032

Appau, A., Drope, J., Witoelar, F., Chavez, J. J., & Lencucha, R. (2019). Why do farmers grow tobacco? A qualitative exploration of farmers perspectives in Indonesia and Philippines. *International Journal of Environmental Research and Public Health*, *16*(13), 2330. https://doi.org/10.3390/ijerph16132330

Aru, H. (2020). Which ministerial 'Power' under the Tobacco Control Act? *Vanuatu Daily Post*, 3. Retrieved January 8, 2023, from https://dailypost.vu/opinion/which-ministerial-power-under-the-tobacco-control-act/article_309cf458-542d-11ea-a9f5-6f01f0b2d3b6.html

Ayo, N. (2012). Understanding health promotion in a neoliberal climate and the making of health conscious citizens. *Critical Public Health*, *22*(1), 99–105. https://doi.org/10.1080/09581596.2010.520692

BAT. (2005). *Fiji social report*. British American Tobacco (BAT). Retrieved January 8, 2023, from https://fijilive.com/edirectory/logo/BAT.pdf

Bolanavanua, S. (2017). Farmer earns $20k with tobacco. *FijiSun*. Retrieved January 8, 2023, from https://fijisun.com.fj/2017/06/28/farmer-earns-20k-with-tobacco/

Brady, H. E., & Collier, D. (2010). *Rethinking social inquiry: Diverse tools, shared standards* (2nd ed.). Rowman & Littlefield Publishers.

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review*, *66*(s1), 44–55. https://doi.org/10.1111/j.1540-6210.2006.00665.x

Buse, K., Tanaka, S., & Hawkes, S. (2017). Healthy people and healthy profits? Elaborating a conceptual framework for governing the commercial determinants of non-communicable diseases and identifying options for reducing risk exposure. *Globalization and Health*, *13*(1), 34. https://doi.org/10.1186/s12992-017-0255-3

Chand, S. S., Singh, B., & Kumar, S. (2020). The economic burden of non-communicable disease mortality in the South Pacific: Evidence from Fiji. *PLoS One*, *15*(7), e0236068. https://doi.org/10.1371/journal.pone.0236068

CIA. (2022). *The World Factbook*. Central Intelligence Agency (CIA). Retrieved January 8, 2023, from https://www.cia.gov/the-world-factbook/

Collin, J. (2012). Tobacco control, global health policy and development: Towards policy coherence in global governance. *Tobacco Control*, *21*(2), 274–280. https://doi.org/10.1136/tobaccocontrol-2011-050418

C-POND. (2014). *Non-communicable diseases strategic plan 2015–2019. Fiji Health Sector Support Program*. http://www.health.gov.fj/wp-content/uploads/2018/03/Final-NCD-Strategic-Plan-2015-2019.pdf

Cruzes, D. S., Dybå, T., Runeson, P., & Höst, M. (2015). Case studies synthesis: A thematic, cross-case, and narrative synthesis worked example. *Empirical Software Engineering*, *20*(6), 1634–1665. https://doi.org/10.1007/s10664-014-9326-8

DFAT. (2012). *PACER plus schedule of commitments on tariffs for Vanuatu (HS2012) Part I. Department of Foreign Affairs and Trade (DFAT)*. Australian Government. Retrieved January 8, 2023, from https://www.dfat.gov.au/trade/agreements/in-force/pacer/documents

Drope, J., & Lencucha, R. (2014). Evolving norms at the intersection of health and trade. *Journal of Health Politics, Policy and Law*, *39*(3), 591–631. https://doi.org/10.1215/03616878-2682621

Dubé, L., Addy, N. A., Blouin, C., & Drager, N. (2014). From policy coherence to 21st century convergence: A whole-of-society paradigm of human and economic development. *Annals of the New York Academy of Sciences*, *1331*, 201–215. https://doi.org/10.1111/nyas.12511

FAO. (2022). *Session 6: Collaboration to implement national food systems transformation pathways in the context of the 5F crisis: National Convenor 1: Vanuatu, Mr Antoine Ravo, Director Agriculture and Rural Development*

—*Focus on governance Small Island Developing States Solutions Forum 2022, Apia*. The Food and Agricultural Organization of the United Nations (FAO).

FCTC Secretariat. (2018). *2018 global progress report on implementation of the WHO framework convention on tobacco control*. Retrieved January 8, 2023, from https://fctc.who.int/publications/m/item/2018-global-progress-report

FCTC Secretariat. (2022). *WHO FCTC implementation database*. World Health Organization (WHO) Framework Convention for Tobacco Control Secretariat (FCTC). Retrieved January 8, 2023, from https://untobaccocontrol.org/impldb/

Feiock, R. C. (2013). The institutional collective action framework. *Policy Studies Journal*, *41*(3), 397–425.

Fernandes, R., & Pinho, P. (2017). The distinctive nature of spatial development on small islands. *Progress in Planning*, *112*, 1–18. https://doi.org/10.1016/j.progress.2015.08.001

Friel, S., Harris, P., Simpson, S., Bhushan, A., & Baer, B. (2015). Health in all policies approaches: Pearls from the Western pacific region: Health in all policies in the Pacific. *Asia & the Pacific Policy Studies*, *2*(2), 324–337. https://doi.org/10.1002/app5.89

George, A. L., & Bennett, A. (2004). *Case studies and theory development in the social sciences*. MIT Press.

Gilmore, A. B., Fabbri, A., Baum, F., Bertscher, A., Bondy, K., Chang, H.-J., Demaio, S., Erzse, A., Freudenberg, N., Friel, S., Hofman, K. J., Johns, P., Abdool Karim, S., Lacy-Nichols, J., de Carvalho, C. M. P., Marten, R., McKee, M., Petticrew, M., Robertson, L., … Thow, A. M. (2023). Defining and conceptualising the commercial determinants of health. *The Lancet*, *401*(10383), 1194–1213. https://doi.org/10.1016/S0140-6736(23)00013-2

Glasgow, S., & Schrecker, T. (2015). The double burden of neoliberalism? Noncommunicable disease policies and the global political economy of risk. *Health & Place*, *34*, 279–286. https://doi.org/10.1016/j.healthplace.2015.06.005

Goma, F., Drope, J., Zulu, R., Li, Q., Chelwa, G., Labonte, R., & Banda, J. (2017). *The economics of tobacco farming in Zambia*. Retrieved January 8, 2023 from https://www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/economics-tobacco-farming-zambia-2017.pdf

Greer, R., Hannibal, B., & Portney, K. (2020). The role of communication in managing complex water–energy–food governance systems. *Water*, *12*(4), 1183. https://doi.org/10.3390/w12041183

HCC. (2020). *Managing conflict of interest for NCD prevention and control in the Caribbean: Challenges for small island developing states*. Healthy Caribbean Coalition (HCC). Retrieved January 8, 2023, from https://www.healthycaribbean.org/managing-conflict-of-interest-in-the-caribbean/

Health Technology Analysts. (2021). *The potential impact of salt reduction in Fiji*. Retrieved January 8, 2023, from https://www.georgeinstitute.org/the-potential-impact-of-salt-reduction-in-fiji

Hubbard, M., & Fowler, L. (2021). Institutional collective action on drugs: Functional and vertical dilemmas of unused pharmaceuticals. *Review of Policy Research*, *38*(1), 76–96. https://doi.org/10.1111/ropr.12406

Kickbusch, I., & Gleicher, D., World Health, O., & Regional Office for, E. (2014). *Smart governance for health and well-being: The evidence*. Retrieved January 8, 2023, from http://apps.who.int/iris/bitstream/10665/131952/1/Smart%20governance%20for%20health%20and%20well-being%20the%20evidence.pdf

Knai, C., Petticrew, M., Mays, N., Capewell, S., Cassidy, R., Cummins, S., Eastmure, E., Fafard, P., Hawkins, B., Jensen, J. D., Katikireddi, S. V., Mwatsama, M., Orford, J., & Weishaar, H. (2018). Systems thinking as a framework for analyzing commercial determinants of health. *The Milbank Quarterly*, *96*(3), 472–498.

Labonté, R., Lencucha, R., Drope, J., Packer, C., Goma, F. M., & Zulu, R. (2018). The institutional context of tobacco production in Zambia. *Globalization and Health*, *14*(1), 5. https://doi.org/10.1186/s12992-018-0328-y

Latu, C., Moodie, M., Coriakula, J., Waqa, G., Snowdon, W., & Bell, C. (2018). Barriers and facilitators to food policy development in Fiji. *Food and Nutrition Bulletin*, *39*(4), 621–631. https://doi.org/10.1177/0379572118797083

de Leeuw, E. (2017). Engagement of sectors other than health in integrated health governance, policy, and action. *Annual Review of Public Health*, *38*(1), 329–349. https://doi.org/10.1146/annurev-publhealth-031816-044309

Lencucha, R., Drope, J., & Chavez, J. J. (2015). Whole-of-government approaches to NCDs: The case of the Philippines Interagency Committee-Tobacco. *Health Policy and Planning*, *30*(7), 844–852. https://doi.org/10.1093/heapol/czu085

Lencucha, R., Drope, J., & Labonte, R. (2016). Rhetoric and the law, or the law of rhetoric: How countries oppose novel tobacco control measures at the World Trade Organization. *Social Science and Medicine*, *164*, 100–107. https://doi.org/10.1016/j.socscimed.2016.07.026

Lencucha, R., Drope, J., Labonte, R., Cunguara, B., Ruckert, A., Mlambo, Z., Kadungure, A., Bialous, S., & Nhamo, N. (2020). The political economy of tobacco in Mozambique and Zimbabwe: A triangulation mixed methods protocol. *International journal of environmental research and public health*, *17*(12), 4262. https://doi.org/10.3390/ijerph17124262

Lencucha, R., Drope, J., Labonte, R., Zulu, R., & Goma, F. (2016). Investment incentives and the implementation of the framework convention on tobacco control: Evidence from Zambia. *Tobacco Control*, *25*(4), 483–487. https://doi.org/10.1136/tobaccocontrol-2015-052250

Lencucha, R., Reddy, S. K., Labonte, R., Drope, J., Magati, P., Goma, F., Zulu, R., & Makoka, D. (2018). Global tobacco control and economic norms: An analysis of normative commitments in Kenya, Malawi and Zambia. *Health Policy and Planning*, *33*(3), 420–428. https://doi.org/10.1093/heapol/czy005

Lencucha, R., & Thow, A. M. (2019). How neoliberalism is shaping the supply of unhealthy commodities and what this means for NCD prevention. *International Journal of Health Policy and Management*, *8*(9), 514–520. https://doi.org/10.15171/ijhpm.2019.56

Lencucha, R., & Thow, A. M. (2020). Intersectoral policy on industries that produce unhealthy commodities: Governing in a new era of the global economy? *BMJ Global Health*, *5*(8), e002246. https://doi.org/10.1136/bmjgh-2019-002246

Li, Q., Magati, P., Lencucha, R., Labonte, R., Makoka, D., & Drope, J. (2019). The economic geography of Kenyan tobacco farmers' livelihood decisions. *Nicotine & Tobacco Research*, *21*(12), 1711–1714. https://doi.org/10.1093/ntr/ntz011

Lubell, M. (2013). Governing institutional complexity: The ecology of games framework. *Policy Studies Journal*, *41*(3), 537–559. https://doi.org/10.1111/psj.12028

Magati, P. O., Drope, J., Lencucha, R., & Labonté, R. (2016). *The economics of tobacco farming in Kenya*. Retrieved January 8, 2023 from, https://www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/economics-of-tobacco-farming-in-kenya-summary.pdf

Makoka, D., Drope, J., Appau, A., Labonte, R., Li, Q., Goma, F., Zulu, R., Magati, P., & Lencucha, R. (2017). Costs, revenues and profits: An economic analysis of smallholder tobacco farmer livelihoods in Malawi. *Tobacco Control*, *26*(6), 634–640. https://doi.org/10.1136/tobaccocontrol-2016-053022

Martin, E., & de Leeuw, E. (2013). Exploring the implementation of the framework convention on tobacco control in four small island developing states of the Pacific: A qualitative study. *BMJ Open*, *3*(12), e003982. https://doi.org/10.1136/bmjopen-2013-003982

McGarry, D. (2019). Tobacco factory shut down—For now. *Vanuatu Daily Post*. https://dailypost.vu/news/tobacco-factory-shut-down-for-now/article_5dfd36a8-ba73-5ed7-a871-850ab6898654.html

Mills, A. J., Durepos, G., & Wiebe, E. (2010). *Encyclopedia of case study research*. SAGE Publications, Inc.

Ministry of Health and Medical Services of Kiribati and WPRO. (2018). *Kiribati NCD risk factors STEPS report 2015-2016*. The Government of Kiribati and the World Health Organization Office of the Western Pacific (WPRO). Accessed October 16, 2023. https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/data-reporting/kiribati/steps/2015-2016-kiribati-steps-report.pdf?sfvrsn=b420198e_3

MoH. (2016). *Vanuatu noncommunicable disease policy & strategic plan 2016–2020*. The Government of Vanuatu. Retrieved January 8, 2023, from https://moh.gov.vu/images/health_policies/policies/NCD_policy_2016-2020-_Final.pdf

Mounsey, S., Vaka, A. K., Cama, T., Waqa, G., McKenzie, B., & Thow, A. M. (2022). Strengthening sugar-sweetened beverage taxation for non-communicable disease prevention: A comparative political economy analysis case study of Fiji and Tonga. *Nutrients*, *14*(6), 1212. https://doi.org/10.3390/nu14061212

Murray, C., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abegaz, K. H., Abolhassani, H., Aboyans, V., Abreu, L. G., Abrigo, M., Abualhasan, A., Abu-Raddad, L. J., Abushouk, A. I., Adabi, M., … Borzouei, S., Global Burden of Disease Risk Factors Collaborators. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: A systematic analysis for the global burden of disease study 2019. *The Lancet*, *396*(10258), 1223–1249. https://doi.org/10.1016/S0140-6736(20)30752-2

OECD. (2021). *Making better policies for food systems*. Organisation for Economic Co-operation and Development (OECD). Retrieved January 8, 2023, from https://doi.org/10.1787/ddfba4de-en

Olson, M. (1971). *The logic of collective action: Public goods and the theory of groups* (Vol. 124, p. 1971). Harvard University Press.

Osornprasop, S. (2018). Tonga's tobacco taxes. *Development Policy Blog*, 5. Retrieved January 8, 2023, from: https://www.devpolicy.org/tongas-tobacco-taxes-20180924/?print=pdf

Parliament of the Republic of Fiji. (2017, July 27). Parliamentary debates. *Daily Hansard*. Retrieved January 8, 2023, from https://www.parliament.gov.fj/wp-content/uploads/2021/07/Daily-Hansard-Friday-16th-July-2021.pdf

Patay, D., Schram, A., Collin, J., Sell, S., & Friel, S. (2022). Authority in tobacco control in Pacific small island developing states: A qualitative study of multisectoral tobacco governance in Fiji and Vanuatu. *Tobacco Control*. https://doi.org/10.1136/tc-2022-057404

Patay, D., Schram, A., & Friel, S. (2022). The role of causal ideas in the governance of commercial determinants of health. A qualitative study of tobacco control in the Pacific. *Social Science & Medicine*, *314*, 115481. https://doi.org/10.1016/j.socscimed.2022.115481

Patay, D., Schram, A., & Friel, S. (2023). The challenges in protecting public health interests in multisectoral governance in the context of small island developing states: The case of tobacco control in Fiji and Vanuatu. *Globalization and Health*, *19*(1), 31. https://doi.org/10.1186/s12992-023-00931-y

Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Services Research*, *34*(5 Pt 2), 1189–1208.

Phillips, T., Ravuvu, A., McMichael, C., Thow, A. M., Browne, J., Waqa, G., Tutuo, J., & Gleeson, D. (2019). Nutrition policy-making in Fiji: Working in and around neoliberalisation in the Global South. *Critical Public Health*, *31*(3), 316–326. https://doi.org/10.1080/09581596.2019.1680805

Ravuvu, A., Friel, S., Thow, A. M., Snowdon, W., & Wate, J. (2017). Monitoring the impact of trade agreements on national food environments: Trade imports and population nutrition risks in Fiji. *Globalization and Health*, *13*(1), 33. https://doi.org/10.1186/s12992-017-0257-1

Reeve, E., Thow, A. M., Huse, O., Bell, C., Peeters, A., & Sacks, G. (2021). Policy-makers' perspectives on implementation of cross-sectoral nutrition policies, Western Pacific Region. *Bulletin of the World Health Organization*, *99*(12), 865–873. https://doi.org/10.2471/BLT.20.283366

ReportLinker. (2023). *Fiji tobacco industry outlook 2022–2026*. Retrieved January 8, 2023 from https://www.reportlinker.com/clp/country/6088/726434

Rushton, S., & Williams, O. D. (2012). Frames, paradigms and power: Global health policy-making under neoliberalism. *Global Society*, *26*(2), 147–167. https://doi.org/10.1080/13600826.2012.656266

Sahal Estimé, M., Lutz, B., & Strobel, F. (2014). Trade as a structural driver of dietary risk factors for noncommunicable diseases in the Pacific: An analysis of household income and expenditure survey data. *Globalization and Health*, *10*(1):48. https://doi.org/10.1186/1744-8603-10-48

Santos, J. A., McKenzie, B., Trieu, K., Farnbach, S., Johnson, C., Schultz, J., Thow, A. M., Snowdon, W., Bell, C., & Webster, J. (2019). Contribution of fat, sugar and salt to diets in the Pacific Islands: A systematic review. *Public Health Nutrition*, *22*(10), 1858–1871. https://doi.org/10.1017/S1368980018003609

Schram, A., & Townsend, B. (2020). International trade and investment and food systems: What we know, what we don't know, and what we don't know we Don't know. *International Journal of Health Policy and Management*, *10*(12), 886–895. https://doi.org/10.34172/ijhpm.2020.202

Schrecker, T. (2019). Globalization and health: Political grand challenges. *Review of International Political Economy*, *27*(1), 26–47. https://doi.org/10.1080/09692290.2019.1607768

Snowdon, W., Kubuabola, I., & Tukana, I. (2011). *Fiji NCD risk factors STEPS report 2011* (NCD STEPS Reports, Issue).

Snowdon, W., Raj, A., Reeve, E., Guerrero, R. L. T., Fesaitu, J., Cateine, K., & Guignet, C. (2013). Processed foods available in the Pacific Islands. *Globalization and Health*, *9*(1), 53. https://doi.org/10.1186/1744-8603-9-53

Snowdon, W., & Thow, A. M. (2013). Trade policy and obesity prevention: Challenges and innovation in the Pacific Islands. *Obesity Reviews*, *14*, 150–158. https://doi.org/10.1111/obr.12090

Snowdon, W., Waqa, G., Raj, A., Kanungo, A., & Robinson, H. (2013). *Non-communicable diseases and health system responses in Fiji* (Working Paper Series, Issue. 34) http://nutritionandhealthfiji.com/uploads/5/7/2/8/57283159/user_kelseym_wp_34.pdf

The Government of Fiji. (2009). Foreign investment regulations 2009. Retrieved January 8, 2023, from https://www.investinfiji.today/wp-content/uploads/2018/01/Fiji-Foreign-Investment-Regulations-2009.pdf

The Government of Fiji, (2010). Tobacco control decree 2010. Pub. L. No. Decree No. 63 of 2010. Retrieved January 16, 2023, from https://www.health.gov.fj/wp-content/uploads/2014/09/31_Tobacco-Control-Decree-2010.pdf

The Government of Fiji, (2013). Tobacco control regulations 2013, The Ministry of Health and Medical Services of Fiji (2013). Retrieved January 16, 2023, from https://laws.gov.fj/Acts/DisplayAct/3162

The Government of Vanuatu. (2008). Tobacco control act 2008. Retrieved January 16, 2023, from https://www.wto.org/english/thewto_e/acc_e/vut_e/wtaccvut14_leg_20.pdf

The Government of Vanuatu, (2013). Tobacco control regulation order no. 86 of 2013, The Ministry of Health of Vanuatu. Retrieved January 16, 2023, from https://www.tobaccocontrollaws.org/laws/regs-no-86-of-2013-vanuatu

The Government of Vanuatu. (2015). Excise Tax Act 2015, Pub. L. No. 174 of 2015, Official Gazette, The Government of Vanuatu. Retrieved January 8, 2023, from: http://www.paclii.org/vu/other/VUGovGaz/2015/100.pdf

Thow, A. M., Waqa, G., Browne, J., Phillips, T., McMichael, C., Ravuvu, A., Tutuo, J., & Gleeson, D. (2021). The political economy of restricting marketing to address the double burden of malnutrition: Two case studies from Fiji. *Public Health Nutrition*, *24*(2), 354–363. https://doi.org/10.1017/S1368980020000440

Townsend, B., Schram, A., Baum, F., Labonté, R., & Friel, S. (2020). How does policy framing enable or constrain inclusion of social determinants of health and health equity on trade policy agendas. *Critical Public Health*, *30*(1), 115–126. https://doi.org/10.1080/09581596.2018.1509059

UN. (2021). *Sustainable Development Goals*, United Nations (UN). Retrieved January 16, 2023, from http://www.un.org/sustainabledevelopment/sustainable-development-goals/

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abolhassani, H., Aboyans, V., Abrams, E. M., Abreu, L. G., Abrigo, M., Abu-Raddad, L. J., Abushouk, A. I., … Bhutta, Z. A., Global Burden of Disease Collaborators. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the global burden of disease study 2019. *The Lancet*, *396*(10258), 1204–1222. https://doi.org/10.1016/s0140-6736(20)30925-9

Waqa, G., Bell, C., Snowdon, W., & Moodie, M. (2017). Factors affecting evidence-use in food policy-making processes in health and agriculture in Fiji. *BMC Public Health*, *17*(1), 51. https://doi.org/10.1186/s12889-016-3944-6

WHO. (2003). WHO framework convention on tobacco control. Geneva, Switzerland: World Health Organization (WHO) Framework Convention for Tobacco Control Secretariat (FCTC). Retrieved January 16, 2023, from https://fctc.who.int/who-fctc/overview

WHO. (2018). *Twelfth Pacific health ministers meeting: Outcome of the twelfth Pacific health ministers meeting*. World Health Organization (WHO). Retrieved January 16, 2023, from https://apps.who.int/iris/rest/bitstreams/1171956/retrieve

WHO. (2021). *Tobacco*. World Health Organization (WHO). Retrieved January 16, 2023, from https://www.who.int/news-room/fact-sheets/detail/tobacco

WHO TFI. (2019). *WHO report on the global tobacco epidemic, 2019*. World Health Organization Tobacco Free Initiative (WHO TFI). Retrieved January 16, 2023, from https://www.who.int/publications-detail-redirect/9789241516204

World Trade Organization (WTO). (2019, February 6). *Vanuatu Trade policy review*. World Trade Organization. Accessed October 19, 2022. https://www.wto.org/english/tratop_e/tpr_e/tp478_e.htm

Win Tin, S. T., Kubuabola, I., Ravuvu, A., Snowdon, W., Durand, A. M., Vivili, P., & Passmore, E. (2020). Baseline status of policy and legislation actions to address non communicable diseases crisis in the Pacific. *BMC Public Health*, *20*(1), 660. https://doi.org/10.1186/s12889-020-08795-2

World Bank. (2014). *Non-communicable disease (NCD) roadmap report*. World Bank. Retrieved January 16, 2023, from http://documents.worldbank.org/curated/en/534551468332387599/pdf/893050WP0P13040PUBLIC00NCD0Roadmap.pdf

WPRO. (2013). Vanuatu NCD risk factors STEPS report 2013. The World Health Organization Western Pacific Region (WPRO) & the Ministry of Health of Vanuatu. Retrieved January 16, 2023, from https://extranet.who.int/ncdsmicrodata/index.php/catalog/714/download/5052

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE.

AUTHOR BIOGRAPHIES

Dr. Dori Patay is an interdisciplinary researcher who investigates public health issues with a regulation and governance, political science and development lens, with a particular focus on multisectoral governance. Dori frequently takes a transdisciplinary approach, drawing from different bodies of scholarships that alone have been unable to untangle the complex issues arising in agrifood systems and public health. She completed her PhD at the School of Regulation and Global Governance, Australian National University (ANU), in 2021. She currently works as a Research Fellow at The University of Sydney, Faculty of Medicine and Health, Sydney School of Public Health, Menzies Centre for Health Policy and Economics.

Ashley Schram is a Braithwaite Fellow in the School of Regulation and Global Governance (RegNet) and Deputy Director of the Australian Research Centre for Health Equity (ARCHE), Australian National University. Her research investigates the regulation, governance, policy, and politics of the social determinants of health inequities. Focal areas include food systems, trade and investment liberalisation, noncommunicable diseases, and sustainable development.

Sharon Friel is an Australian Research Council Laureate Fellow, Professor of Health Equity and Director of Australian Research Centre for Health Equity (ARHCE) at the School of Regulation and Global Governance (RegNet), Australian National University. She is a Fellow of the Academy of Social Sciences Australia, and the Australian Academy of Health and Medical Sciences. Previously, she was Director of RegNet from

2014-2019, and Head of the Scientific Secretariat (University College London) of the World Health Organisation Commission on the Social Determinants of Health between 2005 and 2008. In 2014, her international peers voted her one of the world's most influential female leaders in global health. Her interests are in the political economy of health equity; governance of the social, commercial and planetary determinants of health inequities; climate change, food systems, trade and investment.

How to cite this article: Patay, D., Schram, A., & Friel, S. (2024). Making multisectoral committees work: Lessons from tobacco control in two Pacific small island developing states. *World Medical & Health Policy*, *16*, 405–426. https://doi.org/10.1002/wmh3.589

Received: 23 January 2024 | Revised: 15 February 2024 | Accepted: 19 February 2024

DOI: 10.1002/wmh3.611

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Mental Health Friendly Territories: Strategy for the implementation of the Mental Health Policy in Colombia

Felipe Agudelo-Hernández[1] | **Luz María Salazar Vieira**[2] | **Laura Inés Plata-Casas**[3]

[1]Universidad de Manizales, Manizales, Caldas, Colombia

[2]PAHO/WHO, Bogotá, Colombia

[3]Ministry of Health and Social Protection of Colombia, Bogotá, Colombia

Correspondence

Felipe Agudelo-Hernández, Universidad de Manizales, Manizales, Caldas, Colombia.
Email: afagudelo81703@umanizales.edu.co

Abstract

Evidence-based practices in mental health have been proposed globally and have been adopted in Colombia. However, implementation problems often make it difficult for these initiatives to contribute to people's well-being. The objective of the present study is to describe a strategy for implementing the components of global mental health in two complex Colombian territories: Chocó and La Guajira. These components are a primary health-care approach, continuity of care, anti-stigma, mental health as a human right, mental health in all policies, and a community model of recovery. A monitoring system was created for the reporting of these components by each territory. An appropriation of all the components by the health systems of both territories was found, as mobilization of existing technical resources in the territories and the strengthening of capacities at the administrative, clinical, and community levels, in addition to the articulation of all the strategies proposed at the level global for recovery. Innovation processes built in a participatory manner with communities can favor the implementation of evidence-based practices and public policies in mental health in territories where social determinants make recovery a challenge.

KEYWORDS

continuity of patient care, health systems plans, human rights, mental health systems/hospitals, research/service delivery

Key points

- Difficulties in addressing the mental disorders arise from implementation problems due to a disintegration between components and the absence of communities in the planning and development of strategies.

- An implementation strategy is shown for the main components of the global and national policy for mental health, including continuity of care from a primary care approach, stigma reduction, human rights in health services and community as an axis of recovery.
- To increase the use of mental health services, there is a need for an intersectional implementation framework that considers as many actors as possible.

INTRODUCTION

Mental health is related to the structuring of more peaceful societies, the strengthening of social capital, the quality of community alliances, and sustainable development (Patel et al., 2018). In low- and middle-income countries like Colombia, there are difficulties in accessing recovery strategies for more than 75% of people (Marks, 2022; World Health Organization [WHO], 2022).

Researchers have identified persistent problems in public health management related to mental health in Latin American countries. These include scarce research resources, functional fragmentation of systems, lack of policies that directly affect the organization and provision of health services, and mismanaged policies (Agudelo-Hernández & Rojas-Andrade, 2023). Likewise, in this context, higher expenditures on psychiatric hospitalizations and a lower investment in community-based services have been described (Jamison et al., 2018; Panamerican Health Organization [PAHO], 2018). This dynamic contributes to mental disorders being associated with the most prevalent causes of years of life lost due to disability (PAHO, 2018).

Stigma, human rights violations, and the fragmentation of services have been described as associated problems (WHO, 2022). For this, the World Health Organization (WHO) urged member countries to establish national policies, programs, and legislation aimed at a comprehensive approach to mental health (WHO, 2018). Likewise, the WHO pointed out the need to integrate psychiatric hospitals with general hospitals, educate the community to reduce the stigma of mental disorders, expand research, and strengthen data monitoring (WHO, 2018).

Disability has been found to be related to the gaps that stigma imposes when it materializes in concrete actions and to pose insurmountable barriers for people with mental disorders (Herrera et al., 2023; Thornicroft et al., 2022). To reduce stigma a series of measures have been proposed to identify and intervene in structural factors (WHO, 2022). Several of these actions have to do with improving the community's knowledge, attitudes, and practices regarding mental health (PAHO, 2022; Thornicroft et al., 2022).

Promoting global health equity requires mechanisms for eliminating the forces that threaten human dignity and to guarantee health as a human right (Gill et al., 2024). This approach to human rights can provide more humanized care to medical practice and a holistic vision of people, which includes the contexts and culture of each individual (Gill et al., 2024; WHO, 2012). Human rights promote the active participation of people in decisions that affect their health, increase autonomy, and strengthen communities (PAHO, 2022). The WHO has proposed QualityRights as a strategy aimed at improving the quality and effectiveness of services (WHO, 2012).

In addition to evaluations of mental health services from the perspective of individuals, other key elements have been described to ensure that strategies are effectively delivered to those who need them (WHO, 2012). These elements include the respect to the uniqueness of the individual; the promotion of autonomy and informed decision-making; the defense of human rights; the recognition and respect to dignity; and fostering collaborative relationships and effective communication (Femdal & Knutsen, 2017; Gill et al., 2024).

Another important barrier consists of people's low access to mental health services, combined with fragmented, ineffective care lacking continuity between services, including community services (Agudelo-Hernández, Vélez-Botero, et al., 2023). Clinical teams need evidence-based interventions on a continuous, longitudinal, and coordinated basis (Doupnik et al., 2020; Vandyk et al., 2016). Continuity of care is one of the central elements in international public health systems that have placed their emphasis on the community, especially in mental health (Diez-Canseco et al., 2020; Vandyk et al., 2016).

Colombia has managed to solidify a regulatory and legal framework that progressively benefits comprehensive care (Ministerio de Salud y Protección Social de Colombia-Minsalud, 2013). Within this legal framework is Law 1616 of 2013 (Minsalud, 2013) through which the right to mental health is guaranteed. For the implementation of this Law, the Ministry of Health and Social Protection has generated public policy planning through guidelines to comprehensively address and manage mental health, most notably the National Mental Health Policy (Minsalud, 2018).

Colombia is divided at the administrative level into 32 departments. In the Colombian Pacific is the department of Chocó, with 30 municipalities inhabited by 557,654 people, of which 9.2% are indigenous and 88% Afro-descendant. Chocó has been identified as one of the departments with the least sustainable development (Agudelo-Hernández, García Cano, et al., 2023). Added to the above there are difficulties in integrating the health system with indigenous populations, the armed conflict, rural dispersion, and 96% of private health services (Agudelo-Hernández, García Cano, et al., 2023).

La Guajira, located in the Colombian Atlantic, has 880,560 inhabitants. In this department, some factors aggravate mental health problems, such as migration, especially from Venezuela. A significant percentage of the indigenous population is in vulnerable conditions, especially due to malnutrition and multidimensional poverty (Agudelo-Hernández & Rojas-Andrade, 2023; Gutiérrez-López et al., 2020). The percentage of people treated with disabilities associated with mental disorders has progressively increased between 2009 and 2020 (Gutiérrez López et al., 2020).

At the national level, it was determined that there is a low implementation of mental health services, where 70% of the country's departments have less than 5 services implemented out of the 11 established by the National Mental Health Law (Agudelo-Hernández & Rojas-Andrade, 2023). The departments with the least implementation are Chocó and La Guajira, with only two services (Agudelo-Hernández & Rojas-Andrade, 2023). Despite the efforts of the Colombian state to enact and implement laws that reduce gaps in the care, the regulations issued up to this point have not sufficiently met the proposed objectives (Agudelo-Hernández, 2023; Rojas-Bernal et al., 2018).

As the axis of recovery in mental health strengthens, communities facilitate the social networks that, in turn, support optimal functioning in a framework of human rights and social participation (Agudelo-Hernández, 2023; Limenih et al., 2023; Presseau et al., 2022). Likewise, sustainable development initiatives within health services must be considered. Among them, the identification of actors to provide health services, the identification of users on the ecosystem level, knowledge about the arsenal of tools for the development of services, the use of technology, and the development of evidence (Vaz & Araujo, 2023). This involves defining the components, mechanisms, and actors involved in the processes and results (Vaz & Araujo, 2023).

The approaches proposed by implementation science in the context of mental health services are still in their early stages, especially in Latin American contexts. This is related to the slower arrival of the benefits of global and national public policies that increase psychosocial disability and positively impact the development of territories (Patel et al., 2018). Based on the above, the aim of this implementation study was to describe the Mental Health Friendly Territories (MHFT) strategy for the implementation of the components of global mental health in two complex Colombian territories, Chocó and La Guajira, during the year 2023. This process aims to specify some central components of mental health programs at a global level and their application at a territorial level. Likewise, the study seeks to highlight the role of facilitators and good practices within the territories before the intervention.

MATERIALS AND METHODS

We carry out a longitudinal investigation comprised of sequential mixed methods (Creswell et al., 2003). Specifically, the present study is a hybrid study type II centered on the development of interventions and implementation measures (Proctor et al., 2009). Throughout, we emphasized an ethical component of co-construction, which has implications for the restructuring of power relations that mental health care and research itself normally entail (Limenih et al., 2023). In other words, to achieve the stated objective, knowledge must be reciprocal (Escobar, 2018).

Participants and procedure

The intervention was initially led by PAHO/WHO and the Ministry of Health and Social Protection of Colombia. This was adapted and modified by administrative and clinical actors, the educational sector, and community leaders of the territories, who would carry out its implementation.

The participants in this process, both in the design of the strategy and in its implementation, were the actors of the health system in the territory (41 from Chocó and 40 from La Guajira). Inclusion criteria included being part of the territorial or community health system and signing the informed consent. No exclusion criteria were considered.

In Chocó the mental health leader of the department participated with her work team (four professionals in psychology), as well as two leaders from service-providing institutions of health, and four teachers and coordinators of the psychology and nursing programs of local universities. In La Guajira, the participants were the mental health leader and two psychology professionals, five psychology and nursing teachers from the University, an intercultural leader, and the mental health leader.

Intervention

The MHFT strategy aims to strengthen local communities to implement the National Mental Health Policy and the comprehensive approach to the use, abuse, and dependence of psychoactive substances, to improve the functioning of mental health services and quality of life in mental health. The central components of the MHFT strategy include the recommendations presented in the New Agenda for Mental Health in the Americas (Organización Panamericana de la Salud, 2023) and adopted in national policies for application at the territorial level (Minsalud, 2018).

We utilized steps proposed by Presseau et al. (2022), including the formation of an interdisciplinary team containing people with mental disorders, professionals, and theorists. Group reflections on facilitators and barriers related to inequalities, the creation of a common language for people and all disciplines, and the prioritization of specific implementation frameworks for various moments of the strategy were also considered (Presseau et al., 2022).

The recommendations are focused on the urgent need to strengthen the management of services, their governance, and an intersectoral approach. For this, the components seen in Figure 1 were proposed, to which the national and territorial teams assigned a score.

The strategy has eight components:

- Continuity of Mental Health Care (25 points).
- Mental Health Rights and Access to Services (15 points).
- Nothing About Us Without Us (10 points).
- No Health Without Mental Health (five points).
- Yellow and Purple, colors of the fight against suicide and epilepsy (10 points).
- Innovation Lab for Mental Health (five points).
- Mental Health in All Policies (10 points).
- Comprehensive Approach to Use, abuse, and dependence on psychoactive substances or alcohol (20 points).

The incentives included the following: continuous training process in face-to-face mental health strategies, participation in suicidal behavior prevention strategies, and support in the development and publication of materials to disseminate the prevention messages built with the community. The technological equipment of the mental health offices in both territories was also improved.

The following were proposed as measurement instruments:

- Lists of attendance at 4 days of training and a weekly monitoring session for 3 months; application of a pre- and posttest (indicators specific to the mhGAP program).
- Application of the Implementation Drivers Scale, which contains four domains: Leadership and administrative support; innovation usability; implementation fidelity; and Competences support (Rojas-Andrade et al., 2024). The four factors have acceptable Cronbach's alpha of 0.914, 0.868, 0.927, and 0.725, respectively (Rojas-Andrade et al., 2024).
- Application of some questions from the Alberta Continuity of Care Scale (Agudelo-Hernández, Vélez-Botero, et al., 2023) and the Caldas Scale for psychosocial disability (Agudelo-Hernández, Romero, et al., 2023), before and after the strategy, with improvement in continuity and disability by 20%. The Alberta Continuity of Services Scale-Mental Health was translated into Spanish and validated, with high reliability ($\alpha = 0.93$) in the Colombian population, all the while preserving the initial factorial structure (Agudelo-Hernández, Vélez-Botero, et al., 2023). This instrument inquires into the use of mental health services and the subjective experience regarding the process of providing care through three subscales (system fragmentation, base relationships, and responsive treatment).
- Increase by 20% the use of health technologies (medications, psychotherapeutic processes, community processes), increase in processes by social work for validation of health rights and meetings with administrative entities to facilitate compliance with the health requirements.

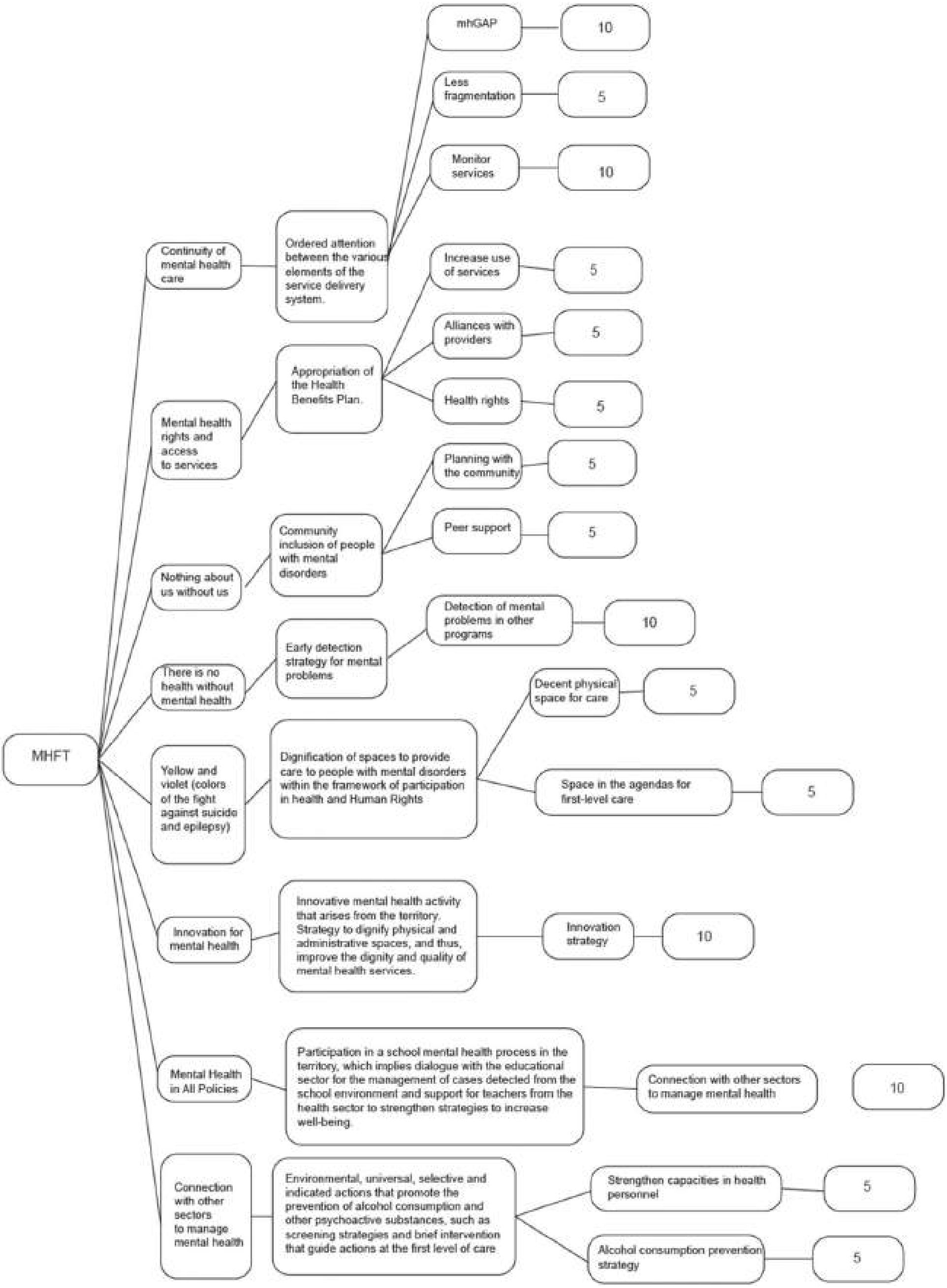


FIGURE 1 MHFT components, definitions, activities, and scores. The authors.

- Application of evidence-based components for campaigns against stigma and prevention of psychoactive substance use.
- Application of components of support groups and structuring of a group process.
- Health innovation strategy for application in the territory.

Analysis of data

Analysis of quantitative data was carried out using SPSS version 26 software. For the qualitative component, the data were analyzed based on thematic analysis. This thematic analysis is carried out for the different focus groups.

RESULTS

In Chocó and Guajira, the implementation of the strategy was carried out with components such as continuity of care, appropriation and use of the health benefits plan for mental health, the community inclusion of people with mental disorders, and the early detection of mental disorders. Other components consisted of the design of the action plan for the prevention of suicidal behavior relevant to the ethnic and cultural context of the territory, in addition to innovative mental health activities proposed from the territory. A dialogue with the education sector was also included to strengthen universal, selective, and indicated prevention strategies, especially related to the consumption of alcohol and other psychoactive substances.

In partnership with academia, the mechanisms of action included the implementation of the Mental Health Global Action Programme (mhGAP) community and clinical component. Also, the improvement in the continuity of care for people with psychosocial disabilities, the prescription of technologies proposed by the Colombian Health Benefits Plan, processes of education in health rights and accompaniment of people with mental disorders and their families in the fulfillment of these rights. This strategy was also based on the PAHO/WHO SAFER strategy to reduce alcohol consumption. Campaigns for stigma reduction were included in addition to those seeking help and training in psychological first aid to community leaders.

Mental health at the first level of care and continuity of care in mental health

The mhGAP was implemented at the first level, in which 30 people participated from Chocó and 43 from Guajira. The supervision strategy was carried out in groups through teleclinics (learning communities mediated by information and communication technologies). A teleclinic was carried out every 2 weeks in the ECHO/RENATA model, with weekly support from the territory's psychiatrist in case management (Figure 2).

The strategy strengthened the implementation of a comprehensive care route that is addressed with a community mental health center. Once the requirements were met and the supports were reviewed, 100% of the participants were certified, given that they passed the aspects related to attendance, pre- and posttest, and participation in the supervision.

Mental health rights and access to services

To comply with this component, a services fair was held with the institutions that provide and manage health services. At this fair, the Health Benefits Plan, Resolution 2808 of 2022 was socialized, as well as the inclusion of psychology and nursing as an entry to the health system. Also, in the mhGAP, the use of these health services was mobilized from the Ministry of Health and Social Protection of Colombia.

This Resolution, in addition to mechanisms for exercising their rights to mental health, were socialized to community members. In this way, the alliance between the Departmental

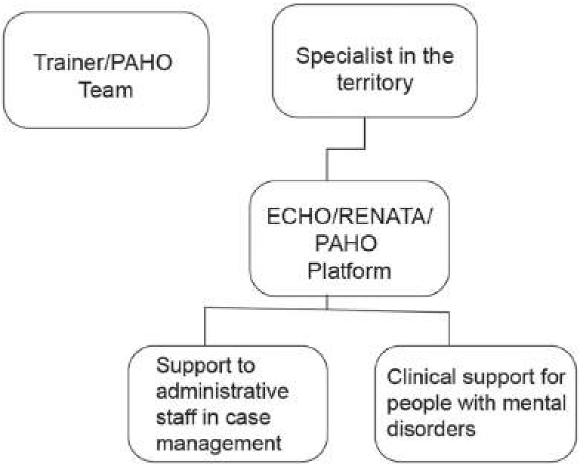


FIGURE 2 ECHO/RENATA model for mhGAP supervision. The authors.

Health Secretariat and the legal office of local universities was strengthened to support those asserting their health rights. The prescription of the technologies proposed in the Health Benefits Plan increased by 15%.

Nothing about us without us

Approximately 50 community leaders were trained in psychological first aid. There, deliberative dialogues were held to address suicidal behavior with indigenous leaders and Afro-descendant communities. At this point, an adaptation of an instrument was carried out for validation among Embera Dobida inhabitants to record mental health and suicide risk variables (Agudelo-Hernández & Belén Giraldo-Álvarez, 2024). It was applied to 60 families, where it was possible to detect emotional symptoms in 60% of children and adolescents, as well as indicators of parental adjustment, perceived parental competence, emotional problems, and behavioral problems reported by parents. The above was supported by attention with an ethnically sensitive approach in the face of the risks found.

This component also highlights the implementation of support groups and considered the application of components, including coping strategies, emotional recognition and management, problem-solving techniques, supportive interactions, trust, support in identity construction, strengthening of social networks, and capacity of agency (Agudelo-Hernández & Rojas-Andrade, 2024).

There is no health without mental health

To fulfill this component, two programs were strengthened at the territorial level. The first consists of the application of the Edinburgh Scale (Vega-Dienstmaier et al., 2002) for the detection of affective problems in the perinatal period. Women with high scores on the scale attended the mental health route, in addition to the support groups mentioned previously.

This led to the identification of 26 women in whom some psychosocial risk factors that could interfere with the pregnancy or postpartum experience. At a quantitative level, these were comprised of an average of 23.53 years of age, 92% of whom were Afro-descendant, and 8% Raizal. The average on the Edinburgh Scale was 16.92, with significant risks and manifest affective symptoms, as well as fear of the future and weak support networks.

At the end of the intervention, a significant decrease in the score was found, especially in those related to the questions: “I have felt sad and miserable,” “I have felt so unhappy that I have had difficulty sleeping,” “Things oppress or overwhelm me,” and “I have been anxious and worried for no reason.” The post-intervention average was 11.69.

Regarding impact, A pointed out: “I thought that sadness and boredom were normal during pregnancy, that I had to put up with it, but the group taught me that it wasn't true, that I can be a happy pregnant woman.” K also says:

> Bringing a child into the middle of this conflict is very scary, and that thought that you are not going to be able to parent, you being so young…, but when I spoke to the psychologist my head cleared a lot. When I listened to other women with the same fear, but also with strength, they encouraged me to continue forward.

Regarding specific techniques to improve mental health, G explains: “I have been taught to talk to my baby at night, and with that I sleep better,” or H: “I now know how to divert the thoughts that come to me, and relax more. So that I and my baby are better.”

Regarding strengthening the support network, J explains: “In the group they taught us how to manage the fear of conflict that adds to the fear of being a mother, but they also taught our family how to support us.” Regarding the same topic, B explains: “I felt that my mother no longer loved me, she gave me a hard time when I got pregnant, but this process helped us forgive each other, and love each other more.” Also, G explains:

> I feel support from my family, also from the community, from other pregnant women. We give each other encouragement and support, and sometimes comfort. At home they are more attentive, they take more care of me, they worry more, the dialogue has improved. The future also seems less distressing.

Yellow and violet

This component of the strategy shows compliance with the processes carried out in the mental health at the first level of care. It is worth highlighting that this process could complement the components of *Mental Health at the first level of care and continuity of care* in mental health, and *Rights in mental health and access to services*.

Interview participants were six health professionals from the “Centro Terapéutico Comfachoco Incluyente” (Comfachoco Inclusive Therapeutic Center), in addition to 10 patients treated at the institution. Two main categories emerge*: Care processes without administrative barriers* and *Care focused on human rights*.

Care processes without administrative barriers

When investigating the health-care processes of the institution, LM, nurse and coordinator of administrative processes, explains:

> A person does not need income from health alone, but they can make induced demand (procedure of the Colombian health system to consult, referred from another level of care) from another sector, even from the general community, schools, friendly lines of the department, and companies. The education

> secretary can call and reserve the space so that it can be attended directly by the specialist. They have close contact with the line and are attended immediately.

To the above, Je, the general physician of the institution, adds:

> From general medicine, the comprehensive evaluation is carried out from the mhGAP to enter the route, which implies sending laboratory tests, ruling out non-psychiatric pathologies, providing support in the first response, and linking them with the institution… In this, the nurse supports to authorizations so that people are not the ones turning around with a role that is not transformed into services.

LM adds:

> We have 1,688 people since 2020. If the person needs a day hospital, the referral is made from general medicine. We try to ensure that whoever arrives here receives everything immediately because they come from very far away, and they are also scared.

The institution has four psychiatrists, two who serve virtually and two in person. They have promoters to make connections by video call so they can receive psychiatric care from the territories. *S* says: “Many people cannot come. Transportation is very expensive or they are confined due to violence. If there are difficulties in the connection, in-person assistance is provided.”

The services offered are four evaluations for psychiatry, four for psychology, two therapies for family, four for nursing, four evaluations for social work, and four for general medicine, under the mhGAP approach. They report a dropout rate of 2%. Jh, a psychiatrist, adds: “In three months there should be a change. The objectives are individualized, and they also use scales to define results, so if we do not achieve the goals, we will evaluate ourselves as a team.” LM adds: “The payer of the services at first may have thought that there were many services, but later, when they saw how hospitalizations and institutionalizations decreased, they saw the advantage.”

They also reported that they use scales for anxiety and depression as measurement instruments, with goals of 40% reduction in the first month. They investigate aspects such as learning strategies for cognitive problems, self-concept scales, cognitive flexibility test, assertiveness scale for communication skills in various scenarios, and resilience scales.

Another important aspect consists of team meetings to discuss the cases, every 2 weeks, both on a technical and emotional level. *Je* explains, “Every two weeks we meet to see if something is not working, but also in those spaces, we take care of the mental health of our colleagues.” They also carry out continuous training processes on a monthly basis.

Regarding the care processes, there is significant acceptability on the part of the people served. L explains, after been discharged from both the day hospital process and at the outpatient level:

> Here they did not treat me as a different person, but as what I am. Here they work hard and with a lot of love… I felt valued, and that's why every time I can come here, I come and greet them, and participate in the activities. No longer as a patient, because I stopped being a patient not since discharge… They showed me that I was a person, just that.

To the above, complement K:

> The institution helped me improve many things in my life, things that were in me and that they influenced, without changing me, just helping me get to know myself… I invite many people to come, here it is not how people imagine, here they help to look at life in another way, in a more beautiful way.

When asking people who are still in the treatment process about the benefits perceived in the institution, L says: “I came with fear, one is afraid of psychiatric hospitals, but that is a help center, a community center.” O adds: “Here I have improved in the attachment I had to my family, in the face of all the problems they had and I wanted to solve them, now I take a different, calmer stance.” A also explains:

> There is good communication in the group, but it is not only that… The group and the team of professionals also help to improve family communication, my own health, also the acquisition of medicines, and knowing what those pastes are for. Also, the attention in this place is very pleasant and the treatment they give me is luxurious… They make you feel valued.

When asking a mother if F, her 9-year-old son, has changed, she says: “He no longer fights, he is dedicated to studying… Even I realized that I have an artist son, I didn't know, here we discovered it.” The father of R, 11 years old, adds: “He is no longer aggressive, he is still tired, but he no longer gets into trouble, he uses his energy to become an athlete.”

Mental health rights and deinstitutionalization

This other category brings together those narratives that are related to the contribution of the institution to the processes of deinstitutionalization and the description of the provision of health services as an opportunity to reaffirm human rights. As M explains:

> I started coming here because I needed the formulation of some pastes to control myself, but here they give me therapies, they ask me what I want and they help me. They even helped me with a business idea and now I sell sweets and it's going well. This has become a very important place for me, because I achieved real relationships here, friendship or something similar, with the doctors here and with other people who come.

In this regard, LM adds: “People do not want to be anywhere else, there are cases of deinstitutionalization that we have achieved. We want to make them feel like they belong. Not to an institution, but to a community.” In the day hospital model, care is always available. J, a psychologist, adds:

> If a person presents a crisis, management begins at the center and the family is cared for. It is sensitive management, and we are all going to help, from the biller to the kitchen lady, because there are significant relationships with everyone, so seeing someone kind makes people calm down.

They describe that there are no immobilizations. In this regard, Jh mentions: “The patients know the staff and that helps to calm them down, because we are all in favor of the patient. Everything is paralyzed in the center and we are going to support each other, even the administrative staff because they are known."

They also explain that they carry out advance consent as recommended by the QualityRights strategy. This consists of asking people with a history or risk of psychomotor agitation what would help them in a future case of crisis, even recording it in the medical record. C, the institution's biller, adds: "Here each person is different and we have to get to know them so we can help them." LM mentions:

> The door is always open… because everyone is welcome, but also because everyone can leave whenever they want. The open door gives them security. Patients come here asking where the crazy people are tied up, and… how about that! There are no crazy people here, I tell them, they don't see that the door is open, we don't tie anyone up here, ever (Figure 3).

Among other aspects, they emphasize the importance of support to overcome cultural barriers, with psychoeducation for their family to reduce stigma and even to improve pharmacological adherence. They also describe a group psychoeducation model, where aspects of the diagnosis and treatment are discussed weekly, but also situations that may cause members concern, such as family, work, or the neighborhood in which they live. These spaces are also attended by people who have already completed the first phase of the model and who are in an outpatient process or who have been discharged from mental health services. LM adds:

> In these groups they share testimonies and make plans together outside the institution, for example, to celebrate Mental Health Day they will take a walk

FIGURE 3 The door of the institution on a day of service. The authors.

> throughout Quibdó [capital] to highlight mental health and reduce stigma, we have invited other sectors.

Jh continues: "Also in these groups the idea of a project with fish was brought up, we already have the seeds, that will help many who do not have work" (Figure 4).

On the other hand, in Guajira a Community-Based Rehabilitation process was developed, where support groups were implemented and compared with conventional care. At a quantitative level, the support groups showed a greater effect than the comprehensive clinical care and the group without care. In the Control Group (conventional care, exclusively for psychiatry), the changes between the pre- and posttest were not statistically significant ($p \geq 0.05$) in all domains of the Caldas Scale and the Alberta Scale. The comparison between the support group and the mhGAP group showed statistically significant improvements in most areas except family disability.

In this regard, Table 1 shows the probability of superiority values for each of the subscales. This indicates that both family and work disability have the highest values when comparing the support and mhGAP groups (PSest = 0.341 and 0.301, respectively). When comparing the support and nontreatment groups, a larger effect size was found in total psychosocial disability (PSest = 0.363). These results indicate a medium effect on these variables.

Innovation laboratory for mental health

A monitoring system was also developed to record progress in the implementation of the components of the mental health policy. The aim is to document progress in numerical terms according to the assignment given to each component of the strategy. Additionally, the application allows uploading media such as videos or photographs of each territory. In the following link, you can see the monitoring system, on which each department relies to guide the remaining actions and sustain the actions achieved by the territory: https://rsscol.com.co/node/4.

FIGURE 4 Fishing lake for a social innovation project in the Comfachocó recovery center. The authors.

TABLE 1 Mann Whitney *U* results for the psychosocial disability and continuity of care variables and intervention effect size.

	SG versus GmhGAP			SG versus CG			GmhGAP versus CG		
Scale	***U***	***p***	**PSest**	***U***	***p***	**PSest**	***U***	***p***	**PSest**
Caldas Scale									
Adherence	219	<0.001	0.214	50	<0.001	0.055	173.5	<0.001	0.170
Interpersonal disability	129.5	<0.001	0.126	10.5	<0.001	<0.011	240	<0.001	0.235
Family disability	348.5	0.029	0.341	127.5	<0.001	0.142	309	0.007	0.343
Social Disability	30	<0.001	0.030	33.5	<0.001	0.037	482.5	0.706	0.080
Work Disability	305	<0.001	0.301	107	<0.001	0.118	289	0.003	0.321
Total Scale of Caldas	259.8	<0.001	0.245	327.5	<0.001	0.363	193.5	<0.001	0.215
Alberta Scale									
Fragmentation	0.5	<0.001	0	0	<0.001	0	172	<0.001	0.168
Personal health relationship	74.5	<0.001	0.073	0	<0.001	0	16	<0.001	0.015
Effective response	253	<0.001	0.230	0	<0.001	0	63.5	<0.001	0.063
Total Alberta Scale	19	<0.001	0.018	0	<0.001	0	27	<0.001	0.026

Abbreviations: CG, control group; GmhGAP, mhGAP group; *p*, *p* valor; PSest, probability of superiority (effect size); SG, support group; *U*, *U* Mann Whitney.

Mental health in all policies

This component highlights the actions carried out by other sectors to promote mental health. Likewise, the governance exercised by the Departmental Health Secretariats of Chocó and La Guajira to articulate these actions in the territory is noted. For this specific point, a recovery route has been generated from the school sector to the recreation spaces for children and adolescents. The first level of care assisted by child psychiatry functions as an articulator of this process (Figure 5).

This route begins with the detection of mental problems or disorders from the school environment or community environment and includes a direct line of communication with the mental health team at the first level of care. The assessment is carried out from an mhGAP model, supported by child and adolescent psychiatry, who design a management plan with a life course, human rights, and recovery approach.

At this point, children or adolescents are referred to the activities preferred by them. Among the options are soccer and swimming schools or art workshops. Constant communication between the three sectors is also proposed. Apart from the above, at the level of the Chocó Health Secretariat, mental health awareness has been raised among teachers in the department's schools, in addition to the socialization of care routes. GY, departmental mental health referent, adds:

> When any school in Chocó has any mental health difficulty identified by its teachers, it communicates with the Friendly Line (phone line available for mental health emergencies). It creates a bridge with the health insurer to facilitate care and with the Municipal Secretariats to learn about the case and continue to ensure compliance. This is integrated with training in psychological first aid for teachers and in tools to address the consumption of psychoactive substances from the school environment.

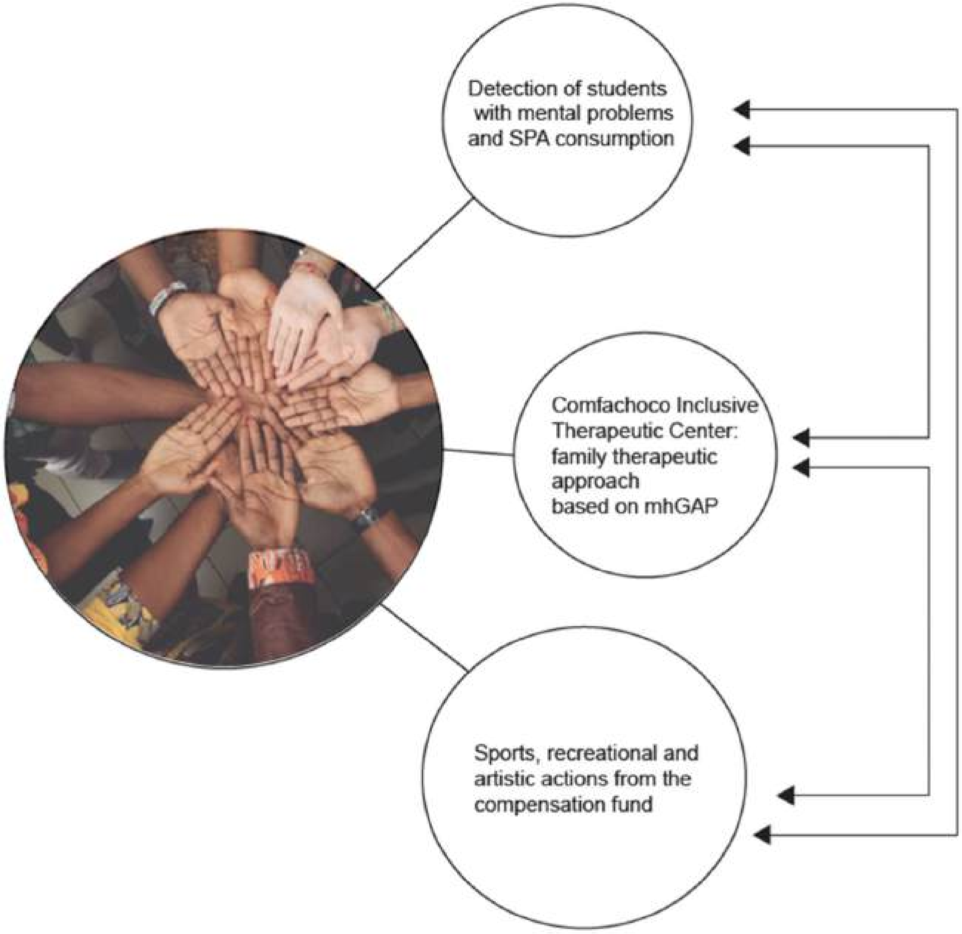


FIGURE 5 Mental health recovery route from the school environment.

DISCUSSION

The objective of this report was to describe the MHFT implementation strategy in two Colombian territories with implementation difficulties. These difficulties are illustrated especially by the impact that some social determinants have had in these territories (war, migration, multidimensional poverty) (Agudelo-Hernández & Rojas-Andrade, 2023: Ghasemi et al., 2021; Presseau et al., 2022). This strategy made it possible to improve the implementation of mental health services, in addition to strengthening mechanisms that both territories previously had.

The New Agenda for Mental Health in the Americas was established as a set of priority mental health policies and strategies formulated (Organización Panamericana de la Salud, 2023). Like Colombia's mental health policies, the New Agenda is explicitly based on the underlying and transversal principles of universal health coverage, human rights, equity, nondiscrimination, and the empowerment of people with mental health problems and their families (Organización Panamericana de la Salud, 2023). Following the above, this strategy agrees with the recommendations of this Agenda.

In this sense, it is recommended to evaluate and analyze the formulation, design and implementation of public health policies from a critical perspective that includes a contextual approach adapted to local situations. Each of these dimensions could be studied separately and could even reveal other dimensions not yet calculated. This is how it is proposed to study social intervention policies, understood as a device for governmentality (Limenih et al., 2023; Presseau et al., 2022). This means focusing on the practices of social intervention and understanding them as relationships and discourses in which different intervention agents are immersed (policymakers, institutions, operators, leaders, professionals, and users) (Agudelo-Hernández, 2023).

Health services are constantly evolving. Therefore, an ecological approach has been considered an effective response to address complex problems and encourage the transformation of health services (Vaz & Araujo, 2023). By focusing on actors and resources, this perspective favors actions to transform health services and the redesign of policies to guaranteeing the well-being of the population and the viability of health systems (Vaz & Araujo, 2023).

In the case of Chocó, an articulation between various levels of the health sector and with other sectors is shown to build a community model of recovery. The CIT's experience shows that the implementation of the community model is possible, from which the rest of the country could take the elements to spread it in other territories. Also, early involvement of community members at the local level with initial point of contact through local authorities, could contribute to regional commitment, participation and transferable regional empowerment between communities (Russell et al., 2023).

The implementation of the mhGAP is recognized as a fundamental part of this strategy, and as an articulating element between the components, both in the clinical component and at the community level. Even actions in other sectors are connected with a strengthened first level of care. In this sense, a methodology is highlighted to implement Community-Based Rehabilitation through support groups that develop the core components in their methodology, to improve psychosocial disability and the continuity of mental health care. These invite work on domains such as the fragmentation of services and other variables related to living conditions, such as employment, education and labor inclusion, for which support groups are a promising strategy (PAHO, 2022).

Although this mental health approach has been recognized and described in the axes of national policy, it is important to recognize the difficulties of implementation to begin to carry them out in a specific social context (Powell et al., 2019). These types of actions are shown as a facilitating element for the transformation towards a more inclusive community. The above configures an implementation climate that allows the construction of more equitable mental health and where health services are a fundamental piece in this process.

Conclusions and policy implications

Addressing mental health requires an arduous process of structural transformations and transcends the implementation of health services. Therefore, any public health action for mental health must include among its priorities the strengthening of multilevel governance, which includes cross-sectoral participation and responsibility. This can impact indicators of psychosocial disability and improve the quality of life, not only of people with mental disorders but also of their environments.

For this, interventions/support must address various areas in a parallel and binding manner. Public spending on mental health must include mechanisms for addressing inequality and fostering social inclusion. Likewise, education and access to optimal and timely health and social assistance services must be connected. Also, interventions must be applied in a contextual manner and include intercultural and territorial approaches.

An additional and important aspect is related to innovation from the point of view of the implementation science. This research obtains and incorporates research priorities from patients, health professionals, and decision-makers, which can elevate the implementation process in other territories (Brunner et al., 2015).

Limitations and bias

Participation in health includes multiple sectors, political actors, citizens, investment of economic resources, knowledge of human rights and social participation. This means offering people information about participation, the motivation to seek health information, promoting empowerment or capacity in making decisions about health, the population's capacity for association, commitment, spontaneous participation, and feeling represented (WHO, 2022).

Analyzing health systems from participation implies proposing a people-centered approach, to promote their agency, have awareness of self-care, and greater empowerment over rights and duties within the health system. The participation of communities allows for improving access in distant areas, sharing knowledge about culture, bringing people closer, and improving the monitoring of strategies of implementation (Looi, 2023).

The participatory approach described contribute to the interpretation of the results, mechanisms and key processes and contextual factors, that support the planning, development, or implementation of community health services. However, this study did not evaluate the public participation method, which will be an important point for future studies (Pedersen et al., 2022). An alignment of multidisciplinary work teams and the constant participation of people with mental disorders, providers and families is required to have better results and ensure follow-up.

AUTHOR CONTRIBUTIONS

Felipe Agudelo-Hernández: Conceptualization; formal analysis; investigation; methodology; validation; visualization; roles/writing—original draft; writing—review & editing. **Luz María Salazar Vieira**: Formal analysis; investigation; methodology; validation; visualization; roles/writing—original draft; writing—review & editing. **Laura Inés Plata-Casas**: Investigation; methodology; validation; visualization; roles/writing—original draft; writing.

ACKNOWLEDGMENTS

To the people with mental disorders in Chocó and La Guajira who show us the path to recovery. To Jhasny Mosquera and Luz Marina, from Centro Terapéutico Comfachoco Incluyente. To Yulissa Mosquera Cetre, Vanessa Peña, Cristian Márquez, from the Chocó Health Secretariat. To Carlos Andrés Mosquera, from Novita-Chocó. To Consuelo Rosas from the Health Secretariat of La Guajira, Clara Britto from Uniguajira. To the team of the Colombian Ministry of Health, especially Bibian Moreno Mayorga. To ECHO/RENATA, especially to Jimena Mejía and Nandy Rodríguez. To the team of the Health Systems and Services Area (PAHO/WHO Colombia), especially Mónica Padilla, Leonardo García Rincón, Juan Fernando García and René Casanova.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

ETHICS STATEMENT

This work complies with the standards for research in human beings as provided in resolution No. 008430 of 1993 of the Ministry of Health and in the Declaration of Helsinki of 2000. It is a minimal-risk investigation and was reviewed and endorsed by document CBE02_2022 by the Bioethics Committee of the University of Manizales. All the sources relied upon are properly cited, and no material requiring special permission to be reproduced was used. All participants agreed to voluntarily participate in the study. The data are kept confidential.

ORCID

Felipe Agudelo-Hernández http://orcid.org/0000-0002-8356-8878
Laura Inés Plata-Casas http://orcid.org/0000-0002-0375-8875

REFERENCES

Agudelo-Hernández, F. (2023). *De las barreras a los posibles. Las políticas del acontecimiento en los grupos de ayuda mutua de salud mental juvenil en Colombia* (Ist ed.). Universidad de Manizales. https://doi.org/10.5281/zenodo.10402130

Agudelo-Hernández, F., & Belén Giraldo Alvarez, A. (2024). Creation of an instrument for pediatric mental health in indigenous people: A participatory design. *Children and Youth Services Review*, *158*, 107447. https://doi.org/10.1016/j.childyouth.2024.107447

Agudelo-Hernández, F., García Cano, J. F., Salazar Vieira, L. M., Vergara Palacios, W., Padilla, M., & Moreno Mayorga, B. (2023). Gaps in primary mental health care in Chocó, Colombia: Barriers and challenges. *Pan American Journal of Public Health*, *47*, e138. https://doi.org/10.26633/RPSP.2023.138

Agudelo-Hernández, F., & Rojas-Andrade, R. (2023). Mental Health Services in Colombia: A national implementation study. *International Journal of Social Determinants of Health and Health Services*, *53*(4), 424–433. https://doi.org/10.1177/27551938231156023

Agudelo-Hernández, F., & Rojas-Andrade, R. (2024). Design and validation of a scale of core components of community interventions in mental health. *The International Journal of Health Planning and Management*, *39*(1), 36–47. https://doi.org/10.1002/hpm.3711

Agudelo-Hernández, F., Romero, E., & Pulgar-Quintero, Y. (2023). Design and validity of an instrument to determine psychosocial disability associated with mental disorders. *Revista Iberoamericana de Evaluación y Diagnóstico psicológico*, *69*(3), 161–171. https://doi.org/10.21865/RIDEP69.3.14

Agudelo-Hernández, F., Vélez-Botero, H., & Rojas-Andrade, R. (2023). Traducción y adaptación de la Escala de Continuidad de Servicios de Salud Mental de Alberta en un contexto latinoamericano. *Revista Chilena de Neuropsiquiatria*, *61*(3), 258–269. https://doi.org/10.21203/rs.3.rs-1819412/v1

Brunner, J. W., Sankaré, I. C., & Kahn, K. L. (2015). Interdisciplinary priorities for dissemination, implementation, and improvement science: Frameworks, mechanics, and measures. *Clinical and Translational Science*, *8*(6), 820–823. https://doi.org/10.1111/cts.12319

Creswell, J. W., Plano Clark, V. L., & Gutmann, M. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook on mixed methods in the behavioral and social sciences*. Sage Publications.

Diez-Canseco, F., Rojas-Vargas, J., Toyama, M., Mendoza, M., Cavero, V., Maldonado, H., Caballero, J., & Cutipé, Y. (2020). Qualitative study of the implementation of the Continuity of Care and Rehabilitation Program for people with severe mental disorders in Peru. *Revista panamericana de salud publica = Pan American Journal of Public Health*, *44*, e169. https://doi.org/10.26633/RPSP.2020.169

Doupnik, S. K., Rudd, B., Schmutte, T., Worsley, D., Bowden, C. F., McCarthy, E., Eggan, E., Bridge, J. A., & Marcus, S. C. (2020). Association of suicide prevention interventions with subsequent suicide attempts, linkage to follow-up care, and depression symptoms for acute care settings: A systematic review and meta-analysis. *JAMA Psychiatry*, *77*(10), 1021–1030. https://doi.org/10.1001/jamapsychiatry.2020.1586

Escobar, A. (2018). *Designs for the pluriverse. radical interdependence, autonomy, and the making of worlds*. University of North Carolina, Chapel Hill Dianne Rocheleau, Clark University. Duke University Press.

Femdal, I., & Knutsen, I. R. (2017). Dependence and resistance in community mental health care-negotiations of user participation between staff and users. *Journal of Psychiatric and Mental Health Nursing*, *24*(8), 600–609. https://doi.org/10.1111/jpm.12407

Ghasemi, E., Majdzadeh, R., Rajabi, F., Vedadhir, A., Negarandeh, R., Jamshidi, E., Takian, A., & Faraji, Z. (2021). Applying intersectionality in designing and implementing health interventions: A scoping review. *BMC Public Health*, *21*(1), 1407. https://doi.org/10.1186/s12889-021-11449-6

Gill, N., Drew, N., Rodrigues, M., Muhsen, H., Morales Cano, G., Savage, M., Pathare, S., Allan, J., Galderisi, S., Javed, A., Herrman, H., & Funk, M. (2024). Bringing together the World Health Organization's QualityRights initiative and the World Psychiatric Association's programme on implementing alternatives to coercion in mental healthcare: A common goal for action. *BJPsych Open*, *10*(1), e23. https://doi.org/10.1192/bjo.2023.622

Gutiérrez López, J. A., Cortés Wilches, N., & Montaña Londoño, C. J. (2020). La Pobreza Multidimensional y su relación con el espacio: Caso de estudio para Colombia. *Revista Visión Contable*, *21*, 78–100. https://doi.org/10.24142/rvc.n21a4

Herrera, S. N., Larsen, E. M., Deluca, J. S., Crump, F. M., Grivel, M., Blasco, D., Bryant, C., Shapiro, D. I., Downing, D., Girgis, R. R., Brucato, G., Huang, D., Kufert, Y., Verdi, M., West, M. L., Seidman, L. J., Link, B. G., McFarlane, W. R., Woodberry, K. A., … Corcoran, C. M. (2023). The association between mental health stigma and face emotion recognition in individuals at risk for psychosis. *Stigma and Health*, *8*(1), 31–39. https://doi.org/10.1037/sah0000379

Jamison, D. T., Nugent, R., & Gelband, H. (2018). *Prioridades para el control de enfermedades: Compendio de la 3 a edición*. Banco Mundial.

Limenih, G., MacDougall, A., Wedlake, M., & Nouvet, E. (2023). Depression and global mental health in the global south: A critical analysis of policy and discourse. *International Journal of Social Determinants of Health and Health Services*. Advance online publication. https://doi.org/10.1177/27551938231220230

Looi, M. K. (2023). What should decolonisation of medical institutions look like. *BMJ*, *383*, 2257. https://doi.org/10.1136/bmj.p2257

Marks, L. (2022). *Clinical psychology in primary care—How can we afford to be without it? Guidance for clinical commissioners and integrated care systems*. The British Psychological Society.

Minsalud. (2013). *Ley 1616 de 2013*. Oct 2013. Retrieved January 11, 2024, from https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/ley-1616-del-21-de-enero-2013.pdf

Minsalud. (2018). *Resolución 4886 de 2018.* January 2019. Retrieved January 11, 2024, from https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/VS/PP/politica-nacional-salud-mental.pdf

Organización Panamericana de la Salud. (2023). *Una nueva agenda para la salud mental en las Américas. Informe de la Comisión de Alto Nivel sobre Salud Mental y COVID-19 de la Organización Panamericana de la Salud*. https://doi.org/10.37774/9789275327265

Panamerican Health Organization [PAHO]. (2018). *La carga de los trastornos mentales en la Región de las Américas*. OPS. https://iris.paho.org/bitstream/handle/10665.2/49578/9789275320280_spa.pdf?sequence=9

PAHO. (2022). *Servicios de salud mental de apoyo entre pares: Promover los enfoques centrados en las personas y basados en los derechos*. OPS. https://doi.org/10.37774/9789275325995

Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., Chisholm, D., Collins, P. Y., Cooper, J. L., Eaton, J., Herrman, H., Herzallah, M. M., Huang, Y., Jordans, M. J. D., Kleinman, A., Medina-Mora, M. E., Morgan, E., Niaz, U., Omigbodun, O., … UnÜtzer, J. (2018). The Lancet Commission on global mental health and sustainable development. *The Lancet*, *392*(10157), 1553–1598. https://doi.org/10.1016/S0140-6736(18)31612-X

Pedersen, J. F., Egilstrød, B., Overgaard, C., & Petersen, K. S. (2022). Public involvement in the planning, development and implementation of community health services: A scoping review of public involvement methods. *Health & Social Care in the Community*, *30*(3), 809–835. https://doi.org/10.1111/hsc.13528

Powell, B. J., Fernandez, M. E., Williams, N. J., Aarons, G. A., Beidas, R. S., Lewis, C. C., McHugh, S. M., & Weiner, B. J. (2019). Enhancing the impact of implementation strategies in healthcare: A research agenda. *Frontiers in Public Health*, *7*, 3. https://doi.org/10.3389/fpubh.2019.00003

Presseau, J., Kasperavicius, D., Rodrigues, I. B., Braimoh, J., Chambers, A., Etherington, C., Giangregorio, L., Gibbs, J. C., Giguere, A., Graham, I. D., Hankivsky, O., Hoens, A. M., Holroyd-Leduc, J., Kelly, C., Moore, J. E., Ponzano, M., Sharma, M., Sibley, K. M., & Straus, S. (2022). Selecting implementation models, theories, and frameworks in which to integrate intersectional approaches. *BMC Medical Research Methodology*, *22*(1), 212. https://doi.org/10.1186/s12874-022-01682-x

Proctor, E. K., Landsverk, J., Aarons, G., Chambers, D., Glisson, C., & Mittman, B. (2009). Implementation research in mental health services: An emerging science with conceptual, methodological, and training challenges. *Administration and Policy in Mental Health and Mental Health Services Research*, *36*(1), 24–34. https://doi.org/10.1007/s10488-008-0197-4

Rojas-Andrade, R., & Agudelo-Hernández, F. (2024). Validation of an instrument to guide the implementation of strategies for mental health care in Colombia. *Revista Panamericana de Salud Publica*, *47*, e10. https://doi.org/10.26633/RPSP.2024.10

Rojas-Bernal, L. Á., Castaño-Pérez, G. A., & Restrepo-Bernal, D. P. (2018). Salud mental en Colombia. Un análisis crítico. *Ces Medicina*, *32*(2), 129–140. http://www.scielo.org.co/pdf/cesm/v32n2/0120-8705-cesm-32-02-129.pdf

Russell, K., Rosenbaum, S., Varela, S., Stanton, R., & Barnett, F. (2023). Fostering community engagement, participation and empowerment for mental health of adults living in rural communities: A systematic review. *Rural and Remote Health*, *23*(1), 7438. https://doi.org/10.22605/RRH7438

Thornicroft, G., Sunkel, C., Alikhon Aliev, A., Baker, S., Brohan, E., El Chammay, R., Davies, K., Demissie, M., Duncan, J., Fekadu, W., Gronholm, P. C., Guerrero, Z., Gurung, D., Habtamu, K., Hanlon, C., Heim, E., Henderson, C., Hijazi, Z., Hoffman, C., … Winkler, P. (2022). The Lancet Commission on ending stigma and discrimination in mental health. *The Lancet*, *400*(10361), 1438–1480. https://doi.org/10.1016/S0140-6736(22)01470-2

Vandyk, A. D., VanDenkerkhof, E. G., Graham, I. D., & Harrison, M. B. (2016). Using the Alberta Continuity of Services Observer-Rated Scale to measure continuity of care in a psychiatric population. *Journal of Nursing Measurement*, *24*(1), 131–146. https://doi.org/10.1891/1061-3749.24.1.131

Vaz, N., & Araujo, C. A. S. (2023). Service design activities in health services: A systematic literature review based on ecosystem perspective and transformative approach. *The International Journal of Health Planning and Management*, *38*(5), 1250–1267. https://doi.org/10.1002/hpm.3682

Vega-Dienstmaier, J. M., Mazzotti Suárez, G., & Campos Sánchez, M. (2002). Validación de unaversión en español de la Escala de Depresión Postnatal de Edimburgo [Validation of a Spanish version of the Edinburgh Postnatal Depression Scale]. *Actas Espanolas de Psiquiatria*, *30*(2), 106–111.

World Health Organization [WHO]. (2012). *WHO QualityRights tool kit: Assessing and improving quality and human rights in mental health and social care facilities*. https://apps.who.int/iris/handle/10665/70927

WHO. (2018). *WHO/ESCAP training manual on disability statistics*. http://www.unescap.org/sites/default/files/Chapter2-Disability-Statistics-E.pdf

World Health Organization [WHO]. (2022). *World mental health report: Transforming mental health for all*. https://www.who.int/publications/i/item/9789240049338

AUTHOR BIOGRAPHIES

Felipe Agudelo-Hernández, MD, is a general psychiatrist and child and adolescent psychiatrist, Ph.D. in Social Sciences, Childhood and Youth. He is an advisor for the implementation of the mental health public policy in Colombia and the community-based rehabilitation strategy. Aside from mental health services, his research interest is in mental health mutual aid groups and other community recovery efforts, especially for severe mental disorders and suicidal behavior. He has led national risk management strategies for adolescents and children at risk of suicide, with an intercultural approach. He is a clinical professor of pediatrics at the University of Manizales and a specialization in pediatrics at the University of Caldas.

Luz María Salazar Vieira is a psychologist, with master's degrees in Systemic Family Therapy and Intervention in Human Systems. Experience in design, execution, evaluation and monitoring of psychosocial projects, mental health systems and services, and knowledge management in public health. She has been an advisor on the prevention of psychoactive substance consumption and an advisor on international cooperation, with an emphasis on official development aid. She is a PAHO/WHO consultant on strategies for universal access to mental health and psychosocial support, and knowledge management in health systems and services, university professor in health psychology.

Laura Inés Plata-Casas is a psychologist, bacteriologist, MSc in public health, MSc in occupational health, and Ph.D. in public policy modeling. She is part of the mhGAP management committee at the Ministry of Health and Social Protection of Colombia, Bogotá, Colombia. University professor.

How to cite this article: Agudelo-Hernández, F., Salazar Vieira, L. M., & Plata-Casas, L. I. (2024). Mental Health Friendly Territories: Strategy for the implementation of the Mental Health Policy in Colombia. *World Medical & Health Policy*, *16*, 427–446. https://doi.org/10.1002/wmh3.611

Received: 16 October 2023 | Revised: 19 February 2024 | Accepted: 20 February 2024

DOI: 10.1002/wmh3.607

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Provider directory inaccuracy and timely access to physical therapy

Thomas Elton IV[1] | **Wendy Y. Xu**[1] | **Simon F. Haeder**[2]

[1]Division of Health Services Management and Policy, College of Public Health, The Ohio State University, Columbus, Ohio, USA

[2]Department of Health Policy & Management, School of Public Healthy, Texas A&M University, College Station, Texas, USA

Correspondence

Simon F. Haeder, Department of Health Policy & Management, School of Public Healthy, Texas A&M University, College Station, TX, USA.
Email: sfhaeder@tamu.edu

Abstract

Can patients find physical therapists in their networks, and can they access physical therapy when they need to? To answer these questions, we analyzed provider directory accuracy and timely access for physical therapists for all managed care plans available in California in 2018 and 2019 using secondary data obtained from the California Department of Managed Health Care for a total of 119,084 physical therapy listings (60,967 for 2018 and 58,117 for 2019). Overall, 19% of listed providers in 2018 and 8% of listed providers in 2019 showed inaccuracies. However, we found substantial differences across markets, with a low of 54% accuracy for Medicaid listings in 2018. Commercial plans were consistently most accurate. In terms of adequacy, we found that more than 90% of listed providers were accessible within 15 days and 97% within 30 days, with Medicaid providing the highest rates of timely access. Overall, barriers to consumer access with regard to physical therapy appear to be primarily in the form of provider directory inaccuracies. High rates of inaccuracies raise concerns for patients as well as regulators. Ultimately, California is one of the most regulated states when it comes to network adequacy and access.

KEYWORDS

health access, managed care, physical therapy

Key points

- To answer the questions whether patients can find physical therapists in their networks, and can they access physical therapy when they need to, we analyzed provider directory accuracy and timely access for physical therapists for all managed care plans available in California in 2018 and 2019 using secondary data obtained from the California Department of

Managed Health Care for a total of 119,084 physical therapy listings (60,967 for 2018 and 58,117 for 2019).
- Overall, we find substantial inaccuracies in the listings amounting to 19% of listings in 2018 and 8% in 2019. However, we found substantial differences across markets, with a low of 54% accuracy for Medicaid listings in 2018. With regard to timely access, we found that more than 90% of listed providers were accessible within 15 days and 97% within 30 days, with Medicaid providing the highest rates of timely access.
- Barriers to consumer access with regard to physical therapy appear to be primarily in the form of provider directory inaccuracies. High rates of inaccuracies raise concerns for patients as well as regulators. Ultimately, consumers in California, one of the most regulated states when it comes to network adequacy and access, continue to face access challenges related to provider directory inaccuracies and network inadequacies.

INTRODUCTION

Most of the insured population in the United States carry insurance plans with managed care arrangements, such as health maintenance organization (HMO) plans. These managed care plans contract with a variety of medical and ancillary providers including physical therapists (PTs) and physical therapist assistants (PTAs) to form “provider networks.” Patients are strongly financially incentivized to seek care only from providers inside their networks with various cost-sharing arrangements. However, previous research indicates that patients may struggle to access care due to these restrictions because provider directories presented to them by their managed care companies may show substantial inaccuracies such as wrong phone numbers or wrong provider specialties. These inaccuracies may create a number of access barriers, including the time-consuming search of an in-network provider who is of the appropriate specialty, and locating providers who accept patients' insurance (Ray et al., 2015). At the same time, provider networks may also not contain an appropriate amount or distribution of providers. Inadequate networks of providers do not have enough clinicians to meet patient demand for care, which may force consumer to either delay or completely forgo care (Haeder, 2019b; Haeder et al., 2019b, 2020; Kim et al., 2009). Both barriers are likely unevenly distributed across patients leading people of lower socioeconomic status experiencing disproportionately higher financial burdens (Xu et al., 2019). This may also contribute to systemic inequities like transportation hardships and travel expenses among others already present in the healthcare field (Blumenberg & Agrawal, 2014; Brown et al., 2016). Lastly, inaccuracies in provider directories may also allow carriers to circumvent regulations intended to ensure that they include an adequate number of providers in their networks (Haeder et al., 2019a, 2019b). The limited existing research suggests that provider networks and directory issues may also impact people accessing physical therapists (McCallum, 2010; Sharpe et al., 2021).

Barriers to physical therapy care are problematic because physical therapy can play an important role in supporting patient health and improve the quality of life by helping preserve functional abilities (Di Fabio & Boissonnault, 1998). In the United States, physical therapy is mainly conducted by PTs and PTAs. PTs are licensed healthcare professionals that have completed a Commission on Accreditation in Physical Therapy Education (CAPTE) accredited Doctor of Physical Therapy Program (DPT) (American Physical Therapy Association, 2023a; Federation of State Boards of Physical Therapy, 2023). PTAs are also licensed professionals who have completed a CAPTE-accredited physical therapist assistant program (American Physical Therapy Association, 2023b). PTs and PTAs are essential for rehabilitation, helping patients manage pain and improving movements (American Physical Therapy Association, 2023a). They address functional issues while also helping to treat sport and employment-related injuries as well chronic problems and providing preventive care (American Physical Therapy Association, 2023a; Bureau of Labor Statistics, 2023; Edemekong et al., 2019). Physical therapy can address issues related to cardiopulmonary, pediatric, geriatric, integumentary, neurologic, and musculoskeletal problems (Rundell et al., 2015; Stevans et al., 2017). The literature has shown that physical therapy has led to improvements in daily activities by aiming to lower abnormal stress on joints, increase function, assuage pain, stimulate healing increase flexibility, and range of motion (ROM) (Dreeben-Irimia, 2007; Holm et al., 2005, 2015). Physical therapy has also been found to decrease pain in the lower extremities as well as back pain (Rundell et al., 2015; Stevans et al., 2017).

Limiting access to physical therapists can result in worsened health issues that increase both health care utilization and costs (Garrity et al., 2020). Research suggests that fewer restrictions for accessing physical therapy directly are associated with less advanced imaging, less physician visits, and lower healthcare costs (Baldwin et al., 2002; Garrity et al., 2020). Delays regarding physical therapy access are also an issue. This is because they were found to increase emergency department use for lower back pain (Magel et al., 2020). Accessing physical therapy timely manner is also associated with a decreased possibility of using opioids long-term and having lumbar surgery later (Magel et al., 2020). At the same time, physical therapy access is inequitable as it has been found that black patients are less likely than white patients to receive physical therapy as well as experience longer wait times when they do (Richter et al., 2022).

As noted above, a growing literature has highlighted access challenges surrounding the managed care provider networks, for different specialties including, for example, primary care (Burman & Haeder, 2022; Haeder et al., 2016; Melnikow et al., 2020; Tipirneni et al., 2016) and mental health (Burman et al., 2023; Cama et al., 2017; Holstein & Paul, 2012; Malowney et al., 2015; Zhu et al., 2022) as well across multiple markets (Haeder, 2019a, 2019b, 2020b). However, we could not identify previous works that assessed provider network issues for physical therapists. Our analyses below extend the assessment to this important specialty.

MATERIALS AND METHODS

The State of California has been one of the most active regulators of provider networks and provider directory issues (Burman & Haeder, 2021; Haeder, Xu, et al., 2023). The state pioneered laws to increase the accuracy of provider directories governing managed care organizations, both for Medicaid and commercially, and has served a model for similarly interested states (California Department of Managed Health Care, 2021; University of Florida Institute for Child Health Policy, 2018). State requirements include updates to printed directories at least quarterly, as well as corrections to online directories within 7 days. Carriers must also fully verify providers across their directories at least once per year. In addition, California has also sought to improve access for consumer by ensuring that provider networks are adequate in number and geography. It does so via its "timely access" standards.[1] With regard to physical therapy, carriers must make available appointments within 15 days. Insurers are required to submit regular data to demonstrate compliance in regulations, generating valuable and unique data sources utilized for our study.

The regulatory regime behind California's effort to ensure consumer access to providers is housed in the California Department of Managed Health Care (DMHC) which regulates well over 90% of the state's insurance market. It regulates all managed care products including the state's Medicaid MCOs as well as Blue Cross and Blue Shield plans. DMHC requires that all carriers survey their networks at least on an annual basis. This survey is based on a sophisticated methodology that is set to ensure "statistically reliable and comparable results across all plans.[2]" (California Department of Managed Health Care, 2018). This methodology was established in 2016 and continues to be updated in light of increasing experience with the approach (California Department of Managed Health Care, 2021). Since 2016, carriers must verify provider directory accuracy using a multi-method approach that includes fax, email, and up to two phone calls. That is, carriers, either themselves or through third-party vendors, reach out to providers in their provider directories to identity whether these providers are actually within the respective network and what the time to the next available appointment is. The first attempt to contact provider is either via email or fax. If unanswered within two business days, providers are sent a reminder. Within five business days, providers are then contact via phone and re-contacted within the next business day if no response is obtained. If no response is ultimately solicited, carriers must identify an additional provider for validation. No actual appointments are scheduled. Moreover, carriers are allowed to supplement surveys via "extraction" from the providers scheduling system. These carrier-generated data, in their raw form, are then submitted the DHMC containing information about each individual provider contacted.[3]

We procured these provider level-data generated by the carriers' audits for the analyses below from DHMC for reporting years 2018 and 2019. For 2018, these data covered 146 unique plans, sold commercially (104 plans), via the ACA marketplace Covered California (21 plans), or as part of the state's Medicaid program, Medi-Cal (21 plans). The 2019 data spanned 155 unique plans sold commercially (110 plans), via Covered California (21 plans), or as part of the Medi-Cal program (24 plans). Overall, the data include 60,967 unique provider listings for 2018; of these, 51,752 were for commercial plans, 7322 for ACA Marketplace plans, and 1893 for Medicaid plans. In 2019, there were 58,117 listings overall split between 48,660 listings for commercial plans, 4116 for ACA Marketplace plans, and 1598 for Medicaid plans.

Our analyses of the secondary data below focus on assessing two important facets of patient access to care. We first assessed the accuracies of the provider listings in directories for physical therapists. Besides successfully contacted and verified providers, DHMC utilizes a number of categories including providers who (1) did not participate in the listed network, (2) did not practice in the listed county, (3) were retired or no longer practicing, (4) did not practice the listed specialty, (5) did not actually provide appointments directly to patients (because they were hospitalists or emergency department providers), or (6) had incorrect contact information listed. Some providers could not be reached or refused to participate. These providers are listed under the "Refused–Refused/Declined to Respond" and "Refused–No Response" category. Our analyses related to both provider directory accuracy and timely access exclude these providers because, by definition, no information was collected. Importantly, we condition our analyses below related to provider directory accuracy on the number of providers who were successfully contacted as the denominator. In addition to assessing the outcomes of the survey, we also compared differences in outcomes across in insurance markets. That is, we utilized a series of tests of proportion to assess statistical differences for directory accuracy rates between commercial market plans and ACA Marketplace plans, between commercial market plans and Medicaid plans, and between ACA Marketplace plans and Medicaid plans.

Accurate provider directories play a vital role in ensuring consumers' access to healthcare services. However, access is not ensured only with accuracy. After individuals manage to successfully locate physical therapists who are in-network, they must also have the capability to book an appointment with said provider. We thus examined the question of whether consumers were able to schedule timely appointments with physical therapists. Specifically, for our measures of timely access, we determined whether surveyors were able to obtain an appointment with a provider within 15 days from their time of contact. As an additional reference point, we also assessed access at 30 days. We selected these timeframes because they correspond with the timely access time frame utilized in California regulations. Our analyses of timely access were naturally conditioned on whether providers were successfully contacted and verified as correctly listed. Analogously as with our assessments of survey outcomes, we again relied on a series of tests of proportion to compare timely access across markets.

RESULTS

Listing inaccuracies

In 2018, surveyors sought to contact 60,967 physical therapist listings in provider directories (Table 1 and Figure 1). Overall, the successful response rate was 89.41% of physical therapist listings ($N = 54{,}511$). Verification could not be conducted either due to the survey being declined or because the surveyors could not establish communication after attempting several times in 10.59% of cases ($N = 6456$). For those successfully contacted, the biggest issues regarding inaccuracies for physical therapists was that they did not treat patients in the county they were listed for (8.87%), followed by inaccuracies with physical therapist contact information (5.93%). All other problems occurred in less than 2% of cases. Overall, when looking at successful contact of physical therapists, surveyors verified that 80.99% of physical therapists were correctly listed and that a corresponding 19.01% of cases that were inaccurate.

In 2019, surveyors were able to reach more physical therapist listings (93.12%) out of 58,117 listings they attempted to contact (Figure 1). Contact information issues were

TABLE 1 Provider directory accuracy for physical therapists, overall and across markets, 2018 and 2019.

	All		Commercial		Covered California		Medicaid	
	2018	2019	2018	2019	2018	2019	2018	2019
Incorrect specialty	545	516	316	258	115	74	114	184
No appointments	718	217	593	177	96	20	29	20
Not in plan network	816	335	647	273	90	33	79	29
Contact information issue	3233	1893	2378	1681	489	132	366	80
Provider not in county	4835	643	3925	582	883	41	27	20
Retired or ceasing to practice	218	520	108	482	56	34	54	4
No response/refused	6456	3996	5224	3443	795	300	437	253
Verified as Correctly Listed	44,146	49,997	38,561	45,207	4798	3782	787	1008

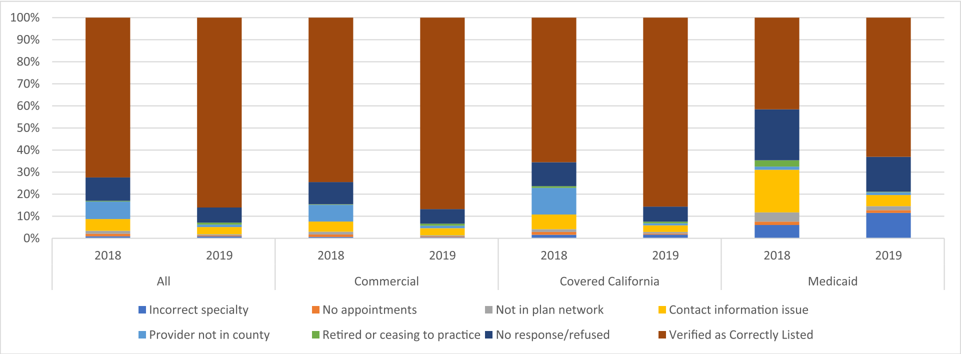


FIGURE 1 Listing of physical therapists, conditional on successful contact by market, 2018 and 2019.

TABLE 2 Comparison of provider directory accuracy for physical therapists, across markets, 2018 and 2019.

	Listings verified as correct			
	Commercial plans	**ACA plans**	**Delta**	***p* Value**
2018	0.83 ($N = 46{,}528$)	0.74 ($N = 6527$)	0.094	0.000
2019	0.93 ($N = 48{,}660$)	0.92 ($N = 4116$)	0.010	0.015
	Commercial plans	**Medicaid plans**	**Delta**	***p* Value**
2018	0.83 ($N = 46{,}528$)	0.54 ($N = 4116$)	0.288	0.000
2019	0.93 ($N = 48{,}660$)	0.75 ($N = 1345$)	0.180	0.000
	ACA plans	**Medicaid plans**	**Delta**	***p* Value**
2018	0.74 ($N = 6527$)	0.54 ($N = 1456$)	0.195	0.000
2019	0.92 ($N = 4116$)	0.75 ($N = 1345$)	0.169	0.000

present in 3.5% of cases. All other accuracy problems occurred in less than 2% of cases. Amongst these, the biggest problem was that the physical therapists were not serving the county they were listed for (1.19%), followed by physical therapists listed who had retired or ceased practicing (0.96%). Overall, 92.38% of verified listings were found to be listed correctly.

Listing inaccuracies by market

Next, we explored whether differences in accuracies rates existed across the three markets using tests of proportion (Table 2). In 2018, conditioning on connecting with a provider, surveyors were able to confirm that 82.88% listings for commercial plans, 73.51% listings for Covered California, and only 54.05% listings for Medicaid were correct. Differences were statistically significant between commercial and ACA plans (proportion delta: 9.37, $p = 0.000$), between commercial and Medicaid plans (delta: 28.82, $p = 0.000$), and between ACA and Medicaid plans (delta: 19.46, $p = 0.000$). We note the substantively lower levels of accuracy for Medicaid listings.[4] However, differences were also large between commercial and ACA plans.

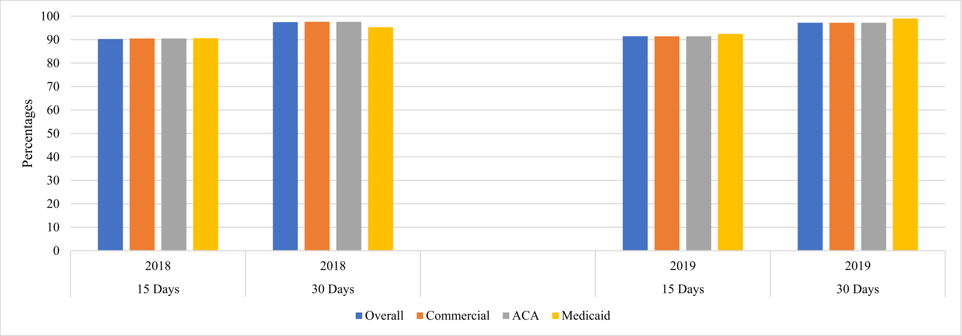


FIGURE 2 Percentage of appointments for physical therapists within state-mandated time frames, conditional on correct listing, by market, 2018 and 2019.

In 2019 listings were verified as accurate for 92.90% listings for commercial plans, 91.89% Covered California plans and 74.94% listings for Medicaid plans, conditioning on connecting with a provider. Differences between commercial and ACA plans continued to be statistically significant ($p = 0.015$) but were substantively small (delta: 1.02). However, large differences remained between commercial and Medicaid plans (delta: 17.96, *p*-value: 0.000) and ACA and Medicaid plans (delta: 16.94, *p*-value: 0.000).

Timely access

To comprehensively evaluate accessibility, we examined whether surveyors could secure appointments with physical therapists in a timely manner (Figure 2). We exclusively present the outcomes for timely access in which the provider had previously undergone verification as being listed correctly. This is a conservative estimate because it eliminated all failed attempts at securing access to care. For physical therapists, surveyors were able to secure appointments within 15 days for 90.29% of listings and within 30 days for 97.47% of listings in 2018. In 2019, timely access numbers were similar with secured appointments for 91.44% of listings within 15 days and 97.22% of listings within 30 days.

Timely access by market

Again, we compared results across markets (Table 3). Timely access rates within 15 days for physical therapists in 2018, were found for 90.51% of listings for commercial plans, 88.54% of listings for ACA Marketplace plans, and 90.6% of listings for Medicaid plans. Tests of proportion did not find substantial differences across markets and statistical significance at commonly accepted levels was only achieved comparing commercial plans to ACA plans (delta: 1.97%, $p = 0.000$) for the 15-day assessment. Access rates increased when the period of observation was increased to 30 days. Here, appointments were available for 97.6% of commercial listings, 96.8% of ACA listings, and 95.3% of Medicaid listings. Differences were statistically significant favoring commercial listings, over ACA listings, and Medicaid listings, but did not exceed 2.3 percentage points.

In 2019, appointments were available for 91.4% for listing for commercial plans, 91.5% for listings for ACA Marketplace plans, and 92.5% for listings for Medicaid plans. We found no differences across markets. At the 30-day mark, appointments were available for 97.19% for commercial plan listings, 97.12% for ACA Marketplace plan listings, and 99.01% for

TABLE 3 Comparison of timely access to physical therapists, across markets, 2018 and 2019.

		Proportion of listings with timely appointments			
		Commercial plans	**ACA plans**	**Delta**	***p* Value**
15 Days	2018	0.91 (*N* = 38,561)	0.89 (*N* = 4798)	0.020	0.000
	2019	0.91 (*N* = 45,207)	0.91 (*N* = 3782)	0.001	0.886
		Commercial plans	**Medicaid plans**	**Delta**	***p* Value**
	2018	0.91 (*N* = 38,561)	0.91 (*N* = 787)	−0.001	0.931
	2019	0.91 (*N* = 45,207)	0.92 (*N* = 1008)	−0.010	0.244
		ACA plans	**Medicaid plans**	**Delta**	***p* Value**
	2018	0.89 (*N* = 4798)	0.91 (*N* = 787)	−0.021	0.089
	2019	0.91 (*N* = 3782)	0.92 (*N* = 1008)	−0.011	0.261
30 Days		**Commercial plans**	**ACA plans**	**Delta**	***p* Value**
	2018	0.98 (*N* = 38,561)	0.97 (*N* = 4798)	0.008	0.002
	2019	0.97 (*N* = 45,207)	0.97 (*N* = 3782)	0.001	0.807
		Commercial plans	**Medicaid plans**	**Delta**	***p* Value**
	2018	0.98 (*N* = 38,561)	0.95 (*N* = 787)	0.023	0.000
	2019	0.97 (*N* = 45,207)	0.99 (*N* = 1008)	−0.018	0.001
		ACA plans	**Medicaid plans**	**Delta**	***p* Value**
	2018	0.97 (*N* = 4798)	0.95 (*N* = 787)	0.015	0.027
	2019	0.97 (*N* = 3782)	0.99 (*N* = 1008)	−0.019	0.001

Medicaid plan listings. Differences did not exceed 1.9 percentage points but were statistically significant comparing commercial to Medicaid plans ($p = 0.001$) and ACA Marketplace to Medicaid plans ($p = 0.001$).

DISCUSSION

Physical therapy is a crucial component of supporting holistic patient health and improves the quality of life for those suffering from a wide variety of conditions. Yet, when scrutinizing provider network issues in managed care plans, most research focused on advanced medical providers such as medical doctors, psychiatrists or psychologists. This has resulted in a substantial research gap for other health care providers that fail to inform policy making and can have detrimental effects on patients. Our findings here indicate that this lack of attention has hidden substantial access challenges for consumers, who were confronted with substantial provider directory inaccuracies when seeking care. Despite some improvements across years, these issues persisted across markets. Accuracy issues for Medicaid plans were particularly large. At the same time, while consumers in the ACA marketplaces and particularly commercial plans did better, accuracy issues affected between 8% and 19% of listings overall. We note that accuracy appears to have improved for 2019. These inaccuracies impose administrative burdens for those searching for providers, serving as an additional challenge for enrollee access to care. Some consumers may not be able to due to administrative burdens (Haeder & Moynihan, 2023b) which can result in consumers receiving delayed care or ultimately not receiving care. At the same time, once the barrier of provider directory accuracy is surmounted, finding an appointment in a timely manner exceeded 90% of listings. Moreover, we found no substantial differences across markets in timely access. This finding alleviates at least some of the concerns raised by the rather concerning accuracy issues in the Medicaid program. That is, once Medicaid beneficiaries are able to identity a provider in their network, they do about just as well as their counterparts in commercial and ACA plans. Moreover, the percentage of calls leading to appointments within 15 and 30 days is substantial in absolute terms.

Our findings also raise concerns about equitable health access. For one, racial and ethnic minorities are disproportionately enrolled in Medicaid (Haeder & Moynihan, 2023a; Haeder, Sylvester, et al., 2023), the program that showed the most substantial accuracy issues. Access limitations related to physical therapy access may contribute to racial disparities because individuals with fewer resources and lower social capital may be disproportionately struggling to overcome issues related to provider directories and provider networks. Delays in access to physical therapy may thus directly prolonged pain for underserved populations and impact their ability to live fulfilling private and professional lives (Richter et al., 2022). The issues related to provider directories that we identify here may be one of the reasons behind previous findings that highlighted racial disparities in physical therapy access (Richter et al., 2022). The accuracy issues analyzed in this paper may have identified an important mechanism that may contribute to racial disparities. At the same time, improving directory accuracy may essentially bring timely access on par with other markets. Future research should further explore this issue.

Overall, our work contributes to the shortage of existing literature regarding network accuracy and timely access in general by extending it into the field of physical therapy. The accuracy issues we identified for physical therapy are consistent with findings from other studies, markets, and specialties. Consumers are consistently confronted with highly inaccurate directories and must expend substantial resources to find a provider who is actually in their network. Moreover, the degree of inaccuracies raises concerns about the regulatory assessment of provider directories, even in places like California that have a strong regulatory regime. Many states rely on submission from carriers to assess time-and-distance standards as well as patient-to-provider rations (Haeder et al., 2021). Given our findings here, these assessments are likely substantially inaccurate. That is, regulators are signing off on provider networks as accurate that are, indeed, highly inaccurate and potentially inadequate. Combined with often inadequate enforcement (Burman & Haeder, 2021; Haeder et al., 2023), it raised questions about how well consumers are actually are actually protected in managed care arrangements.

LIMITATIONS

Various limitations apply to our study. Most obviously, our data come from only one US state, California. This may limit the generalizability of the findings. However, these issues are mitigated by both the size and diversity of the California market. Although this research is specific to California, the leading causes of death in the United States and in California are very similar and include heart disease, stroke, Alzheimer's, lower respiratory diseases, and diabetes (National Center for Health Statistics, 2023a, 2023b). Physical therapy is a crucial component of treating individuals with these diseases holistically. The data from our study are also confined to two distinct years. We also note that our analyses occur in a state with a dedicated enforcement mechanism as well as prolonged interest of policymakers to address consumer access. This makes California likely a best-case scenario. That is, the situation may be substantially worse in other states. Moreover, we do not differentiate between different specializations of physical therapy providers because the data do not contain such information. Lastly, we rely on the data collection and accuracy of carriers under supervision and regulation of DMHC and its methodology. However, we have no reason to believe that carriers would forge their data and potentially incur large legal ramifications. It should be noted that the methodology was slightly changed from 2018 to 2019 so results cannot be fully compared from year to year. Our results are likely conservative for the reasons we outlined above, and access may be substantially worse.

CONCLUSIONS AND POLICY IMPLICATIONS

Concerns about provider directory accuracy and provider network adequacy are not novel. In the past, policymakers at various levels have responded to concerns about provider access in a limited way (Giovannelli et al., 2015, 2016; Haeder et al., 2019b; Hall & Ginsburg, 2017). For example, the federal government has long had regulations in place governing the accuracy of provider directories and the adequacy of provider networks in Medicare (Burman & Haeder, 2021; Haeder, 2019b, 2020a). There are also certain requirements at the federal level for the Medicaid program as well as Marketplace plans. In addition, several states have acted on the issue, as well (Busch & Kyanko, 2020; Giovannelli et al., 2016; Haeder et al., 2023; Wishner & Marks, 2017). However, most of these actions may have been limited due to haphazard or lack of enforcement (Burman & Haeder, 2021). More recently, the Biden Administration has refocused its efforts on the issue (U.S. Department of Health & Human Services, 2022a, 2022b). However, concerns about enforcement remain (Haeder et al., 2023). To our knowledge this is the first study using this specific methodology for the specialty of physical therapy. As our analyses of these issues for physical therapy indicates, despite regulatory efforts on the part of California, accuracy and adequacy leave much to be desired. Critical and sophisticated enforcements efforts should employee secret shopper methodologies across different medical providers to provide a true consumer perspective and to ensure that patients can access care when they need it.

CONFLICT OF INTEREST STATEMENT

No conflicts of interest to report.

ETHICS STATEMENT

Not applicable as analyses based on secondary data.

ORCID

Simon F. Haeder http://orcid.org/0000-0003-0077-6047

NOTES

[1] Cal. Health and Safety Code § 1367.03; Cal. Code of Reg. § 1300.67.2.2

[2] For the detailed methodology see California Department of Managed Health Care, 2018. Measurement Year 2018: Provider Appointment Availability Survey Methodology. Sacramento, CA: California Department of Managed Health Care

[3] The exact methodology is accessible in California Department of Managed Health Care, 2018. Measurement Year 2018: Provider Appointment Availability Survey Methodology. Sacramento, CA: California Department of Managed Health Care

[4] Please note that, to facilitate the presentation of results, we converted proportions to percentages through this section.

REFERENCES

American Physical Therapy Association. (2023a). *Accredited PT & PTA Programs Directory*. Retrieved July 1 from https://aptaapps.apta.org/accreditedschoolsdirectory/AllPrograms.aspx

American Physical Therapy Association. (2023b). *Becoming a PTA*. Retrieved August 14 from: https://www.apta.org/your-career/careers-in-physical-therapy/becoming-a-pta

Baldwin, M. L., Johnson, W. G., & Marcus, S. C. (2002). Effects of provider networks on health care costs for workers with short-term injuries. *Medical Care*, *40*(8), 686–695.

Blumenberg, E., & Agrawal, A. W. (2014). Getting around when you're just getting by: Transportation survival strategies of the poor. *Journal of Poverty*, *18*, 355–378.

Brown, E. J., Polsky, D., Barbu, C. M., Seymour, J. W., & Grande, D. (2016). Racial disparities in geographic access to primary care in Philadelphia. *Health Affairs*, *35*(8), 1374–1381.

Bureau of Labor Statistics. (2023). *Occupational Outlook Handbook, Physical Therapists*. Bureau of Labor Statistics.

Burman, A., & Haeder, S. F. (2021). Without a dedicated enforcement mechanism, new federal protections are unlikely to improve provider directory accuracy. *Health Affairs Forefront*. https://doi.org/10.1377/forefront.20211102.706419

Burman, A., & Haeder, S. F. (2022). Directory accuracy and timely access in Maryland's medicaid managed care program. *Journal of Health Care for the Poor and Underserved*, *33*(2), 597–611.

Burman, A., Haeder, S. F., & Xu, W. Y. (2023). Provider directory inaccuracy and timely access for mental health care. *The American Journal of Managed Care*, *29*(2), 96–102.

Busch, S. H., & Kyanko, K. A. (2020). Incorrect provider directories associated with out-of-network mental health care and outpatient surprise bills. *Health Affairs*, *39*(6), 975–983.

California Department of Managed Health Care. (2018). *Measurement year 2018: Provider appointment availability survey methodology*. California Department of Managed Health Care.

California Department of Managed Health Care. (2021). *Timely access compliance and annual network reporting*.

Cama, S., Malowney, M., Smith, A. J. B., Spottswood, M., Cheng, E., Ostrowsky, L., Rengifo, J., & Boyd, J. W. (2017). Availability of outpatient mental health care by pediatricians and child psychiatrists in five US cities. *International Journal of Health Services*, *47*(4), 621–635.

Dreeben-Irimia, O. (2007). *Introduction to physical therapy for physical therapist assistants*. Jones & Bartlett Learning.

Edemekong, P. F., Bomgaars, D., Sukumaran, S., & Levy, S. B. (2019). *Activities of daily living*. StatPearls Publishing.

Di Fabio, R. P., & Boissonnault, W. (1998). Physical therapy and health-related outcomes for patients with common orthopaedic diagnoses. *The Journal of Orthopaedic and Sports Physical Therapy*, *27*(3), 219–230.

Federation of State Boards of Physical Therapy. (2023). *Eligibility Requirements*. Federation of State Boards of Physical Therapy. Retrieved July 1 from: https://www.fsbpt.org/Secondary-Pages/Exam-Candidates/National-Exam-NPTE/Eligibility-Requirements

Garrity, B. M., McDonough, C. M., Ameli, O., Rothendler, J. A., Carey, K. M., Cabral, H. J., Stein, M. D., Saper, R. B., & Kazis, L. E. (2020). Unrestricted direct access to physical therapist services is associated with lower health care utilization and costs in patients with new-onset low back pain. *Physical Therapy*, *100*(1), 107–115.

Giovannelli, J., Lucia, K., & Corlette, S. (2016). *Regulation of health plan provider networks*. Health Affairs.

Giovannelli, J., Lucia, K. W., & Corlette, S. (2015). *Implementing the affordable care act: State regulation of marketplace plan provider networks*.

Haeder, S. F. (2019a). Quality regulation? Access to high-quality specialists for medicare advantage beneficiaries in California. *Health Services Research and Managerial Epidemiology*, *6*. https://doi.org/10.1177/2333392818824472

Haeder, S. F. (2019b). A tale of two programs: Access to high-quality providers for medicare advantage and affordable care act beneficiaries in New York State. *World Medical & Health Policy*, *11*(3), 212–230. https://doi.org/10.1002/wmh3.309

Haeder, S. F. (2020a). Inadequate in the best of times: Reevaluating provider networks in light of the coronavirus pandemic. *World Medical & Health Policy*, *12*(3), 282–290. https://doi.org/10.1002/wmh3.357

Haeder, S. F. (2020b). Quality advantage? Provider quality and networks in medicare advantage. *Journal of Public and Nonprofit Affairs*, *6*(2), 138–158. https://doi.org/10.20899/jpna.6.2.138-158

Haeder, S. F., & Moynihan, D. P. (2023a). Race and racial perceptions shape burden tolerance for medicaid and the supplemental nutrition assistance program. *Health Affairs*, *42*(11), 1334–1343.

Haeder, S. F., & Moynihan, D. P. (2023b). Most Americans support minimizing administrative burdens for medicaid recipients as the public health emergency ends. *Health Affairs Scholar*, *1*(1), qxad001. https://doi.org/10.1093/haschl/qxad001

Haeder, S. F., Sylvester, S. M., & Callaghan, T. (2023). More than words? How highlighting target populations affects public opinion about the medicaid program. *Journal of Health Politics, Policy and Law*, *48*(5), 713–760. https://doi.org/10.1215/03616878-10637708

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2016). Secret shoppers find access to providers and network accuracy lacking for those in marketplace and commercial plans. *Health Affairs*, *35*(7), 1160–1166. https://doi.org/10.1377/hlthaff.2015.1554

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2019a). A consumer-centric approach to network adequacy: Access to four specialties in California's marketplace. *Health Affairs*, *38*(11), 1918–1926. https://doi.org/10.1377/hlthaff.2019.00116

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2019b). A knotty problem: Consumer access and the regulation of provider networks. *Journal of Health Politics, Policy and Law*, *44*(6), 937–954. https://doi.org/10.1215/03616878-7785835

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2020). Going the extra mile? How provider network design increases consumer travel distance, particularly for rural consumers. *Journal of Health Politics, Policy and Law*, *45*(6), 1107–1136. https://doi.org/10.1215/03616878-8641591

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2021). Mixed signals: The inadequacy of provider-per-enrollee ratios for assessing network adequacy in California (and elsewhere). *World Medical & Health Policy*, *15*(3), 258–272. https://doi.org/10.1002/wmh3.466

Haeder, S. F., Xu, W. Y., Elton, T., & Pitcher, A. (2023). State efforts to regulate provider networks and directories: Lessons for the future. *Journal of Health Politics, Policy and Law*, *48*, 951–968. https://doi.org/10.1215/03616878-10852610

Hall, M. A., & Ginsburg, P. B. (2017). *A better approach regulating provider adequacy*. Brookings Center for Health Policy.

Holm, I., Risberg, M. A., & Steen, H. (2005). Outpatient physical therapy influences the patients' health-related quality of life. *Advances in Physiotherapy*, *7*(1), 40–47.

Holm, I., Tveter, A. T., Moseng, T., & Dagfinrud, H. (2015). Does outpatient physical therapy with the aim of improving health-related physical fitness influence the level of physical activity in patients with long-term musculoskeletal conditions? *Physiotherapy*, *101*(3), 273–278.

Holstein, R., & Paul, D. P. (2012). 'Phantom networks' of managed behavioral health providers: An empirical study of their existence and effect on patients in two new jersey counties. *Hospital Topics*, *90*(3), 65–73.

Kim, J., Norton, E. C., & Stearns, S. C. (2009). Transportation brokerage services and medicaid beneficiaries' access to care. *Health Services Research*, *44*(1), 145–161.

Magel, J., Kim, J., Fritz, J. M., & Freburger, J. K. (2020). Time between an emergency department visit and initiation of physical therapist intervention: Health care utilization and costs. *Physical Therapy*, *100*(10), 1782–1792.

Malowney, M., Keltz, S., Fischer, D., & Boyd, J. W. (2015). Availability of outpatient care from psychiatrists: A simulated-patient study in three US cities. *Psychiatric Services*, *66*(1), 94–96.

McCallum, C. A. (2010). Access to physical therapy services among medically underserved adults: A mixed-method study. *Physical Therapy*, *90*(5), 735–747.

Melnikow, J., Evans, E., Xing, G., Durbin, S., Ritley, D., Daniels, B., & Woodworth, L. (2020). Primary care access to new patient appointments for California medicaid enrollees: A simulated patient study. *The Annals of Family Medicine*, *18*(3), 210–217.

National Center for Health Statistics. (2023a). *California*. Centers for Diseases Control and Prevention. Retrieved August 24 from: https://www.cdc.gov/nchs/pressroom/states/california/ca.htm

National Center for Health Statistics. (2023b). *Leading causes of death*. Centers for Diseases Control and Prevention. Retrieved August 24 from: https://www.cdc.gov/nchs/pressroom/states/california/ca.htm

Ray, K. N., Chari, A. V., Engberg, J., Bertolet, M., & Mehrotra, A. (2015). Opportunity costs of ambulatory medical care in the United States. *The American Journal of Managed Care*, *21*(8), 567–574.

Richter, R. R., Chrusciel, T., Salsich, G., Austin, T., & Scherrer, J. F. (2022). Disparities exist in physical therapy utilization and time to utilization between black and white patients with musculoskeletal pain. *Physical Therapy*, *102*(10), pzac095.

Rundell, S. D., Sherman, K. J., Heagerty, P. J., Mock, C., & Jarvik, J. G. (2015). Patient-reported outcomes associated with use of physical therapist services by older adults with a new visit for back pain. *Physical Therapy*, *95*(2), 190–201.

Sharpe, J. A., Martin, B. I., Fritz, J. M., Newman, M. G., Magel, J., Vanneman, M. E., & Thackeray, A. (2021). Identifying patients who access musculoskeletal physical therapy: A retrospective cohort analysis. *Family Practice*, *38*(3), 203–209.

Stevans, J. M., Fitzgerald, G. K., Piva, S. R., & Schneider, M. (2017). Association of early outpatient rehabilitation with health service utilization in managing medicare beneficiaries with nontraumatic knee pain: Retrospective cohort study. *Physical Therapy*, *97*(6), 615–624.

Tipirneni, R., Rhodes, K. V., Hayward, R. A., Lichtenstein, R. L., Choi, H., Reamer, E. N., & Davis, M. M. (2016). Primary care appointment availability and nonphysician providers one year after medicaid expansion. *The American Journal of Managed Care*, *22*(6), 427–431.

University of Florida Institute for Child Health Policy. (2018). *Provider Directory Data Quality*. University of Florida.

US Department of Health & Human Services. (2022a). *CY 2023 Medicare Advantage and Part D Final Rule*. Department of Health & Human Services.

US Department of Health & Human Services. (2022b). *HHS Notice of Benefit and Payment Parameters for 2023 Final Rule*. Department of Health & Human Services.

Wishner, J. B., & Marks, J. (2017). *Ensuring compliance with network adequacy standards: Lessons from four states*. Urban Institute.

Xu, W. Y., Song, C., Li, Y., & Retchin, S. M. (2019). Cost-sharing disparities for out-of-network care for adults with behavioral health conditions. *JAMA Network Open*, *2*(11), e1914554.

Zhu, J. M., Charlesworth, C. J., Polsky, D., & McConnell, K. J. (2022). Phantom networks: Discrepancies between reported and realized mental health care access in Oregon Medicaid. *Health Affairs*, *41*(7), 1013–1022.

AUTHOR BIOGRAPHIES

Thomas Elton is a Health Services Management and Policy PhD student at The Ohio State University. He earned his MPH with a concentration in Professional Health Education, and his MS in Applied Health Science with an emphasis in School and College Health Education from Indiana University Bloomington. He also earned a graduate certificate in Health Administration from Florida Atlantic University. Some of his research interests include healthcare access, healthcare workforce development, and medical education.

Dr. Wendy Y. Xu is an associate professor at the Ohio State University, College of Public Health. She has a PhD in Health Services Research Policy and Administration from the University of Minnesota. Health care for the vulnerable populations has been a focus in her research, which addresses the causes of these problems arising from certain aspects of the US health care system design, as well as the consequences of health policies attending to these issues.

Dr. Simon F. Haeder, PhD, MPA is an associate professor of Public Health in the Department of Health Policy & Management at Texas A&M University. He previously served as a fellow in the Interdisciplinary Research Leaders Program, a national leadership development program supported by the Robert Wood Johnson Foundation. Dr. Haeder's work primarily focuses on the politics and policies surrounding health access issues including health access for vulnerable populations, the impact of provider networks on health access, and school-based health. He also studies the policymaking and rulemaking processes.

How to cite this article: Elton, T., Xu, W. Y., & Haeder, S. F. (2024). Provider directory inaccuracy and timely access to physical therapy. *World Medical & Health Policy*, *16*, 447–459. https://doi.org/10.1002/wmh3.607

Received: 15 October 2023 | Revised: 16 February 2024 | Accepted: 28 March 2024

DOI: 10.1002/wmh3.613

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Attitudes toward COVID-19 vaccination status disclosure in the provider–patient relationship: Findings from a population survey

Abdallah M. Badahdah[1] | **Filip Viskupič**[2] | **David L. Wiltse**[2]

[1]Sociology Program, School of Psychology, Sociology and Rural Studies, South Dakota State University, Brookings, South Dakota, USA

[2]School of American and Global Studies, South Dakota State University, Brookings, South Dakota, USA

Correspondence
Abdallah M. Badahdah School of Psychology, Sociology and Rural Studies, South Dakota State University, Brookings, SD 57007, USA.
Email: Abdallah.badahdah@sdstate.edu

Funding information
South Dakota State University

Abstract

The coronavirus disease 2019 (COVID-19) pandemic ignited heated discussions on social media as well as in the medical, legal, and political communities, about whether health-care providers should have the right to refuse to see unvaccinated patients. Another discussed idea during the pandemic, though it attracted less attention, was about patients' right to learn about the vaccination status of their health-care providers. In this paper, we examined public attitudes toward these two rights using data from a cross-sectional survey conducted in South Dakota in the summer of 2021. We utilized registration-based sampling to recruit participants. The survey collected data on some of the most significant variables reported in the literature that shape people's attitudes toward COVID-19 vaccines. Specifically, participants provided information on their age, gender, educational level, household income, COVID-19 vaccination status, stress induced by the pandemic, and political partisan identification. The health-care providers' rights as well as the patients' rights were gauged with one item each using a five-point Likert scale. We analyzed data from 573 respondents ($M_{\text{age}} = 56.6$ years, $SD = 16.48$), which showed that older participants, those with higher levels of COVID-19-related stress, and vaccinated individuals expressed higher support, while Republicans expressed lower support for the two policies. Gender, education, and income did not influence participants' attitudes. Although the findings might have limited generalizability to populations outside South Dakota, they offer valuable insights for developing comprehensive ethical codes where vaccination status might be at the center stage for clinician-patient relationships in future pandemic responses.

KEYWORDS

COVID-19, health-care providers' rights, patients' rights, vaccine hesitancy

Key points

- This study investigated the predictors of attitudes toward giving health-care providers the right to refuse to see unvaccinated coronavirus disease 2019 (COVID-19) patients and toward giving patients the right to know the vaccination status of their health-care providers during the COVID-19 pandemic.
- Support for the right of health-care providers to refuse patients unvaccinated for COVID-19 and patients' right to learn about the COVID-19 vaccination status of their health-care providers were related to age, pandemic-induced stress, and COVID-19 vaccination status.
- Self-identified Republicans expressed lower support for the two policies.
- Comprehensive ethical codes are needed where vaccination status might be at the center stage for clinician–patient relationships in future pandemic responses.

INTRODUCTION

During the coronavirus disease 2019 (COVID-19) pandemic, governments around the world implemented various containment and mitigation measures, including COVID-19 vaccination, to control the spread of the disease (Shah & Coiado, 2023). Examples included vaccine passports (Wang & Ping, 2022), general-population mandates (Druml & Czech, 2022), and vaccine mandates for specific populations such as nursing home staff (Ritter et al., 2021) and health-care providers (Giubilini et al., 2023).

These COVID-19 containment and mitigation measures, however, prompted legal and ethical debates, political resistance, and even mass protests (Neumayer et al., 2023; Pfaff et al., 2023). A considerable number of people (Majid et al., 2022) including health-care providers (Verger et al., 2022) expressed reluctance or absolute refusal to adhere to some of COVID-19 mitigation strategies. These strategies were perceived as overly strict, unnecessary, coercive, and discriminatory (Graso et al., 2024; Rodger & Blackshaw, 2022). Moreover, distrust of the medical establishment, safety and efficacy concerns, political ideology, and medical freedom (Carrieri et al., 2023; Colgrove & Samuel, 2022; Wang & Liu, 2021) were some reasons reported for COVID-19 vaccine hesitancy.

Vaccine hesitancy generated discussions among clinicians and ethicists regarding prioritizing treatment and allocation of scarce medical resources to willfully unvaccinated patients (Persad & Largent, 2022; Shaw, 2022). Moral outrage, fear of infection, and transmission of infection to family members, colleagues, and patients in the waiting room (Klitzman, 2022) prompted some physicians (Isaksson Rø et al., 2022; Johnson & Butcher, 2021; McDougall et al., 2021) and nurses (Muñoz-Rubilar et al., 2022; Ottolenghi et al., 2021) to cease or decline to initiate care for willfully unvaccinated COVID-19 patients.

The dismissal practice during the pandemic led several medical professional societies to clarify their positions on this issue (O'Leary et al., 2020). The American Medical Association (AMA), for example, declared that "… a physician should not refuse a patient because the individual is not vaccinated or declines to be vaccinated" (AMA, 2021a, para 1). However, physicians, "must balance the urgency of the individual patient's need; the risk the patient may pose to other patients in the physician's practice; and the need for the physician and staff, to be available to provide care in the future" (AMA, 2021a, para 2).

A related discussion that emerged during the pandemic, although it received less attention, was about whether patients have the right to know about the COVID-19 vaccination status of their health-care providers. The AMA stance on this discussion is that physicians may voluntarily disclose their vaccination status (AMA, 2021b). It goes on to say: "Indeed, it may be ethically admirable for them to do so and could be a way to encourage patients to be vaccinated. Patients have the right to ask, and if they do, physicians should answer truthfully" (AMA, 2021b, para 9).

Although research has explored health-care workers' (HCWs) disclosure of their health conditions during medical encounters (Arroll & Allen, 2015; Fost, 2000; Knishkowy & Guggenheim, 2022), little has been published during the COVID-19 pandemic. A paper by Cannity (2023), argued that physicians' disclosures of their COVID-19 vaccination status might help decrease vaccine hesitancy among patients. In regard to HCWs, Heyerdahl et al. (2023) found that some unvaccinated HCWs evaded talking about their opinion toward COVID-19 vaccines to avoid upsetting their peers or patients. Likewise, vaccinated HCWs concealed their feelings and status to avert conflicts with peers and patients.

Despite the importance of these two issues, we were unable to locate scholarly work on public attitudes toward these two rights. Hence, in the present study, we collected cross-sectional data from South Dakota to gauge the public's attitudes toward (1) physicians' right to refuse to see unvaccinated COVID-19 patients and (2) patients' right to know the COVID-19 vaccination status of their health-care providers. We sought to identify the influence of sociodemographic variables including age, gender, education, income, and stress associated with the pandemic on these attitudes. We also included COVID-19 vaccination status (Wambua et al., 2023) and partisan self-identification (Gadarian et al., 2022; Grimalda et al., 2023), two of the most robust predictors of attitudes and behaviors toward COVID-19 mitigation measures.

MATERIALS AND METHODS

Participants

Our data came from an original survey conducted by authors during July and August of 2021 in the state of South Dakota. The goal of the survey was to investigate public attitudes toward various aspects of the COVID-19 pandemic. We utilized registration-based sampling to recruit participants (Barber et al., 2014). We randomly selected 12,000 individuals from a publicly available list of registered voters that we obtained from the Office of the South Dakota Secretary of State. These individuals were mailed an invitation letter directing them to an online survey on the QuestionPro platform. The letter contained a unique six-digit key that unlocked the survey, to ensure that each invitation could only be used once. Participants did not receive compensation for completing the survey. The response rate was 4.8%, similar to online surveys using registration-based sampling recruitment strategy (Viskupič et al., 2022). All rights of the participants were fully disclosed, along with a statement of consent. The authors received approval from the Research Integrity and Compliance Officer and Institutional Review Board at South Dakota State University before fielding the survey.

Measures

The two outcome items were specifically developed for this study based on previous literature on dismissal of families for delaying or refusing childhood vaccination (Flanagan-Klygis et al., 2005; Francis et al., 2021; O'Leary et al., 2020).

Health-care Providers' *Right* regarding refusal to see patients unvaccinated against COVID-19 was assessed with the following item "Healthcare providers should have the right to refuse to see patients who are not vaccinated against COVID-19."

Patients' *Right* regarding learning about the vaccination status of their HCWs was gauged with the following item "Patients should have the right to find out if their healthcare providers have been vaccinated against COVID-19." Both items were rated on a five-point Likert scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*.

Participant age was measured in years, COVID-19 vaccination status (0 = *Unvaccinated or one dose of Pfizer or Moderna*, 1 = *One dose of Jannsen, two doses of Pfizer or Moderna, or boosted*), and gender (0 = *Female or other*, 1 = *Male*). Educational level was measured using a six-point ordinal scale (1 = *Some high school*, 6 = *Post-graduate degree*), and household income was measured using an eight-point ordinal scale (1 = *under $20,000* to 8 = *$150,000 or more*). We also included an instructional manipulation check in the survey, which 98.3% of participants answered correctly.

We measured stress associated with the COVID-19 pandemic with a single item (Williamson, 2020). Participants were asked to assess their overall stress experience due to the COVID-19 pandemic using an 11-point Likert scale (0 = *Not at all stressful*, 10 = *The most stressful thing you can imagine*).

We measured partisan self-identification, as scholars have previously done (Motta, 2021; Peng, 2022; Wiltse & Viskupič, 2023), using a seven-point Likert-type scale (1 = *Strong Democrat*, 7 = *Strong Republican*).

Analysis

We first described the data and reported correlation coefficients. We then estimated two ordinary least square regressions using *Health-care Providers*' *Right* and *Patient Right* as dependent variables, respectively. The other variables described above served as independent variables. Casewise deletion was applied to missing data when the regression models were estimated. All reported *p* values came from two-tailed tests. We conducted all analyses in Stata 17 (StataCorp LLC, 2021).

RESULTS

Altogether, we received 573 responses. The mean age of participants was 56.6 years (SD = 16.48), 45.7% identified as male, 78.7% were fully vaccinated for COVID-19, 60% reported a total household income of $75,000 or higher, and 51.6% had at least a 4-year college degree. The average stress associated with the COVID-19 pandemic was 5.21 (SD = 2.59, range: 0–10). Regarding partisan self-identification, 15% of participants identified as "strong Democrat," 12% as "Democrat," 11% as "leans Democrat," 10% were "Independent," 10% "leans Republican," 18% identified as "Republican," and 24% identified as "strong Republican."

When it came to the right of HCWs to refuse patients unvaccinated for COVID-19 (mean = 2.42, SD = 1.41), the majority (61%) reported "strongly disagreed" or "somewhat disagreed.

TABLE 1 Correlation matrix.

Variables	1	2	3	4	5	6	7	8
HCWs' right								
Patients right	0.547***							
Age	0.177***	0.228***						
Male	0.026	0.026	−0.022					
Education	0.062	0.039	−0.003	−0.012				
Income	−0.049	−0.083	−0.035	0.106*	0.314***			
COVID vaccination	0.350***	0.490***	0.322***	−0.004*	0.094*	0.023		
Partisan self-identification	0.268***	0.454***	−0.057	0.033	−0.084	0.087	0.270***	
COVID stress	0.225***	0.283***	−0.099*	−0.146*	0.096*	−0.044	0.205***	0.281***

Abbreviations: COVID-19, coronavirus disease 2019; HCW, health-care worker.

*$p < 0.05$, ***$p < 0.001$.

TABLE 2 OLS regression results.

	HCWs refuse unvaccinated patients	Patients have right to know HCWs' vaccination status
Age	0.010* (0.004)	0.011** (0.004)
Male	0.202 (0.127)	0.218 (0.126)
Education	0.063 (0.048)	−0.001 (0.048)
Income	−0.049 (0.036)	−0.066 (0.036)
COVID vaccination status	0.748*** (0.173)	1.373*** (0.172)
Partisan self-identification	−0.104*** (0.031)	−0.219*** (0.031)
COVID stress	0.089*** (0.027)	0.065* (0.026)
Constant	1.158** (0.407)	2.563*** (0.404)
Observations	427	426
R^2	0.194	0.375

Note: Standard errors are given within parentheses.

Abbreviations: COVID-19, coronavirus disease 2019; HCW, health-care worker; OLS, ordinary least squares.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Regarding the patients' right to know the COVID-19 vaccination status of their providers (mean = 3.33, SD = 1.59), roughly more than half (55%) indicated that they "strongly agreed" or "somewhat agreed."

Table 1 showed the correlations between our variables. The correlations between our two dependent variables and age, COVID-19 vaccination status, partisan self-identification, and stress due to the pandemic were statistically significant at 95% confidence interval level.

Table 2 presented regression analysis results. The results in the left column showed positive and statically significant correlations between age ($\beta = 0.010$, $p = 0.011$), COVID-19 vaccination status ($\beta = 0.748$, $p < 0.001$), stress due to the COVID-19 pandemic ($\beta = 0.089$,

$p = 0.001$), and permitting HCWs to dismiss or refuse to see unvaccinated people. The association between the support for this policy and partisan self-identification was negative ($\beta = -0.104$, $p = 0.001$), indicating that Republicans showed lower support. The associations between supporting HCWs' right of dismissal and education, income, and gender were not statistically significant.

The results in the right column showed positive and statically significant correlations between age ($\beta = 0.011$, $p = 0.008$), COVID-19 vaccination status ($\beta = 1.373$, $p < 0.001$), stress associated with the COVID-19 pandemic ($\beta = 0.065$, $p = 0.014$), and support for policy giving patients the right to know COVID-19 vaccination status of their HCWs. The association between the support for this policy and partisan self-identification was negative ($\beta = -0.219$, $p < 0.001$), again indicating that Republicans showed lower support. Education, income, and gender variables did not reach the standard threshold for statistical significance.

The R^2 values of 0.194 and 0.375 suggested that both models were well-specified. The mean variance inflation factor for both models was 1.18 (with the highest individual value of 1.30), ruling out the presence of significant levels of multicollinearity.

DISCUSSION

In the present study, we investigated the predictors of attitudes toward giving HCWs the right to refuse to see unvaccinated COVID-19 patients and toward giving patients the right to know the vaccination status of their HCWs during the COVID-19 pandemic.

We found that self-identified Republicans were more likely to believe that HCWs should not be allowed to refuse to see patients unvaccinated for COVID-19. They were also more likely to believe that patients should not have the right to know about the COVID-19 vaccination status of their health-care provider. Taken together, these findings underscored the deeply political nature of attitudes toward COVID-19 pandemic in the United States (Gadarian et al., 2022; Rabin & Dutra, 2022). Since the beginning of the COVID-19 pandemic, Republican and Democratic politicians at the national and local levels offered different policy responses to the spread of the virus. Republican politicians provided rather tepid endorsements of vaccinations and emphasized individual choice. Some downplayed the need for vaccination and endorsed misinformation regarding alternative medical treatments (Curtis et al., 2023).

Scholars showed that people took cues from politicians regarding how to respond to the outbreak of COVID-19 (Gadarian et al., 2022; Kiviniemi et al., 2022). The extant literature demonstrated that people who identified with the Republican Party were less likely to receive a COVID-19 vaccination and more likely to oppose these policies than self-identified Democrats (Bolsen & Palm, 2022; Debus & Tosun, 2021). Our results are in line with the existing scholarship. In general, Republicans are less likely to be vaccinated for COVID-19 (Albrecht, 2022) and therefore they were more likely to oppose giving doctors the right to refuse to see unvaccinated patients. However, even more fundamentally, Republicans were more likely to be uncomfortable when it comes to disclosing their vaccination status in the first place, and therefore they are opposed to the idea of doctors knowing it. Republicans were also less interested in knowing the vaccination status of their doctor. We believe that it is a natural extension of their first belief.

We found that vaccinated participants were more likely to believe that HCWs should have the right to refuse patients unvaccinated for COVID-19 and that patients have the right to know the COVID-19 vaccination status of their doctor. Vaccinated participants were likely concerned about avoiding infection and reducing the risk of severe COVID-19 if they or loved ones got infected. Indeed, research shows that vaccinated people held negative attitudes toward unvaccinated individuals (Bor et al., 2023; Dowd-Arrow et al., 2023). Unsurprisingly, they supported the right of doctors to refuse unvaccinated patients. While the vaccination rate was high among HCWs, some opposed COVID-19 vaccines (Callaghan et al., 2022; Desye, 2022; Huang et al., 2022). Thus, to protect themselves, vaccinated people were also interested in avoiding unvaccinated HCWs.

Our results also showed that older adults were more supportive of both policies. Their support might be influenced by the fact that older adults were at a greater level of risk of COVID-19 infection, severe symptoms, and mortality (LaHue et al., 2022; Veiga & Cavalcanti, 2023). Further, older adults are more likely to visit HCWs than younger adults. Therefore, avoiding unvaccinated HCWs helps minimize their exposure to COVID-19.

We found people who experienced a higher level of COVID-19-related stress were more likely to be supportive of permitting HCWs to refuse to see unvaccinated people. They were also supportive of allowing patients to find out about their HCWs' vaccination status. Research shows that individuals who were highly stressed during the pandemic were more likely to be fearful of COVID-19 and experience other psychological issues such as sleep disturbance, anxiety, and depression (Erbiçer et al., 2021; Levy, 2022). Therefore, these individuals were more cautious about interacting with unvaccinated people, including HCWs.

Besides scholars, our findings should be of interest also to clinicians and public health administrators. During the COVID-19 pandemic, clinicians were confronted with high numbers of COVID-19 patients. They lived through stressful anxious times (Mattila et al., 2021) that forced some to leave or plan to leave the profession (Abbasi, 2022; DiMaggio et al., 2023). Others used the availability of the COVID-19 vaccines as a justification to refuse to see voluntarily unvaccinated patients. The COVID-19 pandemic reignited the ethical dilemmas that health-care professionals encountered during the early years of the AIDS pandemic. However, in the case of the COVID-19 pandemic, the availability of vaccines was used as a criterion for prioritizing care, allocation of scarce resources, dismissing and refusing to provide treatment for unvaccinated COVID-19 patients.

The findings could help in developing ethical codes that utilize vaccination status as a principal criterion that governs doctor–patient relationships in future pandemics. The ethical codes should consider barriers to vaccine uptake such as socioeconomic, social (e.g., stigma), and racial factors (Park & Davies, 2023).

The findings of the current study should be considered in light of several limitations. First, our data come from a survey fielded in the state of South Dakota, and thus the findings might not be generalizable to communities with more heterogeneous populations. We encourage scholars to extend and further explore our study using nationally represented data without a specific reference to COVID-19. This recommendation would be possible with the development of a reliable and valid scale to measure these two rights applicable to multiple health conditions.

Our use of registration based sampling to recruit participants has some limitations as well. We could not reach unregistered South Dakotans or those who recently moved to the state. This sampling technique likely accounted for the higher mean age in our sample as older adults and those residents with higher income and education are more likely to be registered to vote. It also led to the undersampling of the state's American Indian population for the same reason. Such small demographic imbalances are nevertheless common in similar studies that use registration-based sampling (Viskupič et al., 2022). Finally, the response rate was low, which could be attributed to the absence of incentives. While providing incentives could increase the response rate, research showed that they do not help improve data quality or minimize bias (Stanley et al., 2020). Despite these limitations, the current findings offer unique insights into the attitudes of the public during the COVID-19 pandemic toward the rights of health-care providers to refuse seeing unvaccinated

COVID-19 patients as well as the rights of patients in learning about the COVID-19 vaccination status of their healthcare providers.

ACKNOWLEDGMENTS

This work was supported by South Dakota State University, USA.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon reasonable request.

ETHICS STATEMENT

Before conducting the study, approval was obtained from South Dakota State University's research compliance officer (IRB-2107004-EXM).

ORCID

Abdallah M. Badahdah http://orcid.org/0000-0001-6230-7700
Filip Viskupič http://orcid.org/0000-0003-1096-325X
David L. Wiltse http://orcid.org/0000-0002-6928-4246

REFERENCES

Abbasi, J. (2022). Pushed to their limits, 1 in 5 physicians intends to leave practice. *Journal of the American Medical Association*, *327*(15), 1435–1437. https://doi.org/10.1001/jama.2022.5074

Albrecht, D. (2022). Vaccination, politics and COVID-19 impacts. *BMC Public Health*, *22*(1), 96. https://doi.org/10.1186/s12889-021-12432-x

American Medical Association (AMA). (2021a, September 15). *Can physicians decline unvaccinated patients?*. https://www.ama-assn.org/delivering-care/ethics/can-physicians-decline-unvaccinated-patients

American Medical Association (AMA). (2021b, October 6). Must physicians disclose personal health information to patients? https://www.ama-assn.org/delivering-care/ethics/must-physicians-disclose-personal-health-information-patients

Arroll, B., & Allen, E. C. F. (2015). To self-disclose or not self-disclose? A systematic review of clinical self-disclosure in primary care. *British Journal of General Practice*, *65*(638), e609–e616. https://doi.org/10.3399/bjgp15X686533

Barber, M. J., Mann, C. B., Monson, J. Q., & Patterson, K. D. (2014). Online polls and registration-based sampling: A new method for pre-election polling. *Political Analysis*, *22*(3), 321–335. https://doi.org/10.1093/pan/mpt023

Bolsen, T., & Palm, R. (2022). Politicization and COVID-19 vaccine resistance in the U.S. *Progress in Molecular Biology and Translational Science*, *188*(1), 81–100. https://doi.org/10.1016/bs.pmbts.2021.10.002

Bor, A., Jørgensen, F., & Petersen, M. B. (2023). Discriminatory attitudes against unvaccinated people during the pandemic. *Nature*, *613*(7945), 704–711. https://doi.org/10.1038/s41586-022-05607-y

Callaghan, T., Washburn, D., Goidel, K., Nuzhath, T., Spiegelman, A., Scobee, J., Moghtaderi, A., & Motta, M. (2022). Imperfect messengers? An analysis of vaccine confidence among primary care physicians. *Vaccine*, *40*(18), 2588–2603. https://doi.org/10.1016/j.vaccine.2022.03.025

Cannity, K. M. (2023). Therapist disclosure to combat COVID-19 vaccine hesitancy: A narrative review. *Journal of Behavioral Medicine*, *46*(1–2), 346–355. https://doi.org/10.1007/s10865-022-00305-6

Carrieri, V., Guthmuller, S., & Wübker, A. (2023). Trust and COVID-19 vaccine hesitancy. *Scientific Reports*, *13*(1), 9245. https://doi.org/10.1038/s41598-023-35974-z

Colgrove, J., & Samuel, S. J. (2022). Freedom, rights, and vaccine refusal: The history of an idea. *American Journal of Public Health*, *112*(2), 234–241. https://doi.org/10.2105/AJPH.2021.306504

Curtis, C., Stillman, J., Remmel, M., Pierce, J. C., Lovrich, Jr. N. P., & Adams-Curtis, L. E. (2023). Partisan polarization, historical heritage, and public health: Exploring COVID-19 outcomes. *World Medical & Health Policy*, *15*(2), 163–178. https://doi.org/10.1002/wmh3.543

Debus, M., & Tosun, J. (2021). Political ideology and vaccination willingness: Implications for policy design. *Policy Sciences*, *54*(3), 477–491. https://doi.org/10.1007/s11077-021-09428-0

Desye, B. (2022). Prevalence and determinants of COVID-19 vaccine acceptance among healthcare workers: A systematic review. *Frontiers in Public Health*, *10*, 941206. https://doi.org/10.3389/fpubh.2022.941206

DiMaggio, C., Susser, E., Frangos, S., Abramson, D., Andrews, H., Hoven, C., Ryan, M., & Li, G. (2023). The New York State COVID-19 healthcare personnel study: One-year follow-up of physicians, nurse practitioners, and physician assistants, 2020-2021. *Public Health Reports*, *138*(3), 518–525. https://doi.org/10.1177/00333549231155473

Dowd-Arrow, B., Burdette, A. M., & Smith, A. (2023). Political variations in pandemic lifestyles and COVID-19 vaccination by age cohort in the United States. *Preventive Medicine*, *172*, 107525. https://doi.org/10.1016/j.ypmed.2023.107525

Druml, C., & Czech, H. (2022). A pandemic is no private matter: The COVID-19 vaccine mandate in Austria. *The Lancet Respiratory Medicine*, *10*(4), 322–324. https://doi.org/10.1016/S2213-2600(22)00063-7

Erbiçer, E. S., Metin, A., Çetinkaya, A., & Şen, S. (2021). The relationship between fear of COVID-19 and depression, anxiety, and stress: A meta-analysis. *European Psychologist*, *26*(4), 323–333. https://doi.org/10.1027/1016-9040/a000464

Flanagan-Klygis, E. A., Sharp, L., & Frader, J. E. (2005). Dismissing the family who refuses vaccines: A study of pediatrician attitudes. *Archives of Pediatrics & Adolescent Medicine*, *159*(10), 929–934. https://doi.org/10.1001/archpedi.159.10.929

Fost, N. (2000). Patient access to information on clinicians infected with blood-borne pathogens. *Journal of the American Medical Association*, *284*(15), 1975–1976. https://doi.org/10.1001/jama.284.15.1975

Francis, J. K. R., Rodriguez, S. A., Dorsey, O., Blackwell, J. M., Balasubramanian, B. A., Kale, N., Day, P., Preston, S. M., Thompson, E. L., Pruitt, S. L., & Tiro, J. A. (2021). Provider perspectives on communication and dismissal policies with HPV vaccine hesitant parents. *Preventive Medicine Reports*, *24*, 101562. https://doi.org/10.1016/j.pmedr.2021.101562

Gadarian, S., Goodman, S., & Pepinsky, T. (2022). *Pandemic Politics: The Deadly Toll of Partisanship in the Age of COVID*. Princeton University Press.

Giubilini, A., Savulescu, J., Pugh, J., & Wilkinson, D. (2023). Vaccine mandates for healthcare workers beyond COVID-19. *Journal of Medical Ethics*, *49*(3), 211–220. https://doi.org/10.1136/medethics-2022-108229

Graso, M., Aquino, K., Chen, F. X., & Bardosh, K. (2024). Blaming the unvaccinated during the COVID-19 pandemic: The roles of political ideology and risk perceptions in the USA. *Journal of Medical Ethics*, *50*(4), 246–252. https://doi.org/10.1136/jme-2022-108825

Grimalda, G., Murtin, F., Pipke, D., Putterman, L., & Sutter, M. (2023). The politicized pandemic: Ideological polarization and the behavioral response to COVID-19. *European Economic Review*, *156*, 104472. https://doi.org/10.1016/j.euroecorev.2023.104472

Heyerdahl, L. W., Dielen, S., Dodion, H., Van Riet, C., Nguyen, T., Simas, C., Boey, L., Kattumana, T., Vandaele, N., Larson, H. J., Grietens, K. P., Giles-Vernick, T., & Gryseels, C. (2023). Strategic silences, eroded trust: The impact of divergent COVID-19 vaccine sentiments on healthcare workers' relations with peers and patients. *Vaccine*, *41*(4), 883–891. https://doi.org/10.1016/j.vaccine.2022.10.048

Huang, D., Ganti, L., Graham, E. W., Shah, D., Aleksandrovskiy, I., Al-Bassam, M., Fraunfelter, F., Falgiani, M., Leon, L., & Lopez-Ortiz, C. (2022). COVID-19 vaccine hesitancy among healthcare providers. *Health Psychology Research*, *10*(3), 34218. https://doi.org/10.52965/001c.34218

Isaksson Rø, K., Magelssen, M., Bååthe, F., Miljeteig, I., & Bringedal, B. (2022). Duty to treat and perceived risk of contagion during the COVID-19 pandemic: Norwegian physicians' perspectives and experiences—a questionnaire survey. *BMC Health Services Research*, *22*(1), 1509. https://doi.org/10.1186/s12913-022-08905-3

Johnson, S. B., & Butcher, F. (2021). Doctors during the COVID-19 pandemic: What are their duties and what is owed to them? *Journal of Medical Ethics*, *47*(1), 12–15. https://doi.org/10.1136/medethics-2020-106266

Kiviniemi, M. T., Orom, H., Hay, J. L., & Waters, E. A. (2022). Prevention is political: Political party affiliation predicts perceived risk and prevention behaviors for COVID-19. *BMC Public Health*, *22*(1), 298. https://doi.org/10.1186/s12889-022-12649-4

Klitzman, R. (2022). Needs to address clinicians' moral distress in treating unvaccinated COVID-19 patients. *BMC Medical Ethics*, *23*(1), 110. https://doi.org/10.1186/s12910-022-00859-9

Knishkowy, B., & Guggenheim, N. (2022). The ill physician who self-discloses: What do patients think? *European Journal of General Practice*, *28*(1), 244–251. https://doi.org/10.1080/13814788.2022.2146091

LaHue, S. C., Escueta, D. P., Guterman, E. L., Patel, K., Harrison, K. L., Boscardin, W. J., Douglas, V. C., & Newman, J. C. (2022). COVID-19 severity and age increase the odds of delirium in hospitalized adults with confirmed SARS-CoV-2 infection: A cohort study. *BMC Psychiatry*, *22*(1), 151. https://doi.org/10.1186/s12888-022-03809-2

Levy, I. (2022). Stress, anxiety, and depression in times of COVID-19: Gender, individual quarantine, pandemic duration and employment. *Frontiers in Public Health*, *10*, 999795. https://doi.org/10.3389/fpubh.2022.999795

Majid, U., Ahmad, M., Zain, S., Akande, A., & Ikhlaq, F. (2022). COVID-19 vaccine hesitancy and acceptance: A comprehensive scoping review of global literature. *Health Promotion International*, *37*(3), daac078. https://doi.org/10.1093/heapro/daac078

Mattila, E., Peltokoski, J., Neva, M. H., Kaunonen, M., Helminen, M., & Parkkila, A. K. (2021). COVID-19: Anxiety among hospital staff and associated factors. *Annals of Medicine*, *53*(1), 237–246. https://doi.org/10.1080/07853890.2020.1862905

McDougall, R. J., Gillam, L., Ko, D., Holmes, I., & Delany, C. (2021). Balancing health worker well-being and duty to care: An ethical approach to staff safety in COVID-19 and beyond. *Journal of Medical Ethics*, *47*, 318–323. https://doi.org/10.1136/medethics-2020-106557

Motta, M. (2021). Republicans, not democrats, are more likely to endorse anti-vaccine misinformation. *American Politics Research*, *49*(5), 428–438. https://doi.org/10.1177/1532673x211022639

Muñoz-Rubilar, C. A., Carrillos, C. P., Mundal, I. P., Cuevas, C. D., & Lara-Cabrera, M. L. (2022). The duty to care and nurses' well-being during a pandemic. *Nursing Ethics*, *29*(3), 527–539. https://doi.org/10.1177/09697330211041746

Neumayer, E., Pfaff, K. G., & Plümper, T. (2023). Protest against COVID-19 containment policies in European countries. *Journal of Peace and Research*. https://doi.org/10.1177/00223433221135335

O'Leary, S. T., Cataldi, J. R., Lindley, M. C., Beaty, B. L., Hurley, L. P., Crane, L. A., & Kempe, A. (2020). Policies among US pediatricians for dismissing patients for delaying or refusing vaccination. *Journal of the American Medical Association*, *324*(11), 1105–1107. https://doi.org/10.1001/jama.2020.10658

Ottolenghi, J., McLaren, Jr. R. A., Bahamon, C., Dalloul, M., McCalla, S., & Minkoff, H. (2021). Health care workers' attitudes toward patients with COVID-19. *Open Forum Infectious Diseases*, *8*(8), ofab375. https://doi.org/10.1093/ofid/ofab375

Park, J. K., & Davies, B. (2023). Rationing, responsibility, and vaccination during COVID-19: A conceptual map. *The American Journal of Bioethics*, 1–14. https://doi.org/10.1080/15265161.2023.2201188

Peng, Y. (2022). Politics of COVID-19 vaccine mandates: Left/right-wing authoritarianism, social dominance orientation, and libertarianism. *Personality and Individual Differences*, *194*, 111661. https://doi.org/10.1016/j.paid.2022.111661

Persad, G., & Largent, E. A. (2022). COVID-19 vaccine refusal and fair allocation of scarce medical resources. *JAMA Health Forum*, *3*(4), e220356. https://doi.org/10.1001/jamahealthforum.2022.0356

Pfaff, K. G., Plümper, T., & Neumayer, E. (2023). Polarized politics: Protest against COVID-19 containment policies in the USA. *Political Science Quarterly*, *138*(1), 23–46. https://doi.org/10.1093/psquar/qqac002

Rabin, C., & Dutra, S. (2022). Predicting engagement in behaviors to reduce the spread of COVID-19: The roles of the health belief model and political party affiliation. *Psychology, Health & Medicine*, *27*(2), 379–388. https://doi.org/10.1080/13548506.2021.1921229

Ritter, A. Z., Aronowitz, S., Leininger, L., Jones, M., Dowd, J. B., Albrecht, S., Buttenheim, A. M., Simanek, A. M., Hale, L., & Kumar, A. (2021). Dear pandemic: Nurses as key partners in fighting the COVID-19 infodemic. *Public Health Nursing*, *38*(4), 603–609. https://doi.org/10.1111/phn.12903

Rodger, D., & Blackshaw, B. P. (2022). COVID-19 vaccination should not be mandatory for health and social care workers. *The New Bioethics*, *28*(1), 27–39. https://doi.org/10.1080/20502877.2022.2025651

Shah, A., & Coiado, O. C. (2023). COVID-19 vaccine and booster hesitation around the world: A literature review. *Frontiers in Medicine*, *9*, 1054557. https://doi.org/10.3389/fmed.2022.1054557

Shaw, D. (2022). Vaccination status and intensive care unit triage: Is it fair to give unvaccinated Covid-19 patients equal priority? *Bioethics*, *36*(8), 883–890. https://doi.org/10.1111/bioe.13069

Stanley, M., Roycroft, J., Amaya, A., Dever, J. A., & Srivastav, A. (2020). The effectiveness of incentives on completion rates, data quality, and nonresponse bias in a probability-based internet panel survey. *Field Methods*, *32*(2), 159–179. https://doi.org/10.1177/1525822x20901802

StataCorp. (2021). *Stata statistical software: Release 17*.

Veiga, V. C., & Cavalcanti, A. B. (2023). Age, host response, and mortality in COVID-19. *European Respiratory Journal*, *62*(1), 2300796. https://doi.org/10.1183/13993003.00796-2023

Verger, P., Botelho-Nevers, E., Garrison, A., Gagnon, D., Gagneur, A., Gagneux-Brunon, A., & Dubé, E. (2022). Vaccine hesitancy in health-care providers in Western countries: A narrative review. *Expert Review of Vaccines*, *21*(7), 909–927. https://doi.org/10.1080/14760584.2022.2056026

Viskupič, F., Wiltse, D. L., & Badahdah, A. (2022). Reminders of existing vaccine mandates increase support for a COVID-19 vaccine mandate: Evidence from a survey experiment. *Vaccine*, *40*(51), 7483–7487. https://doi.org/10.1016/j.vaccine.2022.08.014

Wambua, J., Loedy, N., Jarvis, C. I., Wong, K. L. M., Faes, C., Grah, R., Prasse, B., Sandmann, F., Niehus, R., Johnson, H., Edmunds, W. J., Beutels, P., Hens, N., & Coletti, P. (2023). The influence of COVID-19 risk perception and vaccination status on the number of social contacts across Europe: Insights from the CoMix study. *BMC Public Health*, *23*(1), 1350. https://doi.org/10.1186/s12889-023-16252-z

Wang, B., & Ping, Y. (2022). A comparative analysis of COVID-19 vaccination certificates in 12 countries/regions around the world: Rationalising health policies for international travel and domestic social activities during the pandemic. *Health Policy*, *126*(8), 755–762. https://doi.org/10.1016/j.healthpol.2022.05.016

Wang, Y., & Liu, Y. (2022). Multilevel determinants of COVID-19 vaccination hesitancy in the United States: A rapid systematic review. *Preventive Medicine Reports*, *25*, 101673. https://doi.org/10.1016/j.pmedr.2021.101673

Williamson, H. C. (2020). Early effects of the COVID-19 pandemic on relationship satisfaction and attributions. *Psychological Science*, *31*(12), 1479–1487. https://doi.org/10.1177/0956797620972688

Wiltse, D., & Viskupič, F. (2023). Age and partisan self-identification predict uptake of additional COVID-19 booster doses: Evidence from a longitudinal study. *Preventive Medicine Reports*, *36*, 102407.

AUTHOR BIOGRAPHIES

Dr. Abdallah M. Badahdah is an associate professor of Sociology at South Dakota State University. His research focuses on the social aspects of health and illness, stigma, sleep disorders, families, and parenting.

Dr. Filip Viskupič is an assistant professor of Political Science at South Dakota State University. His research lies at the intersection of political science, public health, and psychology. Filip is interested in understanding the political determinants of health, particularly the impact of politics on people's health-related attitudes and behaviors.

Dr. David L. Wiltse is an associate professor of Political Science at South Dakota State University. His research focuses on COVID-19 mitigation attitudes, parties, elections, and campaign finance.

How to cite this article: Badahdah, A. M., Viskupič, F., & Wiltse, D. L. (2024). Attitudes toward COVID-19 vaccination status disclosure in the provider–patient relationship: Findings from a population survey. *World Medical & Health Policy*, *16*, 460–470. https://doi.org/10.1002/wmh3.613

Received: 24 October 2023 | Revised: 9 February 2024 | Accepted: 31 March 2024
DOI: 10.1002/wmh3.614

RESEARCH ARTICLE

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Optimising nutrition and consumption for better health: An analysis of noncommunicable disease strategies in the organisation for economic co-operation and development nations

K. R. Sinimole[1,2]

[1]Information Systems and Business Analytics, Rajagiri Business School, Kochi, Kerala, India

[2]Department of Business Administration, Rajagiri College of Social Sciences (Autonomous), Kochi, Kerala, India

Correspondence
K. R. Sinimole, Information Systems and Business Analytics, Rajagiri Business School, Kochi, Kerala, 682039, India.
Email: skp_radhas@yahoo.com

Abstract

The role of nutrition in promoting health and reducing the prevalence of noncommunicable diseases (NCDs) is vital, yet both inadequate and excessive food consumption can be detrimental. Moreover, excessive smoking and alcohol consumption contribute to higher mortality rates. Countries have implemented policies, strategies, and awareness campaigns to combat NCD-related deaths. Within this context, the study aims to assess the relative efficiency of Organisation for Economic Co-operation and Development (OECD) countries in preventing chronic NCDs by considering nutritional supply and smoking and alcohol consumption as inputs. It also seeks to identify countries' best policies and strategies to reduce regular NCD-related death rates, emphasizing the importance of selecting and implementing adaptive strategies locally. This study employs slack-based measurement (SBM) data envelopment analysis (SBM-DEA). The mean efficiency score across the countries is 0.95, with a standard deviation of 0.09, indicating a generally high-efficiency level. Twenty-nine countries with an efficiency score of 1 are deemed relatively efficient. Austria, Belgium, Germany, Greece, Ireland, Korea, Luxembourg, the United Kingdom, and the United States did not achieve relative efficiency in NCD management. The findings highlight the importance of considering the unique context of each country when designing and implementing NCD prevention and management strategies. The study emphasizes the need for regular evaluation and appropriate measurement methods to assess the achievement of targets and address implementation challenges. Furthermore, it highlights the significance of adopting a comprehensive, coordinated approach to ensure the effectiveness of NCD policies and underscores the need for flexibility and adaptability in addressing NCDs.

KEYWORDS

consumption, DEA, efficiency, health policy, health systems, NCD risk, nutrition, performance

Key points

The research paper emphasizes,

- The critical role of nutrition in promoting health and reducing noncommunicable diseases (NCDs), highlighting the detrimental effects of both inadequate and excessive food consumption, as well as excessive smoking and alcohol consumption, on population health outcomes.
- The necessity for regular evaluation, appropriate measurement methods, and a comprehensive, coordinated approach to address NCDs effectively, highlighting the importance of adapting NCD prevention and management strategies to the unique context of each country.
- The importance of data-driven decision-making and a comprehensive approach spanning macro and micro levels to enhance the effectiveness of NCD policies.

INTRODUCTION

Noncommunicable diseases (NCDs) are responsible for approximately two-thirds of global deaths (Renzella et al., 2018; World Health Organization, 2021) and pose a significant challenge to sustainable development (Kang et al., 2021). They are regarded as a social burden and their economic costs are escalating worldwide (Watkins et al., 2022; Zhang et al., 2023). The COVID-19 pandemic has further hindered countries' ability to respond to and address NCDs, underscoring the need to tackle major risk factors such as unhealthy diets. Despite the detrimental impact of NCDs, efforts to mitigate their spread have been insufficient. Consequently, urgent investments and policy decisions in population health, particularly in the primary prevention of chronic NCDs, are imperative. Developing healthy habits throughout life is a preventive measure crucial for advancing the Sustainable Development Goals (SDGs) for human health. In low- and low-middle-income countries (LMICs), effective measures to prevent and control NCDs require an additional investment of only US$1.27 per person per year (Ruthsatz & Candeias, 2020). By 2030, this investment is projected to save 8.2 million lives, generate US$350 billion in avoided health expenses, and improve productivity (Ruthsatz & Candeias, 2020). The World Health Organization (WHO) has documented the return on investment in each policy area, including US$12.82 from promoting healthy diets (World Health Organization, 2018). However, despite some notable efforts, the population's nutritional status and food consumption remain far from ideal regarding health promotion and disease prevention (Reyes et al., 2021). Though theoretically praised, disease prevention often faces challenges in promotion and implementation due to the perception of preventable damage as normal, lack of emotional impact due to reliance on statistics, the absence of immediate returns on preventive investments compared to treatment, and inconsistent preventive advice (Reyes et al., 2021).

The Organisation for Economic Co-operation and Development (OECD) countries have made significant efforts to prevent and control NCDs, including addressing the intake of alcohol and tobacco. These countries recognize the detrimental impact of excessive alcohol and tobacco use on public health and have implemented various policies and strategies that promote responsible alcohol consumption and tobacco control, such as imposing higher taxes on tobacco products, implementing comprehensive smoking bans, and implementing public health campaigns to raise awareness about the health risks and to reduce consumption. However, challenges remain, and ongoing efforts are needed to reduce the burden of NCDs further, ensuring that effective policies are in place to protect public health and promote healthier lifestyles. Within this context, this paper aims to assess the relative efficiency of OECD countries in preventing chronic NCDs by considering nutritional supply as inputs. It also seeks to identify countries' best policies and strategies to reduce regular NCD-related death rates, emphasising the importance of selecting and implementing adaptive strategies locally.

Dietary patterns and NCDs

Notably, nutrition plays a critical role in maintaining human health, extending the time people are free from NCDs, and improving quality of life across geographies and diverse socioeconomic groups (Benson et al., 2022). The developments in nutritional science give insights into the complex interactions between nutritional, dietary, social, behavioral, and environmental factors—and how nutrition impacts health promotion and maintenance (Ruthsatz & Candeias, 2020; Shao et al., 2021). Besides, studies have demonstrated a significant correlation between increased consumption of fruits and vegetables and a reduced risk of NCDs (Stanhope et al., 2018), and smoking, binge drinking, excessive alcohol use, and sedentary lifestyles have all been linked to worse cardiometabolic outcomes and an increased mortality risk (Afshin et al., 2019). Although some nations have increased their residents' nutritional intake, these efforts may not be adequate to generalise because it is first necessary to invest in rethinking and developing sustainable health policies (Reyes et al., 2021; Ruthsatz & Candeias, 2020). Moreover, people's dietary patterns have changed globally, and people consume more meals per day with increased quantities of packaged and processed food, foods high in sugar, salt, saturated fat, and refined carbohydrates (Marsman et al., 2018). This nutrition transition affects dietary habits and nutrient intake, influencing NCD development risk. In addition, consuming too much or too little of certain macronutrients and micronutrients can negatively impact your health and even increase your mortality risk (Barlow et al., 2016; Cerf, 2021; Kaluza et al., 2020) and can develop NCDs. Thus, people worldwide are affected by the detrimental effects of unhealthy diets, leading to major NCDs like heart disease and various types of cancer (Kaluza et al., 2020; Koyanagi et al., 2018). Moreover, there has been a sudden increase in the global production of unhealthy and unsustainable food.

Many countries have formulated dietary guidelines that offer straightforward, evidence-based advice. However, these policies are developed primarily to prevent disease or nutrient deficiencies (Shao et al., 2017). How successfully they enhance health outcomes and restrict the marketing of unhealthy foods to combat NCDs receives less focus (Charalampous et al., n.d.; Reyes et al., 2021). The effectiveness of such food policies has a variable impact. Therefore, it is paramount and challenging for countries to efficiently manage the population's supply and intake of nutritious food. Although there is a significant amount of research on the association between fruit and vegetable consumption and NCDs, there is a lack of literature examining how effectively countries manage the supply and consumption of nutrients to reduce mortality rates related to NCDs.

Similarly, the use of tobacco and alcohol are primary behavioral risk factors for NCDs globally and account for the deaths of approximately eight million people, particularly in developing countries (Sharma et al., 2020). Despite some large-scale health promotion and disease prevention initiatives to address the nutritional status and use of tobacco and alcohol among populations, the efforts remain suboptimal. Developed nations, such as Australia and New Zealand, have been at the forefront of these efforts, implementing integrated social, economic, and health policies and programs to combat tobacco and alcohol use among disadvantaged groups, particularly indigenous and low-income populations (Sharma et al., 2020). However, the efficacy of policies designed to target tobacco and alcohol use to reduce NCDs has not yet been given sufficient attention.

It is critical to comprehend the complex interplay between nutritional supply and intake, tobacco and alcohol consumption, and the growing burden of NCDs. Although several researchers have attempted to investigate the role of diets in NCDs, analysing the relative efficiency of countries in controlling mortality rates associated with NCDs is a relatively unexplored area of research. As a result, this study attempts to assess the relative efficiency of countries in controlling NCD death rates by monitoring food habits within the confines of disease prevention and the function of dietary determinants (particularly nutritional intake and consumption of cigarettes and alcohol). This study may partly contribute to a better understanding of the effects of nutritional factors on NCD death rates country-wise. Thus, this paper aims to understand how well the countries manage the supply and intake of healthy food.

As healthcare efficiency is associated with multiple inputs and outputs, data envelopment analysis (DEA), a nonparametric performance evaluation method, can help determine the potential for improvement in the supply of nutrition by identifying the highest-performing countries. Therefore, this study seeks to evaluate the relative efficiencies of countries in controlling NCD-related deaths by considering both desirable inputs (supply of nutritious foods) and undesirable inputs (tobacco and alcohol consumption) with the aid of DEA. The study contributes to the literature as there is a limited amount of literature available on studies that use DEA to analyse the efficiency of countries in managing NCDs by taking both desirable and undesirable dietary inputs into account. When selecting the methodology, researchers have carefully considered the DEA model's limitations, input and output selection, and the homogeneity assumption (Kao, 2022).

MATERIALS AND METHODS

Data

The countries in the OECD are widely recognized as global leaders in social and economic growth, and their approaches may be transferable to other settings. The OECD supports countries in achieving their NCD targets by measuring health outcomes and resource use in health systems and analysing policies to enhance access, efficiency, and quality of care. The organisation addresses critical risk factors, such as unhealthy diet, physical inactivity, and harmful alcohol and tobacco use. Additionally, the OECD provides strategic advice and policy recommendations that highlight country-specific best practices and health reviews. Thus, the OECD countries form a homogeneous group for analysing efficiency. Considering the importance of a healthy diet (Afshin et al., 2019; Barlow et al., 2016; Benson et al., 2022; Cerf, 2021; Marsman et al., 2018; Reyes et al., 2021; Ruthsatz & Candeias, 2020;

Shao et al., 2021) reduced alcohol and tobacco consumption (Prince et al., 2015; Watkin & Rosling, 2022), and the OECD's support for countries in achieving their NCD targets, this study aims to analyse the efficiency of OECD countries in controlling NCD death rates.

The research considered the age-standardized mortality rates (per 100,000 population) from WHO statistics, particularly those associated with cardiovascular diseases (CVDs) and cancer, as undesirable outputs (Kang et al., 2021; Zhang et al., 2023). Life expectancy obtained from OECD Statistics, a positive measure closely related to a healthy lifestyle and diet, is included as a desired output. The input data, the supply of vegetables, fruits, protein, fat, and sugar (Afshin et al., 2019; Barlow et al., 2016; Benson et al., 2022; Cerf, 2021; Marsman et al., 2018; Reyes et al., 2021; Ruthsatz & Candeias, 2020; Shao et al., 2021) as well as the consumption of alcohol and tobacco (Prince et al., 2015; Watkin & Rosling, 2022), were extracted from OECD statistics. The study considered data from 2017 to 2019, with the output data referring to 2020. In cases where input or output measures were absent for a particular country, that country was excluded from the analysis. Ultimately, 38 countries were included in the study.

Methodology and model formulation

Method

DEA is a method of linear programming initially introduced by Charnes et al. (1978) that can handle multiple indicators to calculate a single score, which reflects technical efficiency. Using this efficiency score, DEA enables the comparison of several systems and identifies areas for performance improvement. DEA has advantages over conventional regression-based production functions in that it can handle multiple inputs and outputs, has no prior weights, and does not make specific assumptions about functional form. Additionally, it provides individual observations rather than statistical estimates, peer evaluations, and benchmarking and can help identify best practices (Cinaroglu, 2021). DEA is one of the best methods for measuring the efficiency of social and economic entities, particularly in complex and uncertain environments such as healthcare systems (Cinaroglu, 2021). Whether to use a constant or variable return-to-scale approach is determined by the heterogeneity among the decision making units in terms of their input variables (Kim & Kang, 2014).

Additionally, since undesirable outputs are an inevitable by-product of managing health systems, choosing the model's orientation is crucial (You & Yan, 2011). Handling these outputs with care is important, as incorrect modeling can result in under- or overestimating efficiency (Halkos & Polemis, 2018). DEA models with undesirable inputs and outputs can be developed based on data transformation, but this approach can result in data loss and division by zero errors. A linear transformation can also be used to add a sizable positive scalar to the reciprocals to ensure that the transformed values are always positive, but this can lead to an increase in efficiency score even if the transformed value of the undesirable output does not reflect reality (Seiford & Zhu, 2002). You and Yan (2011) developed a ratio model that considers both desirable and undesirable outputs simultaneously. Models also can be systematically derived from a decision-theoretic generalisation of the DEA methodology proposed by Wojcik et al. (2017). To address these issues (Tone, 2002) proposed a nonradial slack-based measurement (SBM) model that incorporates all slack measures into the objective function via a scalar method (Shao et al., 2021). This approach provides more comprehensive efficiency measures by capturing the slack values of inputs and undesirable outputs and the shortfalls of desirable outputs. Thus, the SBM-DEA model can eliminate the deviation of efficiency measurement caused by the difference in radial selection, resulting in more objective and accurate efficiency estimates. Therefore, this paper adopts SBM-DEA to evaluate the relative efficiency. The “slack-based measure (SBM) of efficiency model” from “deaR” package of R language is used for the analysis.

Model formulation

To enhance the fairness of efficiency evaluation (Liu et al., 2022) extended the slack-based DEA (Tone, 2002) model to accommodate undesirable inputs and outputs. The extended model considers N countries (the decision-making units), each utilising *m* inputs and *k* outputs. Assume that {DI} and {UI} represent the set of all desirable (nutritional intake) and undesirable inputs(alcohol and tobacco consumption) and {DO} and {UO} define the set of all desirable (life expectancy) and undesirable (CVDs and cancer per 100,000) outputs respectively. The relative efficiency can be calculated by the following model (Model 1).

$$\min \rho = \frac{1 - \frac{1}{|DI| + |UO|}\left(\sum s_i^{DI}/x_{i0}^{DI} + \sum s_i^{UO}/y_{i0}^{UO}\right)}{1 + \frac{1}{|DO| + |UI|}\left(\sum s_r^{DO}/y_{r0}^{DO} + \sum s_r^{UI}/x_{r0}^{UI}\right)}$$

Subject

$$\sum_{j=1}^{n} Y_j^{DO}\lambda_j - S^{DO} = Y_0^{DO},$$

$$\sum_{j=1}^{n} Y_j^{UO}\lambda_j - S^{UO} = Y_0^{UO},$$

$$\sum_{j=1}^{n} X_j^{DI}\lambda_j + S^{DI} = X_0^{DI}$$

$$\sum_{j=1}^{n} X_j^{UI}\lambda_j - S^{UI} = X_0^{UI},$$

$$S^{DI}, S^{UI}, S^{DO}, S^{UO} \geq 0, \lambda \in S.$$

Model 1: SBM DEA Model

As per the model, a country is relatively efficient if ρ =1 (no input excess or output shortfalls in any optimal solution). The model aims to proportionally decrease the number of undesirable inputs and outputs as much as possible for a given level of desirable inputs and outputs, with optimal unified efficiency values between 0 and 1. If a country is inefficient, it has a reference set of countries, including at least one efficient country, and the efficiency score is determined relative to this reference set. For inefficient countries to become efficient, the reference group of countries should be benchmarked to reduce or increase their input or output.

RESULTS

All the desirable inputs, “fat supply,” “protein supply,” “sugar supply,” “vegetable supply,” and “fruits supply” exhibit approximately symmetric distributions, except the variable “calory supply.” Surprisingly, the undesirable input “Alcohol consumed” shows very low variability, while the undesirable input “smokers aged 15+” demonstrates considerable variability, with a high standard deviation of 4847.85. All three output variables show low variability, particularly the life expectancy variable, which shows much less variability (Table 1). The

TABLE 1 Descriptive statistics.

Parameters	Mean	Standard error	Median	Standard deviation	Minimum	Maximum
Input variables						
Fat supply grams	136.19	3.68	138.53	22.66	89.23	175.57
Calory supply kilo	3372.25	41.37	3393.33	255.03	2694	3839
Protein supply grams	103.84	2.34	105.5	14.4	69.53	144.67
Sugar supply kilo	53.33	3.89	46.47	24.01	26.03	162.13
Vegetable supply kilos	101.88	5.94	92.3	36.61	51.43	236.67
Fruits supply kilos	84.38	4.3	80.82	26.53	33.7	131.9
Alcohol consumed liters	8.6	0.43	9.22	2.64	1.37	11.77
Smokers aged 15+ per 100,000	16,835.53	786.42	17,050	4847.85	7700	28,000
Output variables						
cvd per 100,000	121.65	9.9	95.35	61.02	63.86	312.58
cancer per 100,000	112.62	3.81	111.09	23.48	38.85	162.44
life_ expectancy	81.01	0.42	81.95	2.56	75.1	84.4

mean efficiency score across the countries is 0.95 (±0.09 SD) (Table 2), indicating a generally high efficiency and adequate management level, showcasing consistency among nations' efficiency scores. Twenty-nine countries with an efficiency score of 1 are considered relatively efficient, demonstrating optimal utilisation of resources and effective management in addressing the evaluated criteria (Table 2). However, out of the nine relatively inefficient countries, except the United Kingdom, all others have an efficiency score of less than 0.9, indicating scope for improvement in managing the supply of nutritional resources and controlling the consumption of alcohol and tobacco. Luxembourg demonstrated the lowest efficiency score, showing a relatively high level of inefficiency.

The distribution of efficiency scores across all countries highlights their performance variation (Figure 1). Austria, Belgium, Germany, Greece, Ireland, Korea, Luxembourg, the United Kingdom, and the United States did not achieve relative efficiency in NCD management. The frequency of each country being utilised as a reference set for other countries indicates the number of times other countries are using the performance of this particular country as a standard for comparison, contributing significantly to defining the efficiency frontier and influencing the efficiency scores of other countries. Even though 29 countries show relative efficiency, only 14 countries are taken as benchmarks for other countries, implying the practices of these 14 countries are seen as more applicable or relevant to others (Figure 2). Japan is considered a reference point eight times, implying its consistent efficiency and effectiveness in managing NCDs.

The benchmark countries and their corresponding weights represent the reference points for evaluating the efficiency of inefficient countries and provide a comprehensive overview of how to combine the reference countries to achieve efficiency (Figure 3 and Table 3). By understanding how benchmarked countries achieve high efficiency, other nations can identify areas for enhancement and implement targeted interventions. For example, the reference set for Belgium includes Norway, Japan, the Slovak Republic, and Costa Rica, with weights of 0.38, 0.34, 0.24, and 0.04, respectively (Table 3). The weights

TABLE 2 Average efficiency scores of the countries.

Country	Average efficiency	Country	Average efficiency
Australia	1	Japan	1
Austria	0.76	Korea	0.74
Belgium	0.78	Latvia	1
Canada	1	Lithuania	1
Chile	1	Luxembourg	0.73
Colombia	1	Mexico	1
Costa Rica	1	Netherlands	1
Czech Republic	1	New Zealand	1
Denmark	1	Norway	1
Estonia	1	Poland	1
Finland	1	Portugal	1
France	1	Slovak Republic	1
Germany	0.8	Slovenia	1
Greece	0.83	Spain	1
Hungary	1	Sweden	1
Iceland	1	Switzerland	1
Ireland	0.82	Turkey	1
Israel	1	United Kingdom	0.91
Italy	1	United States	0.85
Average			0.95
Standard deviation			0.09

Source: Calculated from the data.

assigned to each country in the reference set indicate the relative importance of each country in the reference set or the contribution of each reference country to Belgium's efficiency score. Norway contributes the most to Belgium's efficiency score among the reference countries, implying that Belgium's performance is relatively closer to Norway's. Belgium's performance aligns closely (with a weight of 0.34) with Japan's. In other words, Belgium should consider a hypothetical country that combines Norway, Japan, the Slovak Republic, and Costa Rica in the specified ratio to be efficient. Thus, the benchmarking process helps inefficient countries identify the best practices, contributing to the high-efficiency scores of relatively efficient countries.

The insights derived from NCD management practices and the policy implications of relatively efficient countries can guide policymakers of inefficient countries in formulating effective strategies tailored to their respective contexts and giving a clear understanding of what constitutes efficient NCD management, facilitating informed choices in nutritional supply and strategy formulation in controlling the consumption of alcohol and tobacco. Therefore, examining the best practices and factors contributing to efficient countries' efficiency frontier is essential.

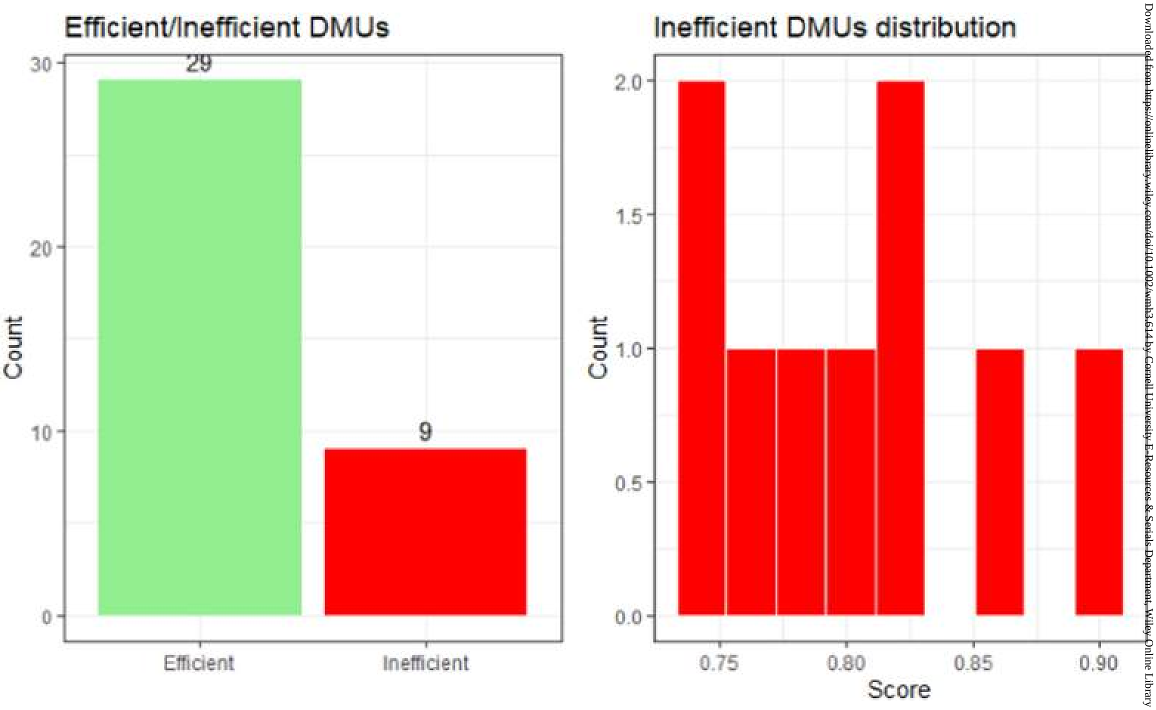


FIGURE 1 Distribution of efficient and inefficient countries.

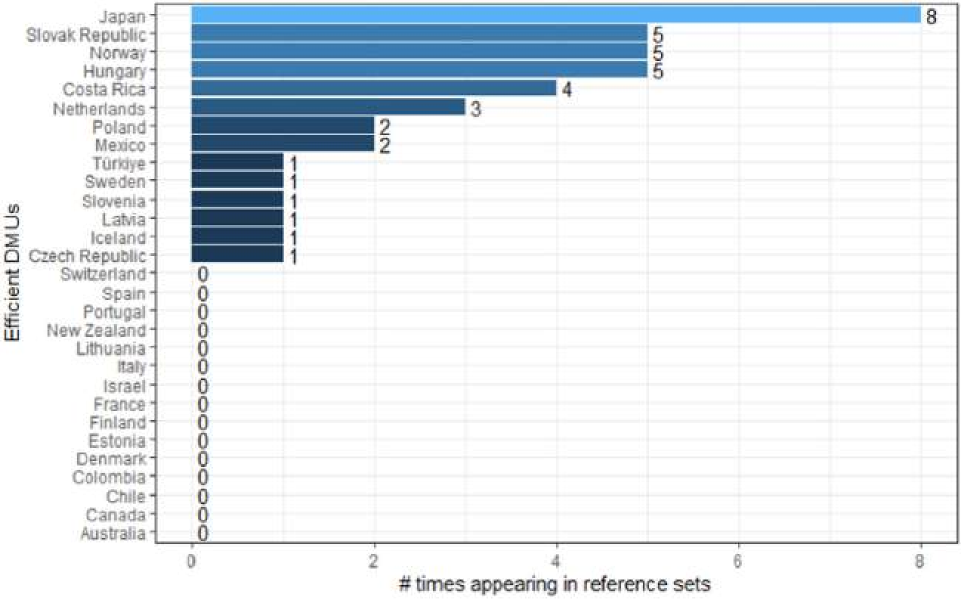


FIGURE 2 Frequency distribution of reference set (countries).

Japan is a benchmarked country for eight countries in the reference list (Figures 2 and 3). Japan, a relatively efficient country, exhibits the highest life expectancy across OECD countries (Ikeda et al., 2011). Although smoking and alcohol consumption in Japan is close to the OECD average, the country has achieved the lowest overweight/obesity rate

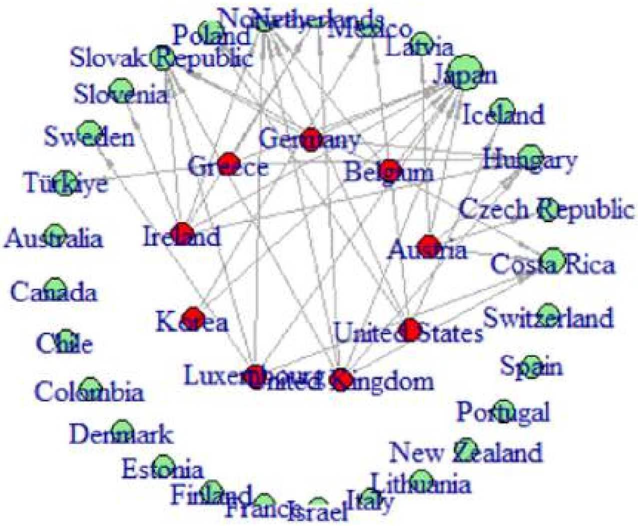


FIGURE 3 Countries and their benchmarks.

among OECD nations. Effective population-based interventions, including salt reduction campaigns and increased access to antihypertensive drugs covered by the health insurance system, have successfully controlled blood pressure and reduced CVD mortality in Japan (Ikeda et al., 2011). The Japanese diet pattern and specific policy measures have helped the country reach the efficiency frontier. Some key factors contributing to Japan's health outcomes and healthcare efficiency are a healthy diet, salt reduction campaigns, access to antihypertensive drugs, and a focus on prevention.

Norway, the next frequently benchmarked country, has an exemplary healthcare efficiency model (Janowska-Miasik et al., 2021). Smoking rates and alcohol use are lower than in the EU overall. The country has implemented comprehensive tobacco control policies, such as increased tobacco prices, plain packaging, and a ban on visible tobacco product displays. Furthermore, Norway has successfully implemented policies to regulate alcohol consumption, including high costs, restricted sales hours, a state-owned monopoly chain of liquor stores, and bans on alcohol advertising and happy hours in bars and restaurants. The cancer strategy for 2018–22 in Norway focuses on improving the quality of life for cancer patients, enhancing prevention measures, and increasing treatment capacity (Janowska-Miasik et al., 2021). Learning from Norway, less efficient countries can implement initiatives like the Norwegian Directorate of Health's dietary guidelines to promote positive and sustainable development by mobilizing children as change agents in promoting healthy diets. Norway's exemplary healthcare efficiency model and success in managing NCDs can be attributed to a combination of several factors and well-implemented policies like a strong focus on prevention, comprehensive tobacco control policies, effective alcohol regulation, focus on cancer prevention and treatment, health education and promotion, integrated healthcare approach, and holistic approach to health.

Costa Rica performed better than the OECD average on 75% of Health status indicators (OECD and the European Observatory on Health Systems and Policies, 2021). The prevalence of smoking and alcohol consumption in Costa Rica is lower than the OECD average. Despite spending less than the OECD average on health, Costa Rica has consistently prioritized public health, making substantial investments in preventing the most easily avoidable causes of death and disability. Notably, the country employs mass media effectively in antitobacco campaigns. The government has well-implemented policies that

TABLE 3 Inefficient countries, along with their reference set and weights.

Inefficient countries with reference set and weights						
Austria	**Japan (0.632)**	**Latvia (0.12)**	**Costa Rica (0.10)**	**Hungary (0.08)**	**Czech Republic (0.07)**	
Belgium	Norway (0.38)	Japan (0.34)	Slovak Republic (0.24)	Costa Rica (0.04)		
Germany	Japan (0.72)	Slovak Republic (0.15)	Hungary (0.12)	Poland (0.02)		
Greece	Japan (0.54)	Türkiye (0.23)	Hungary (0.15)	Netherlands (0.08)		
Ireland	Japan (0.41)	Slovenia (0.23)	Norway (0.18)	Netherlands (0.12)	Hungary (0.03)	Slovak Republic (0.03)
Korea	Japan (0.97)	Mexico (0.03)				
Luxembourg	Japan (0.48)	Sweden (0.25)	Slovak Republic (0.19)	Norway (0.07)	Costa Rica (0.006)	
United Kingdom	Japan (0.41)	Netherlands (0.38)	Norway (0.08)	Slovak Republic (0.06)	Costa Rica (0.03)	Hungary (0.03)
United States	Mexico (0.33)	Norway (0.24)	Iceland (0.22)	Poland (0.20)		

prohibit tobacco advertising, promotion, and sponsorship, ensuring smoke-free environments in workplaces, restaurants, and public transportation areas. Likewise, the legislation mandates graphic health warnings on both sides of cigarette packages, with rigorous enforcement measures, including an increased number of inspectors to prevent violations.

Likewise, in the case of the Netherlands, both smoking and obesity rates are below the EU averages. The Netherlands spends more per capita on health than the EU average, with a considerable share dedicated to long-term care (OECD and the European Observatory on Health Systems and Policies, 2021). The country has well-established policies to ensure smoke-free workplaces and public spaces. The Dutch health system is structured around three distinct coverage schemes: a social health insurance (SHI) system for curative care, a single-payer social insurance system for long-term care, and a tax-funded social care scheme implemented by the municipalities.

Meanwhile, Sweden, another relatively efficient country, lacks an overall strategy for NCDs but has strategies and action plans for working with alcohol, tobacco, and eating habits (Iskrov et al., 2022). Sweden has the highest healthy life years at birth compared to other EU member states. These efficient countries provide valuable insights into best practices that can be emulated by less efficient nations, facilitating improvements in their efficiency scores and overall healthcare systems (Ikeda et al., 2011; Iskrov et al., 2022; Janowska-Miasik et al., 2021).

Switzerland is another relatively efficient country, having implemented the most elaborate and structured national strategy for preventing NCDs compared to other countries, according to a comparison of national systems (Iskrov et al., 2022). Switzerland's NCD strategy focuses on population-related health promotion and prevention. The plan's implementation is well-defined, and the country has a detailed monitoring and evaluation system, with an interim evaluation report and annual reports already published. The factors contributing to Switzerland's healthcare efficiency and success in preventing NCDs are comprehensive national NCD Strategies, well-defined implementation plans, monitoring and evaluation systems, interim and annual reports, and health promotion and prevention focus.

In summary, the efficient countries employ multilayered strategies including (1) advocacy for healthy diets through initiatives like salt reduction campaigns, empowering children as advocates for healthy eating and widespread health education, (2) facilitating access to antihypertensive drugs under comprehensive health insurance, (3) implementing robust tobacco control measures encompassing increased prices, plain packaging, advertising bans, smoke-free environments, graphic health warnings, and vigilant enforcement, (4) regulating alcohol consumption via measures such as cost elevation, restricted sales hours, a government-owned liquor retail chain, and prohibitions on alcohol advertising and promotional activities, and (5) adopting a proactive cancer strategy that bolsters prevention efforts and augments treatment capabilities.

Analysing the NCD-related practices of relatively inefficient countries is essential to understand the reasons for their inefficiency. Luxembourg, the least efficient country, ranks the third highest within the European Union (World Health Organization, 2021) concerning binge drinking behavior at nearly 33%, which is disquieting. Although initiatives such as public awareness campaigns under the Anti-Tobacco Plan 2016-20, increasing the legal age for tobacco purchases in 2017, and higher taxes on tobacco to discourage consumption have been introduced, the impact on preventable mortality may require more time to manifest fully. Furthermore, Luxembourg's fruit and vegetable consumption is lower than many other EU countries. Strengthening existing initiatives and implementing strategies for healthier lifestyles, increased fruit and vegetable consumption, and reduced tobacco and alcohol harm can enhance NCD management efficiency and alleviate the disease burden on the population.

In South Korea, the reported health status is low compared to other OECD countries, with only one-third of the population reporting good or very good health. NCDs were found to be significantly associated with over 60% of deaths in 2017 (Jeong et al., 2021). Tobacco and alcohol consumption among Korean males is notably higher compared to other OECD countries. Korea's lack of emphasis on prevention and focus on treating illnesses rather than monitoring and preventing NCDs may contribute to inefficiency in NCD management. Shifting towards proactive measures targeting behavioral risk factors like tobacco and alcohol consumption could reduce the burden of NCDs and improve healthcare system efficiency.

Around 40% of all deaths in Austria in 2019 were caused by behavioral risk factors such as tobacco smoking, dietary risks, alcohol consumption, and low physical activity. The country's tobacco consumption is high, and alcohol consumption is the second highest in the EU. The measures to discourage smoking, like the prohibition of tobacco within restaurants, were implemented relatively late, only in 2019. Austria primarily allocates its health budget (third-highest in the EU) to hospital inpatient care, with comparatively lower spending on prevention measures. Moreover, there are inequalities in life expectancy based on gender and socioeconomic status. Low consumption of fruits and vegetables, high consumption of sweet beverages and alcohol, and rising e-cigarette use contribute to inefficiency in Belgium. In 2019, Belgium allocated a higher % of its GDP to health expenditure (10.7%), surpassing the EU average of 9.9%. However, the absence of a national NCD prevention and monitoring plan impedes further progress.

Despite high health spending (28% more than the EU average in 2019), Germany exhibits lower self-reported health and persistent concerns regarding unhealthy diets, tobacco use, and poor nutrition (World Health Organization, 2021). Delayed implementation of antismoking measures (banning tobacco advertising on billboards and cinemas in 2020), increasing e-cigarette use, and prevalent binge drinking contributes to inefficiency (OECD and the European Observatory on Health Systems and Policies, 2021). The full implementation of planned health promotion and prevention measures is yet to be realized. Exceptionally high levels of alcohol consumption significantly impact mortality rates in Ireland. Even though the Public Health Alcohol Act has been implemented to address alcohol consumption, ongoing efforts are necessary to control heavy drinking. Greece faces challenges related to tobacco consumption, e-cigarette usage, and lower health spending. The impact of the economic crisis adds to the inefficiency. Addressing unhealthy behaviors and ensuring economic stability are essential for improving NCD management.

In summary, inefficient countries exhibit common concerns related to unhealthy diets, low consumption of fruits and vegetables, tobacco consumption, e-cigarette usage, high consumption of sweet beverages and alcohol, lack of emphasis on prevention, socioeconomic factors, and delayed or ineffective policy implementation.

DISCUSSION

The analysis reveals that a majority of the benchmarked countries (such as Japan, Norway, Costa Rica, Netherlands, and Sweden) have implemented measures to control NCDs, including promoting healthy diets, controlling the consumption of tobacco and alcohol, and facilitating access to life-saving drugs. However, successful NCD prevention and management policy implementation should be people-oriented and supported by the community (Briggs et al., 2019). Therefore, countries must carefully select and implement adaptive interventions considering their local context to reduce NCDs further. The findings also show variations in the efficiency scores (0.95 [±0.09 SD]) among countries and prompt us to delve into country-specific factors that may contribute to the inefficiency observed. In countries like Luxembourg, South Korea, and Ireland, the consumption of tobacco and alcohol is very high. In Austria, behavioral risk factors majorly contribute to inefficiency.

Unhealthy diets contribute to inefficiency in Belgium and Germany. Differences in efficiency scores could indicate potential differences in their healthcare systems and NCD management strategies. Possible reasons for the lower efficiency include differences in the in access and utilisation of preventive healthcare services, the effectiveness of public health campaigns, variations in healthcare funding, differing policy implementation regarding tobacco and alcohol consumption, and the influence of cultural and socioeconomic factors (Bennett et al., 2018; Lencucha & Thow, 2019; Nugent et al., 2018; World Health Organization, 2021) All these reasons highlight the importance of considering the unique context of each country (Jakovljevic et al., 2019).

Moreover, examining health policies in countries with high healthcare efficiency underscores the necessity for diverse and context-specific strategies to effectively address NCDs (Brink et al., 2019; Dekker et al., 2017; Sirdey et al., 2023). For example, the Health Council of the Netherlands (HCNL) derived dietary guidelines based on comprehensive research on the relationship between nutrients, foods, dietary patterns, and the risk of major chronic diseases in the Netherlands (Dekker et al., 2017). By understanding the country-specific factors (socioeconomic, cultural, political, and health factors) (Briggs et al., 2019), policymakers and healthcare professionals can develop tailored interventions and strategies that address each country's unique needs and circumstances, aiming to improve their efficiency and ultimately reduce the burden of NCDs on their populations.

The traditional understanding of nutrition and food safety often overlooks broader structural issues and determinants (Calderon Farfan et al., 2023). Likewise, replacing traditional, healthier, and fiber-rich foods with unhealthy processed foods has increased NCDs globally (Budreviciute et al., 2020). Therefore, countries should enhance nutritional food availability and accessibility, supporting local agriculture and ensuring food security (Quisumbing et al., 2023). Furthermore, the link between poor health and low income leads to food poverty, where individuals resort to purchasing cheaper, unhealthy products and may experience costly treatments and psychosocial issues (Budreviciute et al., 2020; Jakovljevic et al., 2019). However, funding NCDs remains challenging, as donors are not convinced of the cost-effectiveness of interventions (Budreviciute et al., 2020). Countries also face inadequate progress towards SDG 3.4, which aims to reduce premature mortality from NCDs by a third by 2030. Therefore, bold policies, political guidance at the national level, and enhanced international collaborations are imperative to tackle the situation.

In summary, it's essential to recognize that each country's healthcare efficiency is influenced by its unique context, resources, food habits, and societal priorities. Further, the study reveals variations in national procedures and guidelines for NCD prevention and management among different countries. The above factors are general trends observed but may manifest differently in each nation's healthcare system. Thus, the study emphasizes the need for evidence-based, context-specific, and coordinated policies considering the impact of social, political, and economic systems alongside individual behavior and lifestyle to combat NCDs effectively. Therefore, a holistic approach is needed to address interrelated challenges and factors at personal and societal levels.

CONCLUSION

It's important to note that inefficiency in managing NCDs is a complex issue influenced by multiple factors, including country-specific challenges. Learning from successful strategies implemented in efficient countries and focusing on evidence-based policies and data-driven decision-making can help address inefficiencies in NCD management effectively. This research contributes to the understanding of NCD efficiency by examining the nutritional intakes and policies and strategies implemented by various countries to ensure food security and nutritional food supply. Even though most countries have taken the World Health Organization guidelines (implementing a low-cost and effective method for prevention and management) for NCDs seriously, the findings highlight the importance of considering the unique context of each country when designing and implementing NCD prevention and management strategies. The study emphasizes the need for regular evaluation and appropriate measurement methods to assess the achievement of targets and address implementation challenges.

Furthermore, it highlights the significance of adopting a comprehensive, coordinated approach from macro to micro levels to ensure the effectiveness of NCD policies. By shedding light on the diversity of national strategies and policies, this research underscores the need for flexibility and adaptability in addressing NCDs. However, it is essential to note that the study has limitations, such as excluding socioeconomic, environmental, and political factors. Future research should consider these factors to comprehensively assess relative efficiency in NCD prevention and management. Overall, this research contributes to the ongoing efforts to combat NCDs and offers valuable insights for policymakers and healthcare stakeholders aiming to improve the efficiency of NCD-related interventions.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

DATA AVAILABILITY STATEMENT

Data will be made available on request.

ETHICS STATEMENT

The authors have nothing to report.

ORCID

K. R. Sinimole https://orcid.org/0000-0003-1702-8491

REFERENCES

Afshin, A., Sur, P. J., Fay, K. A., Cornaby, L., Ferrara, G., & and a further 127 GBD 2017 Diet Collaborators. (2019). Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*, *393*(10184), 1958–1972.

Barlow, P., Reeves, A., McKee, M., Galea, G., & Stuckler, D. (2016). Unhealthy diets, obesity and time discounting: a systematic literature review and network analysis. *Obesity Reviews*, *17*(9), 810–819. https://doi.org/10.1111/obr.12431

Bennett, J. E., Stevens, G. A., Mathers, C. D., Bonita, R., Rehm, J., Kruk, M. E., Riley, L. M., Dain, K., Kengne, A. P., Chalkidou, K., Beagley, J., Kishore, S. P., Chen, W., Saxena, S., Bettcher, D. W., Grove, J. T., Beaglehole, R., & Ezzati, M. (2018). NCD countdown 2030: Worldwide trends in non-communicable disease mortality and progress towards sustainable development goal target 3.4. *The Lancet*, *392*(10152), 1072–1088. https://doi.org/10.1016/S0140-6736(18)31992-5

Benson, T., Bucher, T., Oughton, R., McCloat, A., Mooney, E., Farrell, S., & Dean, M. (2022). The effects of nutrition and health claims on the nutrient composition of single and subsequent meal servings. *Appetite*, *176*, 106105. https://doi.org/10.1016/J.APPET.2022.106105

Briggs, A. M., Persaud, J. G., Deverell, M. L., Bunzli, S., Tampin, B., Sumi, Y., Amundsen, O., Houlding, E. M., Cardone, A., Hugosdottir, T., Rogers, S., Pozsgai, M., & Slater, H. (2019). Integrated prevention and management of non-communicable diseases, including musculoskeletal health: A systematic policy analysis among OECD countries. *BMJ Global Health*, *4*(5), e001806. https://doi.org/10.1136/bmjgh-2019-001806

Brink, E., van Rossum, C., Postma-Smeets, A., Stafleu, A., Wolvers, D., van Dooren, C., Toxopeus, I., Buurma-Rethans, E., Geurts, M., & Ocké, M. (2019). Development of healthy and sustainable food-based dietary guidelines for the Netherlands. *Public Health Nutrition*, *22*(13), 2419–2435. https://doi.org/10.1017/S1368980019001435

Budreviciute, A., Damiati, S., Sabir, D. K., Onder, K., Schuller-Goetzburg, P., Plakys, G., Katileviciute, A., Khoja, S., & Kodzius, R. (2020). Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Frontiers in Public Health*, *8*, 574111. https://doi.org/10.3389/fpubh.2020.574111

Calderon Farfan, J. C., Rosero Medina, D. F., Acevedo Ninco, Y., Cristancho Marulanda, S., & Arias Torres, D. (2023). Food sovereignty and autonomy for indigenous health as resistance to food globalization: Scoping review. *Global Food Security*, *37*, 100682. https://doi.org/10.1016/J.GFS.2023.100682

Cerf, M. E. (2021). Healthy lifestyles and non-communicable diseases: Nutrition, the life-course, and health promotion. *Lifestyle Medicine*, *2*(2), e31. https://doi.org/10.1002/lim2.31

Charalampous, P., Gorasso, V., Plass, D., Pires, S. M., von der Lippe, E., Mereke, A., Idavain, J., Kissimova-Skarbek, K., Nazar Morgado, J., Henry Ngwa, C., Noguer, I., Padron-Monedero, A., ıa Jos Santi-Cano, M., Sarmiento, R., Devleesschauwer, B., & Haagsma, J. A. (n.d.). Burden of non-communicable disease studies in Europe: A systematic review of data sources and methodological choices. *European Journal of Public Health*, *32*(2), 289–296. https://doi.org/10.1093/eurpub/ckab218

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, *2*(6), 429–444. https://doi.org/10.1016/0377-2217(78)90138-8

Cinaroglu, S. (2021). Efficiency in health services based on professionals consensus quality indicators. *International Journal of Healthcare Management*, *14*, 993–1001.

Dekker, L. H., Rijnks, R. H., Strijker, D., & Navis, G. J. (2017). A spatial analysis of dietary patterns in a large representative population in the north of The Netherlands—The lifelines cohort study. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 166. https://doi.org/10.1186/s12966-017-0622-8

Halkos, G., & Polemis, M. (2018). The impact of economic growth on environmental efficiency of the electricity sector: A hybrid window DEA methodology for the USA. *Journal of Environmental Management*, *211*, 334–346.

Ikeda, N., Saito, E., Kondo, N., Inoue, M., Ikeda, S., Satoh, T., Wada, K., Stickley, A., Katanoda, K., Mizoue, T., Noda, M., Iso, H., Fujino, Y., Sobue, T., Tsugane, S., Naghavi, M., Ezzati, M., & Shibuya, K. (2011). What has made the population of Japan healthy? *The Lancet*, *378*, 1094–1105. https://doi.org/10.1016/S0140-6736(11)61055-6

Iskrov, G., Puska, P., Gassner, L., Zechmeister-Koss, I., & Reinsperger, I. (2022). National strategies for preventing and managing non-communicable diseases in selected countries. *Frontiers in Public Health*, *10*, 838051. https://doi.org/10.3389/fpubh.2022.838051

Jakovljevic, M., Jakab, M., Gerdtham, U., Mcdaid, D., Ogura, S., Varavikova, E., Merrick, J., Adany, R., Okunade, A., & Getzen, T. E. (2019). Comparative financing analysis and political economy of non-communicable diseases. *Journal of Medical Economics*, *22*, 722–727. https://doi.org/10.1080/13696998.2019.1600523

Janowska-Miasik, E., Waśkiewicz, A., Witkowska, A. M., Drygas, W., Markhus, M. W., Zujko, M. E., & Kjellevold, M. (2021). Diet quality in the population of Norway and Poland: Differences in the availability and consumption of food considering national nutrition guidelines and food market. *BMC Public Health*, *21*, 319. https://doi.org/10.1186/s12889-021-10361-3

Jeong, N. J., Park, E., & Del Pobil, A. P. (2021). Effects of behavioral risk factors and social-environmental factors on non-communicable diseases in South Korea: A national survey approach. *International Journal of Environmental Research and Public Health*, *18*, 612. https://doi.org/10.3390/ijerph18020612

Kaluza, A. J., Diana Boer, D., Buengeler, C., & Dick, R. (2020). Leadership behaviour and leader self-reported well-being: A review, integration and meta-analytic examination. *Work & Stress*, *34*, 34–56.

Kang, S., Kang, M., & Lim, H. (2021). Global and regional patterns in non-communicable diseases and dietary factors across national income levels. *Nutrients*, *13*(10), 3595. https://doi.org/10.3390/nu13103595

Kao, C. (2022). A maximum slacks-based measure of efficiency for closed series production systems. *Omega*, *106*, 102525. https://doi.org/10.1016/j.omega.2021.102525

Kim, Y., & Kang, M. (2014). The measurement of health care system efficiency: Cross-country comparison by geographical region. *The Korean Journal of Policy Studies*, *29*(1), 21–44.

Koyanagi, A., Stubbs, B., & Vancampfort, D. (2018). Correlates of sedentary behavior in the general population: A cross-sectional study using nationally representative data from six low- and middle-income countries. *PLoS One*, *13*, e0202222. https://doi.org/10.1371/journal.pone.0202222

Lencucha, R., & Thow, A. M. (2019). How neoliberalism is shaping the supply of unhealthy commodities and what this means for NCD prevention. *International Journal of Health Policy and Management*, *8*(9), 514–520. https://doi.org/10.15171/ijhpm.2019.56

Liu, Z., Yun, S., Sun, M., Dang, J., Zhang, Y., Wang, Y., Dang, C., Deng, Y., & Qiao, D. (2022). Constructing MoS2@Co1.11Te2/Co-NCD with Te nanorods for efficient hydrogen evolution reaction and triiodide reduction. *Materials Today Nano*, *20*, 100274. https://doi.org/10.1016/j.mtnano.2022.100274

Marsman, D., Belsky, D. W., Gregori, D., Johnson, M. A., Low Dog, T., Meydani, S., Pigat, S., Sadana, R., Shao, A., & Griffiths, J. C. (2018). Healthy ageing: The natural consequences of good nutrition—A conference report. *European Journal of Nutrition*, *57*(2), 15–34. https://doi.org/10.1007/s00394-018-1723-0

Nugent, R., Bertram, M. Y., Jan, S., Niessen, L. W., Sassi, F., Jamison, D. T., Pier, E. G., & Beaglehole, R. (2018). Investing in non-communicable disease prevention and management to advance the sustainable development goals. *The Lancet*, *391*(10134), 2029–2035. https://doi.org/10.1016/S0140-6736(18)30667-6

OECD and the European Observatory on Health Systems and Policies. (2021). *State of Health in the EU The Country Health Profile series*. OECD Publishing. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiVoMeYv6P9AhXBTXwKHcA8CBgQFnoECBMQAQ&url=https%3A%2F%2Feurohealthobservatory.who.int%2Fdocs%2Flibrariesprovider3%2Fcountry-health-profiles%2Fchp2021pdf%2Fgermany-countryhealthprofile2021.pdf%3Fsfvrsn%3D1abf97cd_5%26download%3Dtrue&usg=AOvVaw1DDrk4ORd_BO9t2qdC3xDi

Prince, M. J., Wu, F., Guo, Y., Gutierrez Robledo, L. M., O'Donnell, M., Sullivan, R., & Yusuf, S. (2015). The burden of disease in older people and implications for health policy and practice. *The Lancet*, *385*(9967), 549–562. https://doi.org/10.1016/S0140-6736(14)61347-7

Quisumbing, A., Gerli, B., Faas, S., Heckert, J., Malapit, H., McCarron, C., Meinzen-Dick, R., & Paz, F. (2023). Assessing multicountry programs through a "Reach, Benefit, Empower, Transform" lens. *Global Food Security*, *37*, 100685. https://doi.org/10.1016/j.gfs.2023.100685

Renzella, J., Townsend, N., Jewell, J., Breda, J., Roberts, N., Rayner, M., & Wickramasinghe, K. (2018). What national and subnational interventions and policies based on Mediterranean and Nordic diets are recommended or implemented in the WHO European Region, and is there evidence of effectiveness in reducing non-communicable diseases? *(Issue 58)*. World Health Organisation.

Reyes, L. I., Constantinides, S. V., Bhandari, S., Frongillo, E. A., Schreinemachers, P., Wertheim-Heck, S., Walls, H., Holdsworth, M., Laar, A., Nguyen, T., Turner, C., Wellard, K., & Blake, C. E. (2021). Actions in global nutrition initiatives to promote sustainable healthy diets. *Global Food Security*, *31*, 100585. https://doi.org/10.1016/j.gfs.2021.100585

Ruthsatz, M., & Candeias, V. (2020). Non-communicable disease prevention, nutrition and aging. *Acta Bio-Medica: Atenei Parmensis*, *91*(2), 379–388. https://doi.org/10.23750/abm.v91i2.9721

Seiford, L. M., & Zhu, J. (2002). Modeling undesirable factors in efficiency evaluation. *European Journal of Operational Research*, *142*(1), 16–20.

Shao, A., Drewnowski, A., Willcox, D. C., Krämer, L., Lausted, C., Eggersdorfer, M., Mathers, J., Bell, J. D., Randolph, R. K., Witkamp, R., & Griffiths, J. C. (2017). Optimal nutrition and the ever-changing dietary landscape: A conference report. *European Journal of Nutrition*, *56*, 1–21. https://doi.org/10.1007/s00394-017-1460-9

Shao, Q., Yuan Id, J., Lin, J., Huang, W., Ma, J., & Ding, H. (2021). A SBM-DEA-based performance evaluation and optimisation for social organisations participating in community and home-based elderly care services. *PLoS One*, *16*, e0248474. https://doi.org/10.1371/journal.pone.0248474

Sharma, S. R., Matheson, A., Lambrick, D., Faulkner, J., Lounsbury, D. W., Vaidya, A., & Page, R. (2020). The role of tobacco and alcohol use in the interaction of social determinants of non-communicable diseases in Nepal: A systems perspective. *BMC Public Health*, *20*(1), 1368. https://doi.org/10.1186/s12889-020-09446-2

Sirdey, N., David-Benz, H., & Deshons, A. (2023). Methodological approaches to assess food systems sustainability: A literature review. *Global Food Security*, *38*, 100696. https://doi.org/10.1016/J.GFS.2023.100696

Stanhope, K. L., Goran, M. I., Bosy-Westphal, A., King, J. C., Schmidt, L. A., Schwarz, J.-M., Stice, E., Sylvetsky, A. C., Turnbaugh, P. J., Bray, G. A., Gardner, C. D., Havel, P. J., Malik, V., Mason, A. E., Ravussin, E., Rosenbaum, M., Welsh, J. A., Allister-Price, C., Sigala, D. M., & Krauss, R. M. (2018). *Obesity Comorbidity/Etiology and Pathophysiology Pathways and mechanisms linking dietary components to cardiometabolic disease: Thinking beyond calories*. https://doi.org/10.1111/obr.12699

Tone, K. (2002). A slacks-based measure of super-efficiency in data envelopment analysis. *European Journal of Operational Research*, *143*(1), 32–41. https://doi.org/10.1016/S0377-2217(01)00324-1

Watkin, D., & Rosling, H. (2022). NCD countdown 2030: Efficient pathways and strategic investments to accelerate progress towards the sustainable development goal target 3.4 in low-income and middle-income countries NCD countdown 2030 collaborators*. *Lancet*, *399*, 1266–1279.

Watkins, D. A., Msemburi, W. T., Pickersgill, S. J., Kawakatsu, Y., Gheorghe, A., Dain, K., Johansson, K. A., Said, S., Renshaw, N., Tolla, M. T., Twea, P. D., Varghese, C., Chalkidou, K., Ezzati, M., & Norheim, O. F. (2022). NCD countdown 2030: Efficient pathways and strategic investments to accelerate progress towards the sustainable development goal target 3.4 in low-income and middle-income countries. *The Lancet*, *399*(10331), 1266–1278. https://doi.org/10.1016/S0140-6736(21)02347-3

Wojcik, V., Dyckhoff, H., & Gutgesell, S. (2017). The desirable input of undesirable factors in data envelopment analysis. *Annals of Operations Research*, *259*, 461–484.

World Health Organization. (2018). *Time to deliver: Report of the WHO independent high-level commission on non-communicable diseases*. World Health Organization. https://apps.who.int/iris/handle/10665/272710

World Health Organization. (2021). *World health statistics 2021: Monitoring health for the SDGs, sustainable development goals*. World Health Organization. https://apps.who.int/iris/bitstream/handle/10665/342703/9789240027053-eng.pdf

You, S., & Yan, H. (2011). A new approach in modelling undesirable output in DEA model. *Journal of the Operational Research Society*, *62*(12), 2146–2156.

Zhang, X., Pan, T., & McPake, B. (2023). Re‐examining the reversal hypothesis: A nationwide population‐based study of the association between socio‐economic status, and NCDs and risk factors in China. *SSM Population Health*, *21*, 101335. https://doi.org/10.1016/j.ssmph.2022.101335

AUTHOR BIOGRAPHY

K. R. Sinimole is an associate professor of Information Systems and Business Analytics at Rajagiri Business School in Kochi, Kerala, India. She earned her PhD in management from the Tata Institute of Social Sciences in Mumbai. Her research focuses on business analytics, organizational performance, and efficiency. In addition to her research pursuits, she is passionate about teaching subjects like Business Analytics, Operations Research, and Business Statistics.

How to cite this article: Sinimole, K. R. (2024). Optimising nutrition and consumption for better health: An analysis of noncommunicable disease strategies in the organisation for economic co‐operation and development nations. *World Medical & Health Policy*, *16*, 471–488. https://doi.org/10.1002/wmh3.614

Received: 28 September 2023 | Revised: 26 January 2024 | Accepted: 13 March 2024

DOI: 10.1002/wmh3.608

RESEARCH ARTICLE

Beyond bias: Aggregate approaches to conflicts of interest research and policy in biomedical research

S. Scott Graham[1] | **Kimberlyn R. Harrison**[2] | **Jade C. Shiva Edward**[2] | **Zoltan P. Majdik**[3] | **Joshua B. Barbour**[4] | **Justin F. Rousseau**[5,6]

[1]Department of Rhetoric and Writing, Center for Health Communication, The University of Texas at Austin, Austin, Texas, USA

[2]Department of English, The University of Texas at Austin, Austin, Texas, USA

[3]Department of Communication, North Dakota State University, Fargo, North Dakota, USA

[4]Department of Communication, The University of Illinois Urbana-Champaign, Champaign, Illinois, USA

[5]Statistical Planning and Analysis Section, Department of Neurology, University of Texas Southwestern Medical Center, Dallas, Texas, USA

[6]Peter O'Donnell Jr. Brain Institute, University of Texas Southwestern Medical Center, Dallas, Texas, USA

Correspondence

S. Scott Graham, Department of Rhetoric and Writing, Center for Health Communication, The University of Texas at Austin, 208 W. 21st St, STOP B5500, Parlin Hall, Room 3, Austin, TX 78712, USA.
Email: ssg@utexas.edu

Funding information

National Institute of General Medical Sciences, Grant/Award Number: R01GM141476

Abstract

Considerable efforts have been devoted to addressing the problem of conflicts of interest (COI) in health research, policy, education, and practice. An overwhelming body of evidence demonstrates that conflicts associate with deleterious outcomes for the biomedical research enterprise. Nevertheless, little has changed for research, specifically, since the Institute of Medicine's landmark *Conflicts of Interest in Medical Research, Practice, and Education* was published over a decade ago. In this article, we draw on interdisciplinary research on manufactured controversies in science-policy deliberation to argue that the development of meaningful COI policy has been stymied through argumentative "wedges" designed to delay consensus and policy formation. Argumentative wedges disrupt policy formation by mischaracterizing the evidence base, continuously redefining the terms of the debate and/or recommending overly narrow criteria for who should be allowed to participate in policy deliberation. In this article, we argue researchers and policymakers interested in better addressing the harmful effects of COI can improve their efforts through strategic efforts designed to disrupt the wedges of manufactured controversy. Additionally, we argue that efforts to address COI can be further enhanced through embracing a broader framework for COI inquiry. Specifically, we argue that aggregate approaches to COI can help to disrupt these wedges and provide a strong foundation for future policy.

KEYWORDS

biomedical research, conflict of interest, health policy, pharmaceutical industry, regulatory issues, research ethics

Key points

- The development of meaningful conflicts of interest (COI) policy has been slowed through argumentative "wedges" that delay consensus and policy formation.
- These wedges continuously re-define COI, re-establish the facts about the effects of COI, and reframe relevant value considerations while limiting the eligible policy discussants.
- The effects of these wedges can be blunted through a stronger research and policy focus on aggregate and non-individualized approaches to COI.

INTRODUCTION

We are more than 10 years out from the landmark Institute of Medicine report on *Conflict of Interest in Medical Research, Education, and Practice* (Institute of Medicine, 2009). Since the report's publication, the most substantive changes to the conflicts of interest (COI) policy landscape have been in clinical practice and medical education (Torgerson et al., 2022). The Physician Payments Sunshine Act and Open Payments Database provided previously unprecedented transparency around industry-provider relationships, and pharmaceutically sponsored educational modules at academic medical centers are largely a thing of the past. Unfortunately, despite the clear evidence base and need for action, there is still considerable resistance to meaningful policy change in biomedical research and regulatory spaces (Torgerson et al., 2022). The most significant changes in the past decade include the addition of over 7000 new journals to the list of those subscribing to ICMJE reporting guidelines (ICMJE, n.d.) and a modest increase in institutional COI policies (Resnik et al., 2016). However, fundamentally, biomedical researchers still receive industry funding in much the same way as they did in 2009, and the primary policy intervention remains disclosure (Goldberg, 2019). Despite decades of compelling research (Lo et al., 2000), multiple evidence syntheses (Graham, Karnes, et al., 2022; Lundh et al., 2017), and various governmental reports (Health Committee, 2005; Institute of Medicine, 2009), substantial policy interventions targeting COI in research contexts remain elusive.

In this article, we argue that COI policy detractors can undermine meaningful policy interventions by deploying argumentative "wedges" that mischaracterize the evidence base, redefine the terms of the debate and/or recommend overly narrow criteria for who should be allowed to participate in discussion and deliberation. For example, definitional wedges serve to limit efforts to address financial relationships with industry by argumentatively positioning common working definitions of COI that foment doubt and disagreement. As a result, here we must clarify that by "COI" we mean "financial COI" precisely because of successful efforts to draw attention toward nonfinancial COI and other forms of misconduct that get conflated with COI. Ultimately, successfully addressing COI wedges will require a combination of (1) intentional and strategic efforts to disrupt wedges, and (2) a reconsideration of common approaches to COI research and policy. Specifically, we argue that the way COI research is operationalized around individual cognitive biases undermines productive policy deliberation. Accordingly, the principal recommendation of this article is that the common theoretical approach to COI needs to be augmented with a more explicit and robust research infrastructure devoted to investigating aggregate effects of COI. This shift reconceptualizes COIs in principle as caused by systemic, structural forces operating on and beyond individual researchers and labs rather than merely a problem of individual bad actors engaging in unethical conduct motivated by COI. In making this argument, we suggest that commonly accepted individualist definitions of COI are overly constrained and strategically flawed.

We advance the argument of this article in two parts: First, we discuss the current state of COI discourse in the context of insights from interdisciplinary research on manufactured controversies in science-policy deliberation (Ceccarelli, 2011; Goldberg, 2022; Palevitz, 2005; Paroske, 2009). With this foundation in mind, we will then transition to a discussion of the benefits and potential application of aggregate approaches to COI research and policy.

STRATEGIC POLICY DISRUPTION

From Hermogenes to Habermas, theorists of democratic deliberation have routinely argued that the proper foundation for ideal policy formation is the establishment of consensus on foundational matters underlying the principal issue at hand (Nadeau, 1958). In argumentation theory, an underlying point of contention is generally known as stasis (Greek) or status (Latin). Stasis centers on questions of fact, questions of definition, questions of value, and questions of jurisdiction. A stasis is a stopping or standing point where the flow of debate is interrupted. At each point of stasis, the subordinate claims must be adjudicated, and consensus established before debate can proceed. The origin of stasis theory dates to when philosophy, rhetoric, and the law were coextensive in Ancient Greek and Roman thought. Indeed, stasis theory remains prominent in philosophers' penchant for establishing definitions at the outset of arguments or in legal jargon like *stare decisis*. "*Stare*" is the imperative form of the Latin "status," and "*stare decisis*" (stand by things decided) is an overt instruction from a judge to treat a stasis/status question as settled precedent. See Table 1 for an account of the four major stasis and their typical formation in legal disputes.

Although not common in health policy, insights from rhetorical studies occasionally find their way into research on health policy deliberation (Garrison et al., 2019; Russell et al., 2008; Stabile, 2020; St. Amant, 2019). Insights from rhetoric and argumentation can help researchers identify and address specific strategies used to advance specific policy positions. This kind of analysis can be especially useful in cases where discussants may not be always arguing in good faith. Accordingly, in this article, we apply stasis analysis to the conceptualization of COI to identify problematic assumptions in policy deliberation and to develop strategies for circumventing what might otherwise be a policy impasse. The analysis of COI makes clear the value of stasis analysis for interrogating the underlying

TABLE 1 The four major stasis, their definitions, and illustrative examples from a hypothetical murder trial.

Stasis	Definition	Murder trial example
Fact	The conjectural or fact stasis involves the adjudication of facts in evidence.	Is it confirmed that there is a body? Do we agree that someone is dead?
Definition	The definitional stasis addresses mutual understandings of states of affairs and defines them for interlocutors.	Does this event qualify as a murder? Is it perhaps a wrongful death or negligent homicide instead?
Value	The qualitative or value stasis involves seeking agreement on the moral dimensions of the issue question.	Was the homicide justified in some way? Was it self-defense?
Jurisdiction	The jurisdictional stasis seeks to evaluate if a given venue is the appropriate venue to evaluate the issue in question. It may also involve questions as to whether given individuals have the appropriate insight to speak about or testify on a given issue.	This could involve literal jurisdictional questions such as is the issue a federal or local matter. It may also involve questions such whether an expert witness has the appropriate credentials to testify in this case.

points of disagreement that can inhibit policy formation in health-related matters and beyond, making it an especially useful framework for health policy research broadly.

According to stasis theory, ideal policy formation follows from deliberative practices that lead to consensus on subordinate questions of fact, definition, value, and jurisdiction. In this model, the foundational structures of democratic deliberation should support detailed discussion of these subordinate issues before ratifying policy. Assuring that the specific policies enacted reflect shared worldviews, values, and commitments helps establish the consent of the governed. In ideal cases, consensus policy follows from the successful establishment of underlying stases. In contrast, cases where discussants select, first, their preferred policy solution and then seek to argue, often in bad faith, to establish underlying stases that support their pre-arranged conclusions dominate much of the current political moment. For example, in discourse about COVID-19, opponents of systemic and structural solutions have attempted to redefine public health in individualized or medicalized terms (Ezell, 2022; Goldberg, 2021). Similarly, those whose economic interests are threatened by climate change policy have long sought to disrupt the matters of fact by denying that climate change is happening or challenging the idea that it is anthropogenic (Ceccarelli, 2011). And in conflicts of interest, we contend that those who wish to preserve current industry relationships may do so by disrupting discussion on each level of stasis.

Scholarship from a variety of disciplinary spaces offers several related conceptual frameworks for investigating this kind of strategic dissensus. Public health ethicist Daniel Goldberg uses the related notion of "manufacture of doubt" and philosopher Barbara Forrest provides us with the more terminologically economical "wedge" (Forrest & Gross, 2007; Goldberg, 2022). Scholars of rhetoric and argument leverage notions of the "epistemological filibuster" and the "manufactured controversy" to analyze these cases (Ceccarelli, 2011; Paroske, 2009). Exploring debates in intelligent design, climate change denialism, AIDS denialism, and football concussion denialism, the scholars have demonstrated that discussions can work to disrupt closure on foundational stases of fact, definition, value, or jurisdiction. These argumentative approaches "wedge" open subordinate issues and, in so doing, *re*deploy the basic structures of democratic deliberation to prevent or delay policy formation. The shape of any given wedge argument fits, if you will, the stasis it means to disrupt. Leah Ceccarelli's analysis of science denialism identified "epistemological wedges" that disrupt the stasis of fact and "fairness wedges" that target questions of jurisdiction, documenting the effectiveness of these wedges at disrupting policy formation (Ceccarelli, 2011). Here, we add the "terminological wedge" and the "moral wedge" (that target the stases of definition and value, respectively) to the pre-existing suite of policy disruption strategies.

Efforts to establish meaningful intervention to slow down changing climate conditions and the NFL's response to the chronic traumatic encephalopathy (CTE) crisis among its players are two exemplar cases of strategic dissensus in action. The historical and current state of affairs is the result of the strategic promulgation of doubt, frequently by those who stand to make the most money from the disruption and delay of policy action. Each case is characterized by incessant demands for more evidence (even after a scientific consensus is established) and modest policy interventions with minimal effect (e.g., government subsidies for residential solar panels or immediate on-site injury assessments by a team physician). Our argument in this paper is that precisely the same dynamics are at work with respect to COI in biomedical research. Recurring demands for more study, which often underwrite duplicative research, have stymied efforts that would actually address COI in the biomedical research enterprise. Such demands for more evidence delay meaningful policy intervention, even as evidence mounts about the limits of existing efforts (e.g., disclosure).

In terms of COI research, a 2022 methodological review of work in the area shows that most new studies test the relationship between COI and reporting of positive results

(Graham, Karnes, et al., 2022). Rather than testing new hypotheses or potential policies, much COI research focuses on documenting well-established effects in specific disciplinary contexts. That is, new work seeks to establish the extent to which previously observed effects persist in the contexts of specific subspecialties (e.g., psychiatry, oncology, surgery). The recent literature points towards the effects of strategic dissensus in cultivating this duplication of effort. Despite consistent and reliable evidence documenting the harms of industry funding and COI, claims that more evidence is needed are still routinely offered. Relatedly, Daniel Goldberg has offered a pointed critique of the "unreasonable standards for proof for harm" that are often demanded by those who would rather not curtail or regulate industry relationships in medicine (Goldberg, 2016).

As with the cases of climate change and football concussions, policy innovation for COI in biomedical research appears to be similarly curtailed while the above-described epistemic filibuster plays out. Recently, Torgerson et al. (2022) documented the major research and policy innovations in COI since the publication of the landmark 2009 IOM report. While they detail several legislative and policy innovations designed to address COIs in clinical practice and medical education, they were able to identify no such policy innovations in COI management for clinical research. This finding is part of a long-established pattern where efforts to address COI focus away from research contexts. A 2012 report on efforts to develop comprehensive COI policies in neurology points directly to how lack of broader professional consensus has led to curtailed policy efforts. In so doing, the authors note, "Since 2008, the AMA has pursued a renewed attempt to develop a broad policy on physician and PMA COI. Unable to reach consensus in 2009, the AMA limited its focus to COI in CME" (Hutchins et al., 2012, p. 753). Policy efforts to address COI in biomedical research have been largely limited to transparency initiatives, specifically disclosure requirements (Ruff, 2015). Primary policy initiatives in recent years seek to expand the scope of disclosure requirements adding editors and peer reviewers to the list of those who ought to offer disclosures (Torgerson et al., 2022) and seeking to add policies for disclosure of nonfinancial COI (Resnik, 2023). These proposed enhancements to disclosure policies occur in an environment where it is increasingly clear that disclosure fails to adequately address the harms of COI (Torgerson et al., 2022). Available evidence indicates that disclosure statements tend to be inconsistent or inaccurate that they have minimal effect on reader perceptions of research quality, and that they may result in moral licensing (John et al., 2019; Loewenstein et al., 2012).

COI WEDGES

Given the documented delays in establishing a robust COI policy framework, it is essential that we better understand how policy is disrupted in this area so that efforts might be made to better protect against it. As we demonstrate below, COI policy formation is disrupted through epistemic, terminological, fairness, and justification wedges. These wedges are deployed throughout the scientific and policy literature around these issues. Table 2 details these wedges in brief, and our subsequent analysis demonstrates their use in the scholarly and policy literature.

Epistemic wedge

The epistemic wedge is almost certainly the most prevalent in COI discourse. It takes two primary forms: one in the perceptions of practitioners and the other in the literature. In practitioners' discussions about COI, those who hold COIs reject the notion that such

TABLE 2 Common COI wedges, definition, and example formulations.

Wedge type	Definition	Example formulation in COI discourse
Epistemic	Disruption of questions of facts; challenging of available evidence.	While others might be biased by COI, I am not. There is insufficient evidence regarding the harms of COI.
Terminological	Strategic re-definition of terms in use.	There's no COI here because I'm not acting with ill intent (i.e., the conflation of fraud and COI).
Moral	Attempt to leverage values to circumscribe policy efforts.	Limiting COI will limit innovation.
Jurisdictional	Attempt to limit the discussants in argument through appeals to experience and/or expertise.	Only biomedical researchers who work with industry should be allowed to comment on the effects of COI.

conflicts can affect their decision-making. This self-serving cognitive bias has been observed in multiple studies that highlight disparities in beliefs about one's own versus colleagues' susceptibility to COI-induced bias (Keim et al., 1993). In short, physicians are generally willing to believe their colleagues are biased by financial relationships, but they are less likely to believe they, themselves, are also susceptible.

The epistemic wedge also appears in repeated calls in the literature for more evidence of the harms despite the substantial, existing evidence base that on the whole, COIs are associated with biased outcomes. Advocating for "sustaining and strengthening physician-industry" partnerships, Duvall (2006) proclaims "[t]he true extent (depth and breadth) and negative consequences (if any) of interactions between industry and health care professionals are unknown […] nor can integrity be mass imposed by public policy" (p. 1811). Harnessing the intangible character of individualized COI, the question of the "true extent and breadth" of "any" negative ramifications seeks to undermine the clear evidence base that is already established for meaningful intervention. Similarly, an editorial in *Addiction* highlights that those who object to declarations argue that "COI declarations are onerous, unnecessary and stigmatizing, in that they single out authors who accept industry funding and make them appear somehow tainted, often without any supporting evidence" (Babor & Miller, 2014, p. 332). The second part of an infamous three-part 2015 essay against COI policies also engages this wedge, drawing on calls for more evidence that date back to the 2009 IOM report:

> As for "careful study," however, we still lack an empirical basis to guide effective conflict management…. The IOM's 2009 review of conflict-of-interest policies recognized these limitations, noting that "on many topics related to conflicts of interest, no systematic studies are available. For other topics, data are suggestive rather than definitive." (Rosenbaum, 2015b, p. 1959)

Strikingly, as recently as 2020, a letter to the editor in the *American Journal of Clinical Nutrition* employs this epistemic wedge when the authors declare "[w]hile there is conflicting evidence that studies with financial ties may have results that vary from those that do not have financial ties (2), there is no evidence that the industry-funded research is any less reliable than non–industry-funded research" (Khan et al., 2020, p. 915).

Researchers devoted to studying COI are, of course, aware of the numerous meta-studies and reviews of sponsorship bias and COI that consistently demonstrate the pernicious effects of these relationships (Lundh et al., 2017). As Goldberg (2016) has further argued, unreasonable standards for proof of harm drive the constant refrain around a supposed lack of evidence. These calls, themselves, come with their own harms, not only in the disruption of reasonable policy formation but also in driving unneeded research and thereby squandering already limited funding and resources. A recent methodological review of studies of industry sponsorship and COI found that there have been 92 additional studies (with largely the same outcome measures) since Lundh et al.'s (2017) meta-study was published (Graham, Karnes, et al., 2022).

Terminological wedge

A commonly accepted definition of COI appears in the 2009 IOM report, which holds that "A conflict of interest is a set of circumstances that creates a risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest" (p. 46). This definition centers on the judgements of particular individuals. That is, policy makers and practitioners conceptualize COI as matters of cognitive bias, rendering them inscrutable and difficult to assess. It is difficult to trace the presence of an individualized COI to a specifically biased research or clinical outcome except in cases of repeated, documentable malfeasance or when the outcome tends to contradict scientific consensus drawing greater scrutiny.

This individualization and presumption of inscrutability allows for terminological wedges. Arguing for the continued collaboration between vascular surgeons and the medical technology industry, Andrew Van Haute advances the idea that the "unique relationship may lead to the perception, and even reality, of conflicts of interest for physicians, in part because the competing pressures from the multiple, overlapping roles as clinician/caregiver/investigator/innovator/customer are significant" (Van Haute, 2011, p. 31S). This common equivocation between COI's "perception, and even reality" implies a definition of COI grounded not in bias, but in effect. COIs exist by definition regardless of their effects on decision making, but the terminological wedge requires clarification that there's no such thing as a "potential" COI. COI experts must reassert the accepted definition and challenge the notion of effect as a defining feature (McCoy & Emanuel, 2017), which delays and forestalls policy making.

A second terminological wedge can surface in confusion regarding the relationship between COI and fraud. Recounting the widespread problem of fraud in medical research, former US Attorney James Sheehan relies on a definition of fraud in relation to COIs as "the knowing breach of the standard of good faith and fair dealing as understood in the community, involving deception or breach of trust, for money" (Sheehan, 2007, p. S63). In so doing, Sheehan merges COIs with the "knowing" and purposeful "breach of trust," notably with "money" as the principal motivation. Ignoring unconscious bias, Sheehan frames COIs as *willful* acts of deceit with monetary motives, closing off the possibility of alternative forms of influence. While Sheehan's overall argument is about managing COI, the focus on COI as willful acts of deceit undercuts efforts at new policy interventions. Specifically, it suggests that existing law and regulation designed to address fraud is sufficient to manage COI, but decades of evidence suggest the contrary. Following this kind of theory of COI, in 2021 the Office of the Inspector General for the US Department of Health and Human Services issued a special fraud alert related to industry-sponsored CME programs (Office of the Inspector General, 2020). While this offers potential evidence of action with respect to COI, it importantly limits the scope of action to only certain examples of COI in these contexts. As the *JAMA* viewpoint article on the special fraud alert noted,

> To facilitate the identification of industry-sponsored speaker programs that could violate the Anti-Kickback Statute, a number of "suspect characteristics" are being offered as guidance by the Special Fraud Alert. Leading this listing are the absence of "substantive information…presented" at a location "that is not conducive to the exchange of educational information." Additional concerns entail the involvement of "sales or marketing business units" in the "selection of speakers" who are being paid "more than fair market value for the speaking service." (Adashi & Cohen, 2021, p. 1836)

In a similar move, an article from the *World Journal of Surgery* details the various forms in which fraud manifests within scientific and clinical fields and the importance of discouraging such behaviors arguing that, "[f]raudulent activity in research can take many forms, including data fabrication and falsification, plagiarism, dual publication, conflicts of interest and inappropriate coauthorship" (Slesser & Qureshi, 2009, p. 2355). In this instance, conflating COI and fraud furthers the misguided notion that for COIs to exist there must be a situation in which harm is purposefully and nefariously enacted. Slesser and Qureshi rely on linking incipient emotional reactions produced by acts of malfeasance with COI to align the definition more closely with extreme instances of unethical behavior.

The conflation of COI and fraud has been known to cause significant reactance among those who hold COI. That is, conflating COI and fraud makes it more difficult for well-meaning practitioners to discuss their COIs and the potential effects of them. It has contributed to at least one well-known defamation lawsuit (Editors, 2022). Additionally, in his report on behalf of The American Council on Science and Health, Ronald Bailey decries the COI policy movement as an anti-industry "crusade" that seeks to sever the ties between biomedical research and industry that activists claim cause harm to consumers and patients (Bailey, 2008). He cites epidemiologist Kenneth Rothman's (1993) concerns as a valid representation of COI policy:

> "The label of conflict of interest is so commonly used with the intent to discredit a person or work that it is disingenuous for anyone to claim that no accusation is intended when describing conflicts of interest. Part of the problem with the current conflict-of-interest disclosures is that those who are innocent of fraud or of any slanting of their work are tarnished along with the guilty, without any real knowledge of who has in fact been influenced by a financial lure or some other factor." (Rothman qtd in Bailey, 2008, p. 13)

Here he also positions COIs as intentional "fraud" or "slanting" of work and further suggests that COIs produce "no real knowledge" about undue influence. Again, this terminological wedge relies on the inscrutable nature of COI to stifle meaningful policy implementation by calling into question the fundamental motivations of such policies and their susceptibility to rivalrous manipulations. Ironically the conflation of fraud and COI may motivate strategic efforts to cultivate dissensus as a means of undermining COI policy altogether for the fear that to have COI is to be tacitly guilty of fraud.

Moral wedge

Moral wedges in COI discourse typically encourage alternative value frameworks that proponents argue should override concerns about bias and financial influence. The most common moral wedge suggests that strict COI policies constitute a threat to medical innovation. This argument is, perhaps, most clearly articulated in the aforementioned three-part *NEJM* essay on COI that argues:

> Perhaps effective therapies are adopted more slowly when industry representatives are banned from our workplace. Perhaps we miss opportunities to understand complex medical topics because experts aren't permitted to write about them. Perhaps life-saving therapies whose development requires the combined talents of clinicians and industry scientists don't materialize. (Rosenbaum, 2015a, pp. 2067–2068)

Rosembaum's argument follows others who insist that industry collaboration is mutually beneficial because "consumers benefit with new medical devices and drugs that improve health care" (Duvall, 2006, p. 1809) and "Physicians and scientists gain by having access to resources, technology, and ideas that would otherwise be unavailable or in limited supply" (Duvall, 2006, p. 1809). The wedge conceptualizes patients as market actors and assumes that pharmaceutical development is by nature always rapid and exponential. Some arguments in this area go so far to suggest that industry should be considered foundational to medical research, education, and practice. A 2017 *JAMA* editorial contends that it is "unwise to attempt to insulate medical students from interactions with industry," and that academia should "emphasize the need to instill professional sensitivity to work effectively with outside interests while maintaining public trust" (Stead, 2017, p. 1766). This editorial acknowledges risk as a factor but qualifies this risk by turning back to the putative benefits of industry relationships. Here we do not mean to suggest that there can be no benefit to industry relationships, but rather that more wedge arguments tend to treat those relationships as an unqualified good and are often cavalier in the face of substantial evidence about the risks and harms.

While appeals to innovation are the most common, they are not the only moral wedge. Critics of COI policy argue that it not so much conflicts themselves so much as the attempts to address those conflicts that erode public trust in science. Indeed, Borbor and Miller warn of a budding "McCarthyism" in the medical community, with this argument implying that "declaration procedures are the equivalent of unsubstantiated accusations that reflect negatively on the character of honest scientists without proper regard for evidence" (Babor & Miller, 2014, p. 332). In this view, COI declarations are "onerous, unnecessary and stigmatizing" and make authors who declare industry funding seem "tainted." The historical weight of McCarthyism makes this analogy potent, but it confuses systemic relationships with the character of individual scientists. COIs affect outcomes in the aggregate, but not each and every COI is evidence of bias. Similarly, Rosenbaum argues that

> At best, the endless gotcha quest simply ruins some reputations unfairly. But I think it has proven more vicious, creating a cycle in which each story generates more distrust.…As reputational costs of exposure grow, everyone works harder at damage control, and fewer people defend themselves, because self-justifications may only intensify the criticism; those who are exposed just hope it will go away quietly. As the public observes this spiral of blame and shame, the conflict-of-interest movement has paradoxically achieved what it set out to avert: an erosion of public trust in medicine and science. (Rosenbaum, 2015a, p. 2067)

The moral wedge, like all wedges, generally accomplishes what it sets out. It delays policy formation by catalyzing more debate. Presented with the moral wedge, discussants must reestablish the nature of innovation, the available data on the effects of COI, and the sources of public mistrust.

Jurisdictional wedge

The fairness wedge delays policy formation by arguing that not all stakeholders have participated. In the context of COI, the fairness wedge most often appears when disputants argue that COI oversight should be a joint effort between industry and policymakers, emphasizing the need for equal participation and representation. Primarily, authors emphasize the need for "both sides" to be involved in fraud and bias oversight. In his literature review of COI reporting, Stead concludes that "Taken together, the viewpoints in this issue of *JAMA* suggest a systematic approach in which all stakeholders in the health professions and biomedical sciences work together to protect professional judgment and integrity while advancing progress" (Stead, 2017, p. 1767). The pleas emphasize collaboration, but the influence of industry is apparent. Duvall suggests a working relationship between the American Medical Association (AMA) and the Pharmaceutical Research and Manufacturers of America (PhRMA) to create a COI reporting system, in which PhRMA should and would have primary control:

> The AMA and PhRMA, organizations representing two major stakeholders, could collaborate to develop the reporting criteria and scheme while the PhRMA could take the lead in developing and managing the reporting system. Such a reporting system would be the beginning of a tangible and good faith effort to address the central issue. (Duvall, 2006, p. 1811)

Similarly, an article in the *Yale Journal of Health Policy, Law, and Ethics* argues that oversight committees should include "senior scientists experienced in working with industry" as well as "the head of the office responsible for technology transfer and industry relationships" (Taylor, 2013, p. 184).

These arguments employ the warrant that a "balanced" oversight team ensures "fair" practices. But such arguments assume that stakeholders have equal weight in the oversight process. Indeed, Stead argues as much when he insists that "Each type of stakeholder has an important role and responsibility" (Taylor, 2013, p. 184). This echoes facets of the moral wedge that insist academia needs the collaboration of industry, and "turn[s] a public values debate into a debate over science for the purpose of achieving a particular political end" (Ceccarelli, 2011, p. 211). Ultimately, the fairness wedge, in this context, also implies that the pharmaceuticals industry is inappropriately excluded from policy discourse and that a balance needs to be created so as to level the playing field. Such a suggestion ignores longstanding concerns, however, that industry already has an outsized effect on regulation through lobbying efforts, campaign donations, and regulatory capture.

Beyond bias and wedges

Efforts to understand and address COI must move past the presumptive focus on individuals and cognitive biases and toward a systemic approach to COI. Although COI research has a long history of investigating related phenomena such as multi-authored articles, institutional contexts of interest, industry relationships with professional medical organizations, and so on, common definitions like the one offered in the IOM report often recede to an individualist framework. That is, bias in multi-authored articles is understood simply as the combined bias of all authors related to a project rather than the complex interplay among webs of researchers, labs, research organizations, and funders across projects. Although questions of evidence often take center stage in COI debates, most of the evidentiary questions at issue are the result of terminological wedges. COI are sometimes said to have no evidence of effects because it is quite difficult to demonstrate that an individual is biased, especially in the absence of obviously biased actions. This individual-centered definition of COI also supports jurisdictional arguments about who can properly testify about the effects of COI. Biomedical researchers with industry relationships are granted an outsized role in COI policy deliberation because they can provide direct testimony about their motives and beliefs. Moreover, placing outsize weight on such testimony ignores ample evidence about bias frequently being unrecognized among the biased. Nevertheless, the primacy of the individual continues to define COI discourse. Aggregate approaches to COI would mirror scholarship in legal and health equity that partially decouples systemic racism and implicit bias (Bonilla-Silva, 2006; Jones, 2002). Addressing racial disparities often requires managing similar terminological and epistemic challenges as in COI. The common claim that "there's not a racist bone in my body" similarly leverages suggestions of an individual's privileged access to their interior cognitive states and distracts from structural conditions that persist regardless of the truth of claims to the lack of bias. Our arguments for the utility of aggregate approaches to COI, like arguments for the utility of structural racism as a conceptual framework, highlight that deleterious structural effects endure even amidst the supposed or real absence of cognitive bias.

Rejecting individualist notions of COI can go a long way towards shoring up COI research and policy debate from disruptive delays. (Consult Table 3 for a broad overview of how intentionally aggregate approaches to COI can blunt common argumentative wedges.) Biomedical science is a team sport. Clinical trials frequently have dozens of authors with differing COI or no COI. Even if an individual research team is entirely free from COI, it would be nearly impossible to develop a robust and literature-informed study that is not reliant on prior research by those who hold COI. Furthermore, the broader biomedical research enterprise is built around complex interactions among researchers, reviewers, editors, funders, and so forth. Importantly, the structural conditions of financial influence persist regardless of any individual's COIs and regardless of any individual's COIs' biasing effects. For example, research grounded in an aggregate approach to COI has found that

TABLE 3 Common COI wedges and available responses.

Wedge type	Example formulation	Possible response
Epistemic	While others might be biased by COI, I am not.	COI can compromise the integrity and quality of research beyond individual researchers.
	There is insufficient evidence regarding the harms of COI.	Not only is there considerable evidence regarding the harms of COI on individual studies, but research on COI may also demonstrate a broader array of harms such as compromises to the quality of biomedical medical publishing and diminished drug safety profiles.
Terminological	There's no COI here because I'm not acting with ill intent (i.e., the conflation of fraud and COI).	Individual bias and ill intent are not required for financial influences to exist. They may affect collaborative teams and propagate through citation networks.
Moral	Limiting COI will limit innovation.	COI may compromise drug safety. Protecting patient health is the core value.
Jurisdictional	Only biomedical researchers who work with industry should be allowed to comment on the effects of COI.	A proper empirical understanding of the aggregate effects of COI on the biomedical research enterprise will require interdisciplinary research efforts over individualized testimony.

journals that accept reprint fees publish more articles with COI and more COIs per article (Graham et al., 2020). This kind of research demonstrates how COI can have mutually reinforcing effects, the kind which cannot be well studied within an individualized COI framework.

Additionally, the individualist character of COI can lead to problematic research designs that do not reflect the ways in which conflicted and unconflicted individuals interact. For example, a study of COI and Food and Drug Administration advisory committee member voting patterns found that vote outcomes would not have changed if conflicted members were removed from the final tallies but ignored their deliberations (Xu et al., 2017). Advisory committee meetings are adversarial hearings designed to be persuasive for advisory committee members. Thus, removing conflicted members and recalculating votes ignores the very structure of these meetings and the persuasive interactions the meetings support by design. Advisory committee members do not hear testimony in quiz-show style isolation booths, and their votes are not statistically independent of each other. COI may exert influence through the persuasiveness of members' questions and commentary. Conflicted members may influence the votes of unconflicted members, and the reverse may be true as well.

Efforts to delay substantive policy formation around COI in biomedical research have been largely effective. Although we have seen a proliferation of disclosure policies for biomedical journals, systematic review regimes, and professional medical organizations, the available research indicates that these policies are poorly enforced (Gottlieb, 2023) and do little to mitigate against the most deleterious effects of COI (Cain et al., 2011). Furthermore, the broad effectiveness of COI wedges has catalyzed significant duplication of efforts as researchers work to prove over and over again (a) that COI exists, (b) that they are pervasive, and (c) that they have measurable effects on the biomedical research enterprise. In this context, recent years have also seen the generation of newer frameworks for discussing COI, e.g., ghost management, sponsor influence, and commercial determinants of health (CDoH). These newer frameworks for discussion COI may be, in part, driven by efforts to escape the argumentative quagmire that continues to stymie COI policy formation. We applaud this kind of theoretical innovation and agree that it is an important part of responding to wedge arguments in policy debate. We now outline several additional strategies that may prove useful in advancing research and policy formation in this area.

Emerging efforts to address COI are generally marked by a recurrent focus on aggregations of influence. That is, these insights tend to lean into the metaphor suggested by the caricature of the industry octopus that is used broadly in pharmaceuticals criticism. Academic and professional interest in CDoH, for example, tends to focus on investigating the private sector's actions, strategies, and pursuit of products that impact public health adversely (Freudenberg, 2014; Kickbusch et al., 2016; Mialon, 2020). Research on CDoH primarily focuses on three avenues of study: harmful products that facilitate negative health impacts, practices that pose risks to health used to promote, sell, and advocate for favorable policies regarding those products, and global factors that propel the aforementioned harmful practices (Mialon, 2020; Stuckler et al., 2012). COI, as one vector for CDoH, have measurable effects on biomedical research and subsequent second-order impacts on public health. Similarly, "ghost management" describes the broad array of practices by which industry actors actively shape the production of knowledge, particularly in the medical and pharmaceutical industries (Gagnon, 2013, 2021; Jureidini & McHenry, 2020; Sismondo, 2007; Sismondo & Doucet, 2010). As an extension of the term "ghost writing," ghost management refers to systematic efforts to create favorable evidence bases, conceal of drug advertising in medical publications, and thread promotional materials into medical and continuing medical education (Jureidini & McHenry, 2020; Sismondo, 2007). A key issue in studying ghost management is its invisibility; such practices are opaque by nature and thus difficult for reviewers to locate (Jureidini & McHenry, 2020; Sismondo, 2009; Sismondo & Doucet, 2010). The study of ghost management is well suited to intervene as Ceccarelli recommends for other manufactured controversies. Specifically, demonstrating bad faith engagement in policy deliberation challenges the idea that regulated parties can reasonably be included as equals in the development of regulation.

Finally, an aggregate approach to COI research agenda also has the potential to showcase a broader range of effects than research in COI. When COI is construed to be only a problem of individual bad actors, research and policymaking tends to focus on the effects for specific researchers or operationalizes COI at the article or study level. Given the data that show how COI change reporting practices, it can be difficult to access unbiased data that might be used as a robust outcomes measure for COI. The lack of such data stymies efforts to assess connections between patient harm and COI (Lundh et al., 2017). A pilot study adopting an aggregate approach compared the COI evidence in the collected research on a given drug, the total number of a drug's COI by type, and the drug's safety profile in adverse event reporting; it found that safety profiles of drugs differed by aggregate COI (Graham, Majdik, et al., 2022). That is, some forms of COI (industry employment, stock options, one-time fees) across publications studying particular drug products associated with increased adverse events rates for those products, whereas other forms of COI (industry grants) did not. The incidence rate ratios are not large, but the widespread adoption of drug products imply thousands of additional injuries and dozens of additional deaths if the effects persist at scale. This kind of research can intervene in questions of value. The common framing of bias mitigation versus innovation should be attenuated with discussion of potential patient harms. Innovation should not also be injurious. Importantly, here, the observed effect is not consistent across COI types. Industry employment or stock holdings and one-time fees show increases in adverse event rates, while research grants correspond with a *reduction* in adverse event rates. This finding points to the possibility of safer modes of industry involvement in research, addressing jurisdictional debates.

CONCLUSION

This article has argued that research on COI can be productively enhanced through additional investments in aggregate understanding of COI. We have made this argument by leveraging rhetorical stasis theory to showcase how research and policymaking on COI has been stunted by manufactured doubt sown or allowed to grow at multiple stages of biomedical policy deliberation. Despite decades of accumulated evidence of harm, many continue to foment doubt around the nature and effects of COI, halting policymaking through epistemic wedges. They also argue that establishing strong policies to address COI may cause unintended harms such as delayed innovation or diminished public trust in medicine, creating controversy through terminological and moral wedges. Finally, disputants wedge open debates of policy jurisdiction by arguing that regulated parties should have equal footing in discussions of regulatory formation. Taken together, we argue that these wedges manufacture controversy and delay policy reform, compromising ethical and effective practice.

In response, we demonstrate how a fundamental rejection of terminological wedges that construe COI as individualist can lead to stronger foundations for COI research and policy. Like ghost management and CDoH frameworks, an aggregate approach to COI provides a targeted inquiry into biomedical research relationships and promotes a quantitative assessment of influence within those relationships. This approach can intervene in policy debates by avoiding the individualism of COI and recentering conversations on the systemic nature and effects of industry-sponsored financial networks. We have also demonstrated how emerging evidence from research centering an aggregate understanding of COI approach might be leveraged to productively inform policy and related policy debate. The study of economic interests and their effects on biomedical research and public health will require coordinated interdisciplinary efforts that bring together insights from health policy, bioethics, pharmaceuticals criticism, and meta-science.

ACKNOWLEDGMENTS

The research presented in this submission was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number R01GM141476.

CONFLICT OF INTEREST STATEMENT

S. S. G. reports grant funding from NIGMS and the Texas Health and Human Services Commission. Z. P. M. reports grant funding from NIGMS, NSF, and the Summer Institute in Computational Social Science. J. B. B. reports grant funding from NIGMS, NSF, and Blue Cross Blue Shield/Health Care Service Corporation. J. F. R. reports grant funding from NIGMS, NIMH, NIAID, NLM, Health Care Cost Institute, Austin Public Health, Texas Child Mental Health Care Consortium, Texas Alzheimer's Research and Care Consortium, the Michael & Susan Dell Foundation. JFR also reports receiving a grant from the NIH Division of Loan Repayment that includes. All other authors report no conflicts of interest.

ETHICS STATEMENT

Ethical clearance was not required because this study did not involve human subjects.

ORCID

S. Scott Graham http://orcid.org/0000-0003-1569-2428

REFERENCES

Adashi, E. Y., & Cohen, I. G. (2021). Industry-sponsored speaker programs—End of the line? *Journal of the American Medical Association*, *325*(18), 1835–1836. https://doi.org/10.1001/jama.2020.26580

Babor, T. F., & Miller, P. G. (2014). McCarthyism, conflict of interest and addiction's new transparency declaration procedures: Editorial. *Addiction*, *109*(3), 341–344. https://doi.org/10.1111/add.12384

Bailey, R. (2008). *Scrutinizing industry-funded science: The crusade against conflicts of interest*. American Council on Science and Health.

Bonilla-Silva, E. (2006). *Racism without racists: Color-blind racism and the persistence of racial inequality in the United States*. Rowman & Littlefield Publishers.

Cain, D. M., Loewenstein, G., & Moore, D. A. (2011). When sunlight fails to disinfect: Understanding the perverse effects of disclosing conflicts of interest. *Journal of Consumer Research*, *37*(5), 836–857. https://doi.org/10.1086/656252

Ceccarelli, L. (2011). Manufactured scientific controversy: Science, rhetoric, and public debate. *Rhetoric & Public Affairs*, *14*(2), 195–228.

Duvall, D. G. (2006). Conflict of interest or ideological divide: The need for ongoing collaboration between physicians and industry. *Current Medical Research and Opinion*, *22*(9), 1807–1812. https://doi.org/10.1185/030079906X120977

Editors, T. (2022 December 19). A Note to Readers | The Editors. https://www.nybooks.com/articles/2009/02/12/a-note-to-readers/

Ezell, J. M. (2022). The medicalization of freedom: How anti-science movements use the language of personal liberty and how we can address it. *Nature Medicine*, *28*(2), 219. https://doi.org/10.1038/s41591-021-01640-y

Forrest, B., & Gross, P. R. (2007). *Creationism's Trojan Horse: The Wedge of Intelligent Design*. (Updated ed. edition) Oxford University Press.

Freudenberg, N. (2014). *Lethal But Legal: Corporations, Consumption, and Protecting Public Health*. (New to this Edition: New to this Edition) Oxford University Press.

Gagnon, M.-A. (2013). Corruption of pharmaceutical markets: Addressing the misalignment of financial incentives and public health. *The Journal of Law, Medicine & Ethics: A Journal of the American Society of Law, Medicine & Ethics*, *41*(3), 571–580. https://doi.org/10.1111/jlme.12066

Gagnon, M.-A. (2021). The case of the global pharmaceutical sector. In M. Benquet & T. Bourgeron (Eds.), *Accumulating capital today*. (pp. 163–177). Routledge.

Garrison, N. A., Brothers, K. B., Goldenberg, A. J., & Lynch, J. A. (2019). Genomic contextualism: Shifting the rhetoric of genetic exceptionalism. *The American Journal of Bioethics*, *19*(1), 51–63. https://doi.org/10.1080/15265161.2018.1544304

Goldberg, D. (2016). On physician-industry relationships and unreasonable standards of proof for harm: A population-level bioethics approach. *Kennedy Institute of Ethics Journal*, *26*(2), 173–194. https://doi.org/10.1353/ken.2016.0022

Goldberg, D. S. (2019). The shadows of sunlight: Why disclosure should not be a priority in addressing conflicts of interest. *Public Health Ethics*, *12*(2), 202–212. https://doi.org/10.1093/phe/phy016

Goldberg, D. S. (2021). Against the medicalization of public health (ethics). *Public Health Ethics*, *14*(2), 117–194. https://doi.org/10.1093/phe/phab024

Goldberg, D. S. (2022). Harm reduction ethics, public health, and the manufacturer of doubt. *The American Journal of Bioethics*, *22*(10), 18–20. https://doi.org/10.1080/15265161.2022.2110989

Gottlieb, J. (2023). Challenges of assessing disclosure Accuracy—All we have is our integrity. *JAMA Ophthalmology*, *141*(4), 383–384. https://doi.org/10.1001/jamaophthalmol.2023.0398

Graham, S. S., Karnes, M. S., Jensen, J. T., Sharma, N., Barbour, J. B., Majdik, Z. P., & Rousseau, J. F. (2022). Evidence for stratified conflicts of interest policies in research contexts: A methodological review. *BMJ Open*, *12*(9), e063501. https://doi.org/10.1136/bmjopen-2022-063501

Graham, S. S., Majdik, Z. P., Barbour, J. B., & Rousseau, J. F. (2022). Associations between aggregate NLP-extracted conflicts of interest and adverse events by drug product. *Studies in Health Technology and Informatics*, *290*, 405–409. https://doi.org/10.3233/SHTI220106

Graham, S. S., Majdik, Z. P., Clark, D., Kessler, M. M., & Hooker, T. B. (2020). Relationships among commercial practices and author conflicts of interest in biomedical publishing. *PLoS One*, *15*(7), e0236166. https://doi.org/10.1371/journal.pone.0236166

Health Committee. (2005). *The influence of the pharmaceutical industry*. UK House of Commons. https://publications.parliament.uk/pa/cm200405/cmselect/cmhealth/42/42.pdf

Hutchins, J. C., Rydell, C. M., Griggs, R. C., Sagsveen, M., Bernat, J. L., & For the American Academy of Neurology Pharmaceutical and Device Industry Conflict of Interest Task Force. (2012). American Academy of Neurology policy on pharmaceutical and device industry support. *Neurology*, *78*(10), 750–754. https://doi.org/10.1212/WNL.0b013e318248e4ff

ICMJE. (n.d.). Journals stating that they follow the ICMJE Recommendations. Retrieved December 28, 2023, from https://www.icmje.org/journals-following-the-icmje-recommendations/

Institute of Medicine. (2009). *Conflict of interest in medical research, education, and practice*. The National Academies Press. https://doi.org/10.17226/12598

John, L. K., Loewenstein, G., Marder, A., & Callaham, M. L. (2019). Effect of revealing authors' conflicts of interests in peer review: Randomized controlled trial. *BMJ*, *367*, l5896. https://doi.org/10.1136/bmj.l5896

Jones, C. P. (2002). Confronting institutionalized racism. *Phylon (1960-)*, *50*(1/2), 7–22. https://doi.org/10.2307/4149999

Jureidini, J., & McHenry, L. B. (2020). *The illusion of evidence-based medicine: Exposing the crisis of credibility in clinical research*. (Illustrated edition) Wakefield Press.

Keim, S. M., Sanders, A. B., Witzke, D. B., Dyne, P., & Fulginiti, J. W. (1993). Beliefs and practices of emergency medicine faculty and residents regarding professional interactions with the biomedical industry. *Annals of Emergency Medicine*, *22*(10), 1576–1581. https://doi.org/10.1016/s0196-0644(05)81262-4

Khan, T. A., Chiavaroli, L., Bazinet, R. P., & Sievenpiper, J. L. (2020). Apparent conflicts of interest do not preclude scientific rigor. *The American Journal of Clinical Nutrition*, *111*(4), 915–916. https://doi.org/10.1093/ajcn/nqaa005

Kickbusch, I., Allen, L., & Franz, C. (2016). The commercial determinants of health. *The Lancet Global Health*, *4*(12), 12. https://doi.org/10.1016/S2214-109X(16)30217-0

Lo, B., Wolf, L. E., & Berkeley, A. (2000). Conflict-of-Interest policies for investigators in clinical trials. *New England Journal of Medicine*, *343*(22), 1616–1620. https://doi.org/10.1056/NEJM200011303432206

Loewenstein, G., Sah, S., & Cain, D. M. (2012). The unintended consequences of conflict of interest disclosure. *Journal of the American Medical Association*, *307*(7), 669–670. https://doi.org/10.1001/jama.2012.154

Lundh, A., Lexchin, J., Mintzes, B., Schroll, J. B., & Bero, L. (2017). Industry sponsorship and research outcome. *Cochrane Database of Systematic Reviews*, *2017*(2), MR000033. https://doi.org/10.1002/14651858.MR000033.pub3

McCoy, M. S., & Emanuel, E. J. (2017). Why there are no "potential" conflicts of interest. *Journal of the American Medical Association*, *317*(17), 1721–1722. https://doi.org/10.1001/jama.2017.2308

Mialon, M. (2020). An overview of the commercial determinants of health. *Globalization and Health*, *16*(1), 74. https://doi.org/10.1186/s12992-020-00607-x

Nadeau, R. (1958). Hermogenes on “stock issues” in deliberative speaking. *Speech Monographs*, *25*(1), 59–66. https://doi.org/10.1080/03637755809375225

Office of the Inspector General. (2020). *Special Fraud Alert: Speaker programs*. Department of Health and Human Services. https://oig.hhs.gov/fraud/docs/alertsandbulletins/2020/SpecialFraudAlertSpeakerPrograms.pdf

Palevitz, B. A. (2005). *Creationism's Trojan Horse: The wedge of intelligent design*. Oxford University Press.

Paroske, M. (2009). Deliberating international science policy controversies: Uncertainty and AIDS in South Africa. *Quarterly Journal of Speech*, *95*(2), 148–170. https://doi.org/10.1080/00335630902842053

Resnik, D. (2023). Disclosing and managing non-financial conflicts of interest in scientific publications. *Research Ethics*, *19*(2), 121–138. https://doi.org/10.1177/17470161221148387

Resnik, D. B., Ariansen, J. L., Jamal, J., & Kissling, G. E. (2016). Institutional conflict of interest policies at U.S. Academic Research Institutions. *Academic Medicine*, *91*(2), 242–246. https://doi.org/10.1097/ACM.0000000000000980

Rosenbaum, L. (2015a). Beyond moral outrage—Weighing the trade-offs of COI regulation. *New England Journal of Medicine*, *372*(21), 2064–2068. https://doi.org/10.1056/NEJMms1502498

Rosenbaum, L. (2015b). Understanding bias—The case for careful study. *New England Journal of Medicine*, *372*(20), 1959–1963. https://doi.org/10.1056/NEJMms1502497

Rothman, K. J. (1993). Conflict of interest: The new McCarthyism in science. *Journal of the American Medical Association*, *269*(21), 2782–2784. https://doi.org/10.1001/jama.1993.03500210082037

Ruff, K. (2015). Scientific journals and conflict of interest disclosure: What progress has been made? *Environmental Health*, *14*(1), 45. https://doi.org/10.1186/s12940-015-0035-6

Russell, J., Greenhalgh, T., Byrne, E., & Mcdonnell, J. (2008). Recognizing rhetoric in health care policy analysis. *Journal of Health Services Research & Policy*, *13*(1), 40–46. https://doi.org/10.1258/jhsrp.2007.006029

Sheehan, J. G. (2007). Fraud, conflict of interest, and other enforcement issues in clinical research. *Cleveland Clinic Journal of Medicine*, *74*(Suppl. 2), S63–S67; discussion S68–69 https://doi.org/10.3949/ccjm.74.suppl_2.s63

Sismondo, S. (2007). Ghost management: How much of the medical literature is shaped behind the scenes by the pharmaceutical industry? *PLoS Medicine*, *4*(9), 9. https://doi.org/10.1371/journal.pmed.0040286

Sismondo, S. (2009). Ghosts in the machine: Publication planning in the medical sciences. *Social Studies of Science*, *39*(2), 171–198. https://doi.org/10.1177/0306312708101047

Sismondo, S., & Doucet, M. (2010). Publication ethics and the ghost management of medical publication. *Bioethics*, *24*(6), 273–283. https://doi.org/10.1111/j.1467-8519.2008.01702.x

Slesser, A. A. P., & Qureshi, Y. A. (2009). The implications of fraud in medical and scientific research. *World Journal of Surgery*, *33*(11), 2355–2359. https://doi.org/10.1007/s00268-009-0201-5

St. Amant, K. (2019). Ethos prototypes: The intersection of rhetoric, cognition, and communicating health policy internationally. *World Medical & Health Policy*, *11*(4), 464–473. https://doi.org/10.1002/wmh3.323

Stabile, B. (2020). The persisting importance of rhetoric and equity in health policy and outcomes. *World Medical & Health Policy*, *12*(2), 86–89. https://doi.org/10.1002/wmh3.344

Stead, W. W. (2017). The complex and multifaceted aspects of conflicts of interest. *Journal of the American Medical Association*, *317*(17), 1765–1767. https://doi.org/10.1001/jama.2017.3435

Stuckler, D., McKee, M., Ebrahim, S., & Basu, S. (2012). Manufacturing epidemics: The role of global producers in increased consumption of unhealthy commodities including processed foods, alcohol, and tobacco. *PLoS Medicine*, *9*(6), e1001235. https://doi.org/10.1371/journal.pmed.1001235

Taylor, P. L. (2013). Innovation incentives or corrupt conflicts of interest? Moving beyond Jekyll and Hyde in regulating biomedical academic-industry relationships. *Yale Journal of Health Policy, Law, and Ethics*, *13*(1), 135–197.

Torgerson, T., Wayant, C., Cosgrove, L., Akl, E. A., Checketts, J., Dal Re, R., Gill, J., Grover, S. C., Khan, N., Khan, R., Marušić, A., McCoy, M. S., Mitchell, A., Prasad, V., & Vassar, M. (2022). Ten years later: A review of the US 2009 institute of medicine report on conflicts of interest and solutions for further reform. *BMJ Evidence-Based Medicine*, *27*(1), 46–54. https://doi.org/10.1136/bmjebm-2020-111503

Van Haute, A. (2011). Managing perceived conflicts of interest while ensuring the continued innovation of medical technology. *Journal of Vascular Surgery*, *54*(3 Suppl.):31S-3S. https://doi.org/10.1016/j.jvs.2011.05.108

Xu, J., Emenanjo, O., Ortwerth, M., & Lurie, P. (2017). Association of appearance of conflicts of interest with voting behavior at FDA Advisory Committee Meetings—A cross-sectional study. *JAMA Internal Medicine*, *177*(7), 1038–1040. https://doi.org/10.1001/jamainternmed.2017.1917

AUTHOR BIOGRAPHIES

S. Scott Graham is an associate professor in the Department of Rhetoric and Writing and a faculty affiliate in the Center for Health Communication at The University of Texas at Austin, Austin.

Kimberlyn R. Harrison is a doctoral student in the Department of English at The University of Texas at Austin.

Jade C. Shiva Edward is a doctoral student in the Department of English at The University of Texas at Austin.

Zoltan P. Majdik is a professor in the Department of Communication at North Dakota State University.

Joshua B. Barbour is a professor in the Department of Communication at the University of Illinois Urbana-Champaign.

Justin F. Rousseau is an associate professor in the Statistical Planning and Analysis Section of the Department of Neurology and the Peter O'Donnell Jr. Brain Institute at University of Texas Southwestern Medical Center.

How to cite this article: Graham, S. S., Harrison, K. R., Edward, J. C. S., Majdik, Z. P., Barbour, J. B., & Rousseau, J. F. (2024). Beyond bias: Aggregate approaches to conflicts of interest research and policy in biomedical research. *World Medical & Health Policy*, *16*, 489–505. https://doi.org/10.1002/wmh3.608

DOI: 10.1002/wmh3.612

COMMENTARY

WMHP WORLD MEDICAL & HEALTH POLICY WILEY

Barriers to the safe preservation of the traditional herbal practice in Ghana

Benjamin Clay

School of Clinical Medicine, University of Cambridge, Cambridge, UK

Correspondence
Benjamin Clay, School of Clinical Medicine, Addenbrooke's Hospital, Hills Rd, Cambridge CB2 0SP, UK.
Email: bjc61@cam.ac.uk

Funding information
University of Cambridge; Gonville and Caius College, University of Cambridge; Royal College of Surgeons of Edinburgh

Abstract

The preservation of the culturally important traditional herbal medicine practice in Ghana is threatened by the growth of allopathic medicine. It is argued that two main factors comprise this threat: significant safety concerns over many traditional herbal preparations, and a conflict in therapeutic frameworks which provides a substrate for the production of misinformation regarding allopathic medicine. Poorly enforced regulation of the commercial herbal market and a total lack of regulation of the traditional herbal market have led to prevalent contamination of herbal preparations with pathogenic bacteria and an unacceptable risk of pharmacological toxicity due to inconsistent production methods and understanding of the active components in these preparations. Simultaneously, misinformation spread by traditional herbal practitioners about allopathic medicine has caused significant morbidity and mortality in Ghana. Evidence from the literature and experience from clinical practice in a hospital in the Eastern region of Ghana are used to explore these factors and provide recommendations. First, thorough regulation of the herbal practice is needed to allay safety concerns. Second, the overall healthcare landscape will have to change to resolve the current tensions between practices. One solution would be the formation of a cooperative healthcare system which incorporates both the allopathic and herbal practices with well-defined, nonoverlapping scopes of practice. However, such a novel landscape may be unrealistic, with the potential for traditional herbal practices being relegated to secondary role, mainly providing pharmacologically inert preparations while continuing to benefit patients through spiritual, cultural and pastoral interventions.

KEYWORDS

Ghana, health policy, herbal medicine, traditional medicine

Key points

- The continued existence of traditional herbal practice in Ghana is threatened by the growth of allopathic medicine due to concerns over the safety of such traditional preparations and tension between practices due to conflicting therapeutic frameworks.
- Thorough regulation of the traditional herbal practice is required urgently to address the potential for unintentional overdosing, drug–drug interactions and the widespread contamination of preparations with pathogens.
- The traditional practice could be incorporated into an overarching health landscape based on allopathic medicine or it could be relegated to a secondary role focussing on its nonpharmacological elements.

INTRODUCTION

Ghana's healthcare landscape is in transition. Like many West African countries, Ghana has two major healthcare practices, namely allopathic medicine, and herbal medicine. Ghana's allopathic healthcare system comprises a network of primary care facilities as well as secondary and tertiary care hospitals. Increased healthcare investment and key policy changes, such as the state-run National Health Insurance Scheme (NHIS), have resulted in widespread improvements in health outcomes over the last 30 years, including reductions in mortality from communicable disease, neonatal and obstetric complications (Adua et al., 2017). Furthermore, levels of engagement with allopathic medicine are also increasing with nationwide enrollment in the NHIS reaching a record high of 68.6% in 2021 (Ghana Statistical Service, 2022). Concurrently, use of herbal medicine remains prevalent; recent studies estimate that over 70% of Ghanaians regularly use herbal products (Kretchy et al., 2021). These are often sought as first-line treatments due to proximity, price and a perception that the preparations are harmless due to their "natural" origin (Abdullahi, 2011).

The importance of proximity and price should not be understated. Studies have demonstrated that in rural communities, only 4% of households have easy access to hospital care, with factors such as poor road conditions being major contributors to this shortfall (Agbenyo et al., 2017). Many medications, including many of those listed on the WHO's Essential Medicines List are either completely unavailable or regularly out-of-stock (Atiga et al., 2023; Boateng et al., 2020; Frimpong & Ofori-Kwakye, 2016). The requirement for significant out-of-pocket payments for allopathic treatments, even for patients enrolled in the NHIS is well-documented, with a recent study finding that 42% of the poorest quintile of insured patients paid out-of-pocket (Akweongo et al., 2021). This requirement, in combination with the current inflationary economic crisis in Ghana in the wake of the COVID-19 pandemic, can make continued use of allopathic services unsustainable for many Ghanaians. These factors can result in a necessity to use herbal medicines despite NHIS enrollment, a desire to engage with allopathic services, and knowledge of the potential risks of use of herbal medicines.

The Ghanaian herbal medicine industry comprises a commercialized sector and an unregulated traditional sector. The latter is made up of many individual traditional herbal practitioners who practise independently throughout the country. These practitioners produce traditional herbal medicines according to formulations which are inherited through oral tradition.

It will be argued that the safe preservation of the herbal industry, particularly the traditional practice, is at risk due to two main factors, as identified during placement in a hospital in the Eastern region of Ghana, although the potential for further contributory factors is acknowledged. First, the concerns from allopathic practitioners over the safety profiles of herbal preparations. Second, the tension caused by fundamental differences in the therapeutic frameworks of the two practices, which has led to misinformation being spread by herbal practitioners regarding allopathic medicine. Higher levels of health literacy will increase awareness and reduce tolerance of these factors, leading to the potential loss of the traditional practice due to cultural pressure. To prevent this, changes need to be made both to the herbal practice itself and to its relationship with allopathic practice.

SAFETY OF TRADITIONAL HERBAL MEDICINES

Theoretically, commercialized forms of herbal medicine are subject to similar levels of regulation as allopathic medicine by Ghana's Food and Drug Administration. However, poor enforcement of such regulations and the presence of loose distribution channels both pose significant risks to quality control and safety in the herbal industry. These potential risks are reflected in public opinion with surveys of both the general population and allopathic healthcare practitioners demonstrating significant levels of concern over the safety profiles of herbal medicines (Kretchy et al., 2016, 2021). Such concerns are substantiated both by anecdotal evidence and by reports of poisonings in the medical literature (Ekor, 2014; Okaiyeto & Oguntibeju, 2021). The most significant safety risks are those of contamination with pathogens and of toxicity due to drug-drug interactions and unintentional overdosing.

Contamination with pathogens is prevalent, even in the more regulated commercial herbal medicine sector. One study assessing samples of herbal medicines purchased across three of the largest markets in the Ghanaian capital, Accra, found that 63.3% of imported herbal preparations and 76.7% of Ghanaian herbal preparations were contaminated with pathogenic bacteria (Darkwah et al., 2022). The risk is potentially even greater in the traditional sector due to the unregulated preparation of medicines in rural settings. However, a lack of research into this area means the prevalence of contamination in traditional herbal preparations remains unknown.

Significant numbers of patients regularly combine herbal and allopathic drugs in this manner (Ameade et al., 2018) with the risk of unintentional drug–drug interactions with herbal preparations relating to the lack of understanding of the makeup of most preparations, clearly leading the potential for harmful interactions.

The risk of toxicity due to unintentional overdosing is secondary to two factors. First, due to sociocultural influences which can dramatically increase the frequency of administration of these preparations and therefore of their active components. Examples of such sociocultural influences include religion and marital status, which are both independent predictors of increased frequency of use of herbal medicines. Married persons are thought to be greater users of herbal products to promote fertility, obstetric health, and sexual function, while the association between Christian and Traditionalist faiths and increased herbal medicine use is not well understood (Kretchy et al., 2021). The second factor contributing to the risk of unintentional overdosing is a lack of regulation of the doses of the active components in herbal preparations.

Both of these factors are exemplified by the case of a 25-year-old male patient encountered in a hospital in the Eastern region of Ghana. This patient was admitted with severe malaria, complicated by acute-on-chronic renal failure. He had a background of end-stage chronic kidney disease, thought to be secondary to toxicity from the overuse of traditional herbal medicines prepared for erectile dysfunction. Due to the logistical and financial difficulties of accessing drugs such as sildenafil, there is a high demand for herbal preparations with similar effects. This demand is exacerbated by the continued prevalence of polygyny (one male and multiple females in an intimate relationship) in Ghana. Approximately 18% of married women aged 18-49 in Ghana are in polygynous marriages (Adewale et al., 2021). The increased prevalence of such marriages in regions of the country with higher levels of economic deprivation and higher rates of infant and child mortality (Adewale et al., 2021; Alhassan, 2023; Ghana Statistical Service, 2022) can lead to a drive for multiple pregnancies for each woman in the marriage. To this end, regular sexual intercourse between each female and the single male is desirable. This can result in significant pressure on the men in these relationships to have frequent sexual intercourse to maintain polygynous marriages. These preparations also are known to be potentially toxic with one study demonstrating that nearly a quarter of such erectile dysfunction herbal medicines purchased across Ghana had effective doses which were higher than the equivalent maximum safely permissible daily dose of sildenafil (Akuamoa et al., 2021).

Thorough investigation into the safety profiles and makeup of traditional herbal medicines, alongside rigorous regulation of preparation techniques and dosing are urgently required to safely preserve this practice. In practical terms, this must be a pragmatic and graduated change, with a collaborative rather than punitive focus. The priority should be a scheme whereby practical hygienic preparation techniques are taught to traditional herbal practitioners is essential, with recommendations to avoid using the same tools as for food preparation, to clean tools with water between preparations, to use boiling water for extraction of herbal preparations wherever possible and to place limits on the "shelf-life" of such preparations when they are produced in rural settings, as achieved in other countries (Kwame, 2021). To avoid perceptions of allopathic condescension in this scheme, it could be delivered by practitioners from the widespread primary care facility network which is primarily staffed by nondoctors. This could be incentivised by the permission of herbal practitioners to promote their complementary preparations for common ailments within the grounds of these facilities. The second way in which this regulation should commence relates to the investigation of the safety profiles of herbal preparations. Quantification of the amounts of active compound in common ingredients should be carried out and compared with the equivalent doses of similar, known allopathic drugs. This could allow the production of a guideline with recommendations for the quantity of ingredient which is safe for consumption in one dose to avoid unintentional overdosing and toxicity of the most common components.

CONFLICTING THERAPEUTIC FRAMEWORKS AND MISINFORMATION

Allopathic medicine primarily employs a biopsychosocial interpretation of the patient-illness dynamic. In this framework, physical illness arises from the interactions of objective organic and environmental influences. Traditional medicine in Ghana and most of West Africa posits that illness develops as a result of imperfect relationships between the patient and their environment, with a strong emphasis on natural, social, and spiritual contextual factors. In this framework, such "natural" imbalances are often treated with herbal medicine, while perceived social and spiritual imbalances are often treated with pastoral, mystical, or magical interventions (Busia, 2005).

In isolation, such conflicts do not necessarily predispose to misinformation, however, when combined with a lack of systemic emphasis on strong evidence and transparency in the traditional herbal sector, poor communication between the sectors (Ampomah et al., 2023), and a perception of a threat to the position and authority of traditional practitioners due to the growth of allopathic medicine, ideal conditions are generated for the precipitation of misinformation (Yeboah, 2000).

During the COVID-19 pandemic, there was prevalent misinformation and subsequent abuse of traditional herbal preparations for the prevention and treatment of COVID (Tabong & Segtub, 2021). Another well-documented example of this misinformation is demonstrated by the continued deaths of many women, particularly in more deprived areas of Ghana due to the use of herbal remedies or other traditional practices for self-managed termination of pregnancy (Morhe et al., 2023; Yeboah, 2000).

A first-hand example of the negative effects of misinformation was also seen in the same hospital in the Eastern region of Ghana as previously mentioned. A 65-year-old patient presented with a right-sided middle cerebral artery stroke. She was severely hypertensive, with imaging confirming a hemorrhagic stroke that was likely precipitated by her uncontrolled blood pressure. This patient had already been discovered to be severely hypertensive one year prior. At the time, she was discharged with long-term amlodipine and told of the risks of noncompliance. She was adherent to this treatment regime for only three weeks before the village traditional herbal practitioner visited her at home. He argued that allopathic medicine was brought by the slave trade and should not be trusted. Instead, he claimed that her high blood pressure was caused by conflicts with nature, and advised that a herbal medicine should be taken in place of the amlodipine to correct this imbalance.

As levels of engagement with allopathic practice increase further, tension between the traditional and allopathic practices may rise. In turn, this could lead to increased misinformation, with serious consequences for the health of many across Ghana, but particularly in more deprived areas due to increased penetrance of misinformation (Pan et al., 2021; Yeboah, 2000). These negative health consequences of misinformation will no longer be tolerated as health outcomes improve in all other areas.

CONCLUSIONS

The safe preservation of the herbal medical practice in Ghana necessitates its modernization. Research into and regulation of the trade are required to ensure the production of safe, consistent preparations. In addition, the scope of the herbal practice may need to change significantly for it to persist in an increasingly allopathic healthcare landscape. The herbal practice could form part of a novel healthcare model capable of synergistically incorporating both practices.

To move towards such a system, four subsidiary recommendations are made:

1. Formation of centralized bodies which represent the interests of the whole traditional and allopathic practices to enable high-level dialog. The existing Ghana Federation of Traditional Medicine Practitioners Associations (GHAFTRAM) should be reorganized with a more extensive network of representatives on the township and even village levels, with regular meetings to ensure effective representation. In addition, there should be a drive to maximize the recruitment of currently associated practitioners, through an amnesty for and encouragement of healers whose herbal practice is intertwined with organized religion or stigmatized traditionalist practices to join.
2. Prioritization of shared understanding of the pharmacological actions of allopathic and traditional medicines to improve safety and circumvent the differences in philosophies by

placing a greater emphasis on the end-effects of allopathic drugs and traditional preparations.
3. Definition of mutually agreed limits of practice to avoid scope creep by either sector and to foster inter-practice relations through regular interactions for referral and follow-up of shared patients.
4. The acceptance by allopathic practitioners of the fact that a lack of evidence for many herbal preparations' efficacy does not equal evidence for a lack of efficacy, serving to reduce perceptions of condescension by allopathic practitioners and thus reduce tension between practices.

This would be a novel healthcare landscape which may prove unachievable due to differences in therapeutic frameworks and tension due to reduction in engagement with the traditional practice. Indeed, previous attempts at collaboration such as the Primary Health Training for Indigenous Healers (PRHETIH) program have widely been recognized as failures with scholars citing the lack of recognition of the two practices' differing pathophysiological models as a key factor (Kpobi & Swartz, 2019). These challenges have been previously identified in countries with higher levels of economic development with a historical emphasis of traditional practices—China and Egypt (Yakoot, 2013; Zhang et al., 2019), with the traditional practice in these countries eventually relegated to a lower level of importance, with emphasis on its spiritual and cultural elements. Such an outcome may be reached in Ghana, especially if increased research into the active components of herbal medicines leads to assimilation of a substantial proportion of the corpus of herbal remedies into the allopathic drug formulary. In this case, the traditional practice could continue to exist as an alternative practice focussed on its pastoral, spiritual, and mystical elements, which make up a significant proportion of the practice's cultural value and may provide psychological benefits to many patients.

To circumvent such problems, widespread incorporation of some elements of traditional medicine within the allopathic model could be trialed. An example of such incorporation could include the regular and nonjudgmental enquiry into the use of herbal preparations and patients' spiritual, pastoral, and natural influences and beliefs in a manner similar to the routine enquiry into patients' ideas, concerns and expectations in the Cambridge-Calgary model of allopathic consultation. This simple change could serve to change allopathic practitioners' beliefs and values regarding traditional medicine in a manner which encourages patients' use of the less potentially harmful elements of the practice, improving relations with the herbal practice and mitigating the potential for claims of condescension by allopathic practice. Furthermore, this change could contribute to a modernized holistic consultation model in Ghana's unique sociocultural context.

ACKNOWLEDGMENTS

The authors have nothing to report.

CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

ETHICS STATEMENT

The authors have nothing to report.

ORCID

Benjamin Clay http://orcid.org/0009-0002-0511-8991

REFERENCES

Abdullahi, A. A. (2011). Trends and challenges of traditional medicine in Africa. *African Journal of Traditional, Complementary, and Alternative Medicines*, *8*(5S), e010813. https://doi.org/10.4314/ajtcam.v8i5S.5

Adewale, D., Dey, N. E. Y., Ansah, K. O., Duah, H. O., & Agbadi, P. (2021). The association between polygyny statuses of currently married and in-union women and attitude towards intimate partner violence against women in Ghana. *Social Sciences & Humanities Open*, *4*(1), 100207. https://doi.org/10.1016/j.ssaho.2021.100207

Adua, E., Frimpong, K., Li, X., & Wang, W. (2017). Emerging issues in public health: A perspective on Ghana's healthcare expenditure, policies and outcomes. *EPMA Journal*, *8*(3), 197–206. https://doi.org/10.1007/s13167-017-0109-3

Agbenyo, F., Nunbogu, A. M., & Dongzagla, A. (2017). Accessibility mapping of health facilities in rural Ghana. *Journal of Transport & Health*, *6*, 73–83. https://doi.org/10.1016/j.jth.2017.04.010

Akuamoa, F., Hoogenboom, R. L. A. P., Hamers, A., Rietjens, I. M. C. M., & Bovee, T. F. H. (2021). PDE-5 inhibitors in selected herbal supplements from the Ghanaian market for better erectile function as tested by a bioassay. *Toxicology In Vitro*, *73*, 105130. https://doi.org/10.1016/j.tiv.2021.105130

Akweongo, P., Aikins, M., Wyss, K., Salari, P., & Tediosi, F. (2021). Insured clients out-of-pocket payments for health care under The National Health Insurance Scheme in Ghana. *BMC Health Services Research*, *21*(1), 440. https://doi.org/10.1186/s12913-021-06401-8

Alhassan, A. R. (2023). Polygynous marriage union among Ghanaian Christian women: Socio-demographic predictors. *PLoS One*, *18*(4), e0275764. https://doi.org/10.1371/journal.pone.0275764

Ameade, E., Ibrahim, M., Ibrahim, H. S., Habib, R. H., & Gbedema, S. Y. (2018). Concurrent use of herbal and orthodox medicines among residents of Tamale, Northern Ghana, who patronize hospitals and herbal clinics. *Evidence-Based Complementary and Alternative Medicine*, *2018*, 1289125. https://doi.org/10.1155/2018/1289125

Ampomah, I. G., Malau-Aduli, B. S., Seidu, A. A., Malau-Aduli, A. E. O., & Emeto, T. I. (2023). Integrating traditional medicine into the Ghanaian health system: Perceptions and experiences of traditional medicine practitioners in the Ashanti Region. *International Health*, *15*(4), 414–427. https://doi.org/10.1093/inthealth/ihac059

Atiga, O., Walters, J., & Pisa, N. (2023). Challenges of medical commodity availability in public and private health care facilities in the Upper East Region of Ghana: A patient-centered perspective. *BMC Health Services Research*, *23*(1), 719. https://doi.org/10.1186/s12913-023-09717-9

Boateng, R., Renner, L., Petricca, K., Gupta, S., & Denburg, A. (2020). Health system determinants of access to essential medicines for children with cancer in Ghana. *BMJ Global Health*, *5*(9), e002906. https://doi.org/10.1136/bmjgh-2020-002906

Busia, K. (2005). Medical provision in Africa—Past and present. *Phytotherapy Research*, *19*(11), 919–923. https://doi.org/10.1002/ptr.1775

Darkwah, S., Agbettor, D., Codjoe, F., & Donkor, E. S. (2022). Microbial contamination of herbal preparations on the Ghanaian market, Accra. *Microbiology Insights*, *15*, 11786361221139602. https://doi.org/10.1177/11786361221139602

Ekor, M. (2014). The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology*, *4*, 177. https://doi.org/10.3389/fphar.2013.00177

Frimpong, G., & Ofori-Kwakye, K. (2016). Access to essential medicines in Ghana: A survey of availability of children's medicines in medicine outlets in the Ashanti Region. *Journal of Applied Pharmaceutical Science*, *6*(10), 20–28. https://doi.org/10.7324/JAPS.2016.601003

Ghana Statistical Service. (2022). *Ghana 2021 population and housing census general report*. Ghana Statistical Service. https://census2021.statsghana.gov.gh/gssmain/fileUpload/reportthemelist/Volume%203%20Highlights.pdf

Kpobi, L., & Swartz, L. (2019). Indigenous and faith healing in Ghana: A brief examination of the formalising process and collaborative efforts with the biomedical health system. *African Journal of Primary Health Care & Family Medicine*, *11*(1), 2035–2039. https://doi.org/10.4102/phcfm.v11i1.2035

Kretchy, I. A., Koduah, A., Opuni, K., Agyabeng, K., Ohene-Agyei, T., Boafo, E. A., & Ntow, P. O. (2021). Prevalence, patterns and beliefs about the use of herbal medicinal products in Ghana: A multi-centre community-based cross-sectional study. *Tropical Medicine & International Health*, *26*(4), 410–420. https://doi.org/10.1111/tmi.13541

Kretchy, I. A., Okere, H. A., Osafo, J., Afrane, B., Sarkodie, J., & Debrah, P. (2016). Perceptions of traditional, complementary and alternative medicine among conventional healthcare practitioners in Accra, Ghana: Implications for integrative healthcare. *Journal of Integrative Medicine*, *14*(5), 380–388. https://doi.org/10.1016/S2095-4964(16)60273-X

Kwame, A. (2021). Integrating traditional medicine and healing into the Ghanaian mainstream health system: Voices from within. *Qualitative Health Research*, *31*(10), 1847–1860. https://doi.org/10.1177/10497323211008849

Morhe, E. K. S., Gbagbo, F. Y., & Morhe, R. A. S. (2023). Self-managed abortions in Ghana: A health policy framework analysis. *Public Health Challenges*, *2*(2), e101. https://doi.org/10.1002/puh2.101

Okaiyeto, K., & Oguntibeju, O. O. (2021). African herbal medicines: Adverse effects and cytotoxic potentials with different therapeutic applications. *International Journal of Environmental Research and Public Health*, *18*(11), 5988. https://doi.org/10.3390/ijerph18115988

Pan, W., Liu, D., & Fang, J. (2021). An examination of factors contributing to the acceptance of online health misinformation. *Frontiers in Psychology*, *12*, 630268. https://doi.org/10.3389/fpsyg.2021.630268

Tabong, P. T. N., & Segtub, M. (2021). Misconceptions, misinformation and politics of COVID-19 on social media: A multi-level analysis in Ghana. *Frontiers in Communication*, *6*, 613794.

Yakoot, M. (2013). Bridging the gap between alternative medicine and evidence-based medicine. *Journal of Pharmacology & Pharmacotherapeutics*, *4*(2), 83–85. https://doi.org/10.4103/0976-500X.110868

Yeboah, T. (2000). Improving the provision of traditional health knowledge for rural communities in Ghana*. *Health Libraries Review*, *17*(4), 203–208. https://doi.org/10.1111/j.1471-1842.2000.00297.x

Zhang, M., Moalin, M., & Haenen, G. R. M. M. (2019). Connecting west and east. *International Journal of Molecular Sciences*, *20*(9), 2333. https://doi.org/10.3390/ijms20092333

AUTHOR BIOGRAPHY

Benjamin Clay is a final year medical student at the University of Cambridge, School of Clinical Medicine and an aspiring surgeon. He has a BA in Neuroscience from the University of Cambridge (2021). His research interests are broad and encompass general, vascular, and plastic surgery as well as cardiology, paediatrics and global health. He is currently working with researchers from the Academic Section of Vascular Surgery at Imperial College London to apply natural language processing artificial intelligence to the electronic health record in order to reveal novel and translatable prognostic factors in patients undergoing surgery.

How to cite this article: Clay, B. (2024). Barriers to the safe preservation of the traditional herbal practice in Ghana. *World Medical & Health Policy*, *16*, 506–513. https://doi.org/10.1002/wmh3.612