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COVID-19 black swan and personal protective equipment (PPE) in Pakistan

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Abstract

Purpose – This paper aimed to examine the sources of information and use of personal protective equipment (PPE) during the COVID-19 pandemic in the province of Punjab, Pakistan. The COVID-19 pandemic affected at a large level of all social institutions including the healthcare system of the countries.

Design/methodology/approach – The study was conducted in Pakistan by using an online survey technique. The rationale to opt for this method was based on the country's lockdown situations, social distancing and the care of the respondents. A total of 847 individuals from different parts of the Punjab province participated in the study. An attitudinal scale was administered, which consisted of statements to measure (dis)agreement among the individuals on current situations of the COVID-19 pandemic. The ethical considerations and confidentiality of the respondents were opted by describing the purpose of research on the first page of the questionnaire.

Findings – The study findings revealed that peer group, signs and symptoms of COVID-19 pandemic and causes and consequences of COVID-19 pandemic had favourable positive effects on the use of PPE by individuals through the mediation of fear of infection during COVID-19 pandemic. Furthermore, the study findings were interpreted as per the effects of current situations of COVID-19 on the sources of information and the use of PPE by individuals.

Originality/value – This study focused on an important gap in the research on COVID-19 pandemic in the country in terms of mass media, health practitioners, peer group, fear of infection and use of PPE.

Keywords COVID-19 pandemic, Mass media, Health practitioners, Peer group, Fear of infection, Use of PPE

Paper type Research paper

Introduction

The SARS-COV-2 (COVID-19) outbreak has been labelled the "Black Swan", an unanticipated and unprecedented event, of the twenty-first century (Bai *et al.*, 2020; WHO, 2020a, b, c, d). The world has experienced a rare and unexpected event of such a large magnitude because of which global systems have been affected. As the COVID-19 pandemic developed and spread, immediate action was necessary (Lipsitch *et al.*, 2020); healthcare services were under tremendous pressure to treat the rapidly increasing number of infected patients (Taherifard and Taherifard, 2020; Wang and Lund, 2020; Wang *et al.*, 2021). The speed and severity of the pandemic put enormous stress on healthcare systems around the world (McCauley *et al.*, 2013; Shoaib and Abdullah, 2020, 2021). As is the case when there is a new respiratory infectious disease outbreak, such as COVID-19, it is vital that the knowledge and advice of infection prevention and control (IPC) experts is taken into account, listened to and acted upon (Ranney

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et al., 2020). At the onset of the pandemic, the World Health Organization (WHO) issued IPC guidelines, including the adoption of wearing personal protective equipment (PPE) (Freedman, 2020). Catastrophically, many COVID cases were caused by the inadequate or inappropriate use of PPE which had the devastating impact of drastically increasing the already-high global death toll (Shoaib and Abdullah, 2021).

The use and provision of PPE has had an enduring impact (Shoaib and Abdullah, 2021; WHO, 2020a, b, c, d) during the pandemic during which 8 million people have been infected with COVID-19 and 0.45 million have lost their lives around the world to date (WHO, 2020a, b, c, d). Due to an initial lack of knowledge, people were reluctant to use PPE correctly or, in some cases, at all (Adams and Walls, 2020; Amin, 2020; Driggin *et al.*, 2020). Information accessed through social media and government sources on television and radio was designed to teach how to effectively use PPE when away from home or at work (Gopalan and Misra, 2020; Lan *et al.*, 2021; Lum *et al.*, 2020). Ads on the precautionary measures that PPE offered against the virus were widely broadcast, including during televised news bulletins (Li *et al.*, 2020). It was found that peer groups acted as an effective source of spreading and disseminating PPE information (Cinelli *et al.*, 2020; Li *et al.*, 2020) as well as frontline healthcare staff, as many shared information on their personal social media accounts (Depoux *et al.*, 2020). Once PPE was being used on a large scale, the uptake became a motivating factor for those not already using it (McCauley *et al.*, 2013). Regardless of widespread policy and professional and personal efforts, partial or incorrect use of PPE has been observed and reported worldwide (Jameel and Faiz, 2020). In addition, from the earliest days of the pandemic, there have been countless anti-pandemic, anti-PPA and anti-vaccine campaigns on certain media outlets, such as social media and mobile phones (Pennycook *et al.*, 2020), with social media (i.e., Twitter, Google, Instagram) in particular being used to further spread and disseminate information, regardless of whether it was correct or not (Depoux *et al.*, 2020). Despite these issues, there is a lack of research on the part of governments and researchers with regards to sharing information about the benefits of PPE (Shoaib and Abdullah, 2020, 2021). Thus, we conducted this research to bridge the knowledge gap and create an awareness about the importance of using effective IPC with regards to PPE to motivate people to use PPE beyond the current pandemic but also in the case of any future epidemics or pandemics.

Review of literature

Mass media has played a significant role in spreading information and awareness of COVID-19, as numerous studies have revealed (Cinelli *et al.*, 2020; Depoux *et al.*, 2020; Li *et al.*, 2020; McCauley *et al.*, 2013). Moreover, fear about the risk of infection is also linked to the media, and many people are now routinely using PPE as part of life to prevent the spread of the virus (Shoaib and Abdullah, 2021). Scholars such as Depoux *et al.* (2020) have asserted that it is the responsibility of media to spread news and information about the pandemic as well as portray the effects of COVID-19 (Li *et al.*, 2020). Furthermore, many studies have revealed there are multiple sources of information, including the media, peer groups and health practitioners, regarding the COVID-19 pandemic and the use of PPE (Cinelli *et al.*, 2020; Depoux *et al.*, 2020; Shoaib and Abdullah, 2020, 2021).

Along with social media, several studies have asserted that peer groups and health practitioners have played an important role in spreading information regarding the pandemic and the use of PPE (Shoaib and Abdullah, 2020, 2021). Ranney *et al.* (2020) stated similarities with the present study about the role of health practitioners and the use of PPE. Adams and Walls (2020) revealed the importance of healthcare workers to prevent the spread of the pandemic, while Driggin *et al.* (2020) asserted the role of health practitioners in preventing outbreaks within healthcare systems. Regarding the Pakistani context, Noreen *et al.* (2020) highlighted the current COVID-19 pandemic, the limitations and the gaps concerning

Pakistan and revealed the impact of the pandemic on Pakistani society. Furthermore, the results of Shoaib and Abdullah (2020) supported similar findings about the nature of the pandemic effects on Pakistan.

Multiple variables and concepts have been used by researchers to study the COVID-19 pandemic through the lens of social sciences, including the role of media in spreading information (Cinelli *et al.*, 2020; Dong *et al.*, 2020; McCauley *et al.*, 2013; Shoaib *et al.*, 2021), signs and symptoms of COVID-19 (Banerjee and Rai, 2020; Fegert *et al.*, 2020; Freedman, 2020; Jianhua, 2020), the prevalence of the pandemic and consequences (Ćosić *et al.*, 2020; Imran *et al.*, 2020), causes and consequences of the pandemic, the role of health practitioners (Adams and Walls, 2020; Gopalan and Misra, 2020; Lipsitch *et al.*, 2020) and the fear of infection (Shoaib and Abdullah, 2020, 2021). Based on a review of the literature, the following conceptual framework has been developed for this study (see Figure 1).

Based on the conceptual framework of the study, the following hypotheses have been developed to test the model by employing the statistical technique.

H1. As a source of awareness during the COVID-19 pandemic, the mass media has direct effect on peer groups, health practitioners and the causes and consequences of the COVID-19 pandemic among individuals.

H2. Peer groups and social media exposure have a direct impact on the signs and symptoms of the COVID-19 pandemic among individuals.

H3. Health practitioners have a direct impact on the causes and consequences of the COVID-19 pandemic and the use of PPE.

H4. Peer groups, signs and symptoms and causes and consequences of the COVID-19 pandemic have all had favourable positive effects on the use of PPE due to the fear of infection.

Materials and methods

This study was conducted in the province of Punjab, Pakistan, by using an online survey technique. The rationale for choosing this method was based on lockdowns, social distancing and the safety of the respondents. A total of 847 individuals participated from 36 districts of

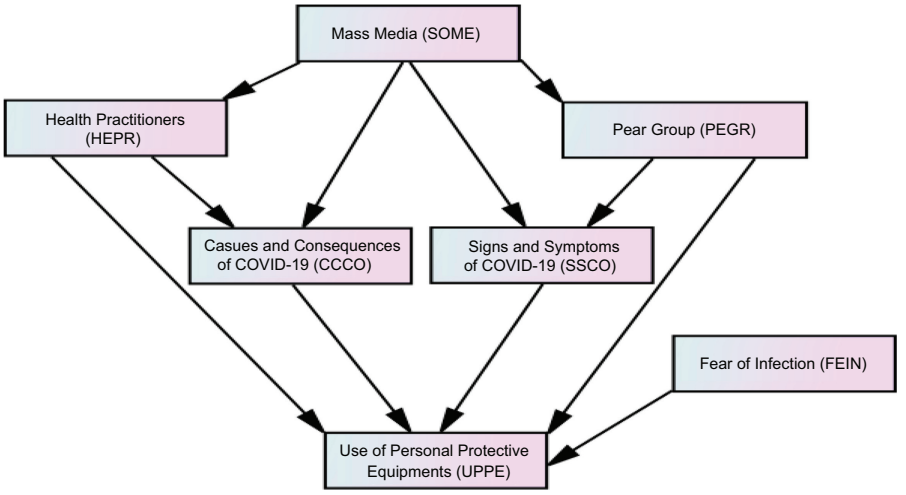

Figure 1.
Conceptual framework

the province. An attitudinal scale consisting of statements to measure (dis)agreement of the individuals facing the current situation of the COVID-19 pandemic was administered. The ethical considerations and confidentiality of the respondents were shared by describing the purpose of research on the first page of the questionnaire. Moreover, the scale was pre-tested, and the value of Cronbach's alpha was reported, ranging from 0.78 to 0.88 (overall 0.93). Furthermore, the structural equation modelling (SEM) technique was employed to test the model.

Results and discussions

The model portrayed the causal relationship between seven different measurements of information sources regarding the COVID-19 pandemic, fear of infection and the use of PPE. To test the hypothesis, a survey data from 847 individuals with three independent variables (exogenous), one dependent variable (endogenous) and one variable were used as a moderator (risk of infection). Moreover, two path variables were also used: "signs and symptoms of COVID-19" and "causes and consequences of COVID-19". For the questions measuring variables, individuals were asked to express their (dis)agreement with certain relevant statements on a 6-level Likert scale. Before discussing the model, it is important to describe the demographic characteristics of the participants.

Both females and males, aged between 23 and 54, participated and filled in the online questionnaire; the sample included participants from both rural and urban locations. More than half (69%) of the participants were married and residing with their families during the COVID-19 pandemic in the Punjab province. Moreover, all participants were literate and had a variety of occupations.

Hypotheses testing

Hypothesis 1: As a source of awareness during the COVID-19 pandemic, the mass media had direct effects on peer groups, health practitioners and the causes and consequences of the COVID-19 pandemic among individuals.

The results supported hypothesis 1 that there are direct favourable positive effects of mass media exposure as a source of information which has direct effects on peer groups, health practitioners and causes and consequences of the pandemic. Furthermore, the calculated results showed that mass media exposure as a source of information about the pandemic directly affected peer groups ($\beta = 0.250$, $p = 0.000$), health practitioners ($\beta = 0.255$, $p = 0.000$) and causes and consequences of the pandemic ($\beta = 0.103$, $p = 0.003$). Noreen *et al.* (2020) highlighted the limitations and the information gaps concerning the impact of the pandemic in Pakistan, while Shoaib and Abdullah (2021) had findings similar to ours in the context of peer groups and social capital in Pakistan. Similarly, Depoux *et al.* (2020) asserted the role of the media with regards to spreading news and information about Pakistan, and Li *et al.* studied the global media portrayal of the pandemic (2020).

Hypothesis 2: Peer groups and social media exposure have a direct impact on the signs and symptoms of the COVID-19 pandemic among individuals.

Hypothesis 2 is supported by the tabulated data that show there are direct effects of peer groups and social media exposure as a source of information about the pandemic and on the signs and symptoms of COVID-19 among individuals. Furthermore, the statistical results showed that peer groups ($\beta = 0.368$, $p = 0.000$) and mass media exposure as a source of information ($\beta = 0.286$, $p = 0.000$) have favourable positive direct effects on signs and symptoms of COVID-19. Jianhua (2020) discussed the signs and symptoms and prevalence of the virus and how it spread throughout China, as well as further detailing its significant consequences. Several studies have highlighted the role of social media as a source of

pandemic information and the various ways for individuals to protect themselves with precautionary measures (Cinelli *et al.*, 2020; Depoux *et al.*, 2020; Li *et al.*, 2020).

Hypothesis 3: Health practitioners have a direct impact on the causes and consequences of the COVID-19 pandemic and the use of PPE. The statistical analysis findings supported hypothesis 3 that there are direct favourable positive effects of health practitioners on the causes and consequences of the pandemic and the use of PPE. Furthermore, the results of the model showed that health practitioners have direct favourable positive effects on the causes and consequences of the pandemic ($\beta = 0.226$, $p = 0.000$) and the use of PPE ($\beta = 0.218$, $p = 0.000$). Ranney *et al.* (2020) had similar results regarding the role of health practitioners and the use of PPE. Likewise, Adams and Walls (2020) revealed the importance of healthcare workers during the pandemic and how their work, among other factors, prevented the spread of the virus. Driggin *et al.* (2020) stated the role and importance of health practitioners in preventing a COVID-19 outbreak within local healthcare systems.

Hypothesis 4: Peer groups, signs and symptoms and causes and consequences of the COVID-19 pandemic have all had favourable positive effects on the use of PPE due to the of fear of infection. The results in Table 1 support hypothesis 4 that there are direct effects of peer groups, signs and symptoms of COVID-19 and causes and consequences of the pandemic on the use of PPE due to fear of infection. Furthermore, the results of the model also showed that peer groups ($\beta = 0.121$, $p = 0.000$), signs and symptoms of COVID-19 ($\beta = 0.405$, $p = 0.000$) and causes and consequences of the pandemic ($\beta = 0.191$, $p = 0.000$) have favourable positive effects on the use of PPE due to fear of infection ($\beta = 0.077$, $p = 0.005$). Findings in several research studies revealed there are multiple sources of information regarding the COVID-19 pandemic and the use of PPE. Moreover, the risk of infection is linked with the media spreading fear, and PPE is now being used in everyday life as a preventative measure (Shoaib and Abdullah, 2020).

The study revealed that social media exposure as a source of information has indirect effects (standardized estimate = 0.092***) on COVID-19 signs and symptoms from peer groups sharing information. Similarly, the study presented that social media exposure as a source of information has indirect effects (standardized estimate = 0.030**) on the use of PPE

Variables	Standardized regression weights	Estimate	SE	CR	*p*
SOME → PEGR	0.250	0.261	0.035	7.495	***
SOME → HEPR	0.255	0.250	0.032	7.681	***
SOME → CCCO	0.103	0.082	0.027	3.003	0.003
PEGR → SSCO	0.368	0.359	0.030	12.135	***
SOME → SSCO	0.286	0.291	0.031	9.413	***
HEPR → CCCO	0.226	0.184	0.028	6.615	***
HEPR → UPPE	0.218	0.203	0.026	7.677	***
PEGR → UPPE	0.121	0.105	0.027	3.952	***
SSCO → UPPE	0.405	0.361	0.027	13.220	***
CCCO → UPPE	0.191	0.219	0.032	6.741	***
FEIN → UPPE	0.077	0.045	0.016	2.804	0.005
Variances					
SOME		5.372	0.261	20.567	***
FEIN		13.151	0.639	20.567	***
e1		4.797	0.233	20.567	***
e2		5.506	0.268	20.567	***
e4		4.077	0.198	20.567	***
e3		3.141	0.153	20.567	***
e5		2.818	0.137	20.567	***

Note(s): Chi-square = 666.389, df = 10, *p*-value = 0.000
AGFI = 0.923, GFI = 0.911, CFI = 0.903, RMSEA = 0.065

Table 1. Regression weights, variances and model summary ($n = 847$)

through communication shared among peer groups. Moreover, the study findings described that social media exposure as a source of information has indirect effects (standardized estimate = 0.058***) on the causes and consequences of the pandemic for health practitioners. In addition, the study findings also showed social media exposure as a source of information has indirect effects (standardized estimate = 0.056***) on the use of PPE for health practitioners.

Furthermore, the findings depicted that social media exposure as a source of information has indirect effects (standardized estimate = 0.116***) on the use of PPE through signs and symptoms of COVID-19 and illustrated that social media exposure as a source of information has indirect effects (standardized estimate = 0.020***) on the use of PPE on causes and consequences of the pandemic. Additionally, the results revealed that the peer group has indirect effects (standardized estimate = 0.149***) on the use of PPE on the signs and symptoms of COVID-19. Similarly, the findings stated that health practitioners have indirect effects (standardized estimate = 0.043***) on the use of PPE through the treatment of the causes and consequences of the pandemic (refer to Table 2 and Figure 2).

Table 2.
Indirect effects of the model (n = 847)

Indirect path	Unstandardized estimate	Lower	Upper	p-value	Standardized estimate
SOME → PEGR → SSCO	0.094	0.070	0.124	0.001	0.092***
SOME → PEGR → UPPE	0.027	0.013	0.045	0.004	0.030**
SOME → HEPR → CCCO	0.046	0.033	0.063	0.001	0.058***
SOME → HEPR → UPPE	0.051	0.031	0.075	0.001	0.056***
SOME → SSCO → UPPE	0.105	0.084	0.132	0.001	0.116***
SOME → CCCO → UPPE	0.018	0.009	0.030	0.001	0.020***
PEGR → SSCO → UPPE	0.130	0.098	0.168	0.001	0.149***
HEPR → CCCO → UPPE	0.040	0.026	0.057	0.001	0.043***

Note(s): Significance of Estimates: ***$p < 0.001$, **$p < 0.010$, *$p < 0.050$, † $p < 0.100$
Total number of observations = 847

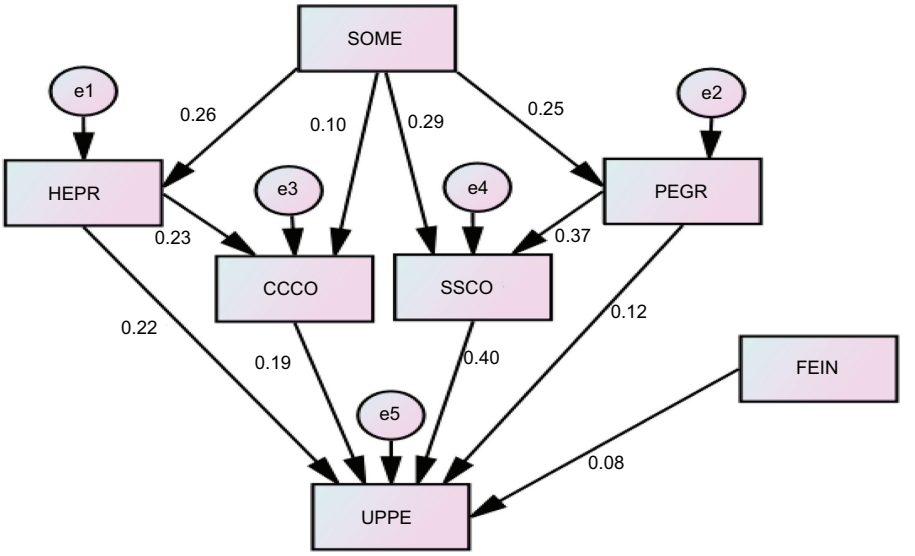

Figure 2.
Model fit path diagram

In Pakistan, mass media, including social media networks, was used to campaign and raise awareness of the benefits of using PPE (Shoaib and Abdullah, 2020, 2021) and to help the public disseminate information regarding the outbreak and protective measures (Noreen *et al.*, 2020). Moreover, research suggested peers and family members play a huge role in sharing information, especially official information given by the WHO and governments. However, COVID-19 information was also transmitted through social media tools normally used for communication (Bai *et al.*, 2020; Cinelli *et al.*, 2020; Depoux *et al.*, 2020), including encouragement to adopt PPE (Li *et al.*, 2020) even though a significant portion of the population still consulted doctors and healthcare workers for PPE advice (McCauley *et al.*, 2013). Medical staff offered guidance about how to properly use PPE and why it is beneficial and an effective measure to avoid infection or spread of the virus (Adams and Walls, 2020). The combination of professional advice and social media has been beneficial in managing COVID-19 by encouraging the use of, and even purchasing, PPE.

Conclusion

The COVID-19 pandemic has affected the world in many ways, two specifically being the use of PPE and the fear of infection. There are a host of sources contributing to raising awareness, including social media, peer groups and health practitioners. Moreover, causes and consequences, signs and symptoms and fear of infection have also been reported as contributing factors to the use of PPE. Thus, this study concludes that peer groups, signs and symptoms of COVID-19 and the causes and consequences of the pandemic have had favourable positive effects on the use of PPE by individuals due primarily to the fear of infection. As a result, there is an urgent need for assistance by individuals, governments and communities for facilitating individuals to be able to convince the unconvinced about the importance of overcoming the COVID-19 pandemic through the proper use of PPE.

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Motivating or stigmatising? The public health and media messaging surrounding COVID-19 and obesity: a qualitative think aloud study

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Abstract

Purpose – The purpose of this study is to explore how individuals with overweight and obesity living in the UK respond to the public health and media messaging surrounding COVID-19 and obesity.

Design/methodology/approach – Qualitative interview study with a think aloud protocol. A total of 10 participants self-reported to have overweight, obesity or as actively trying to lose weight were recruited through social media and were asked to think aloud whilst exposed to four sets of public health and media materials describing the link between COVID-19 and obesity. Interviews were conducted over zoom, recorded and transcribed verbatim.

Findings – Three primary themes were identified through thematic analysis: "flawed messaging", "COVID-19 as a teachable moment" and "barriers to change". Transcending these themes was the notion of balance. Whilst the messaging around COVID-19 and obesity was deemed problematic; for some, it was a teachable moment to facilitate change when their future self and physical health was prioritised. Yet, when focussing on their mental health in the present participants felt more overwhelmed by the barriers and were less likely to take the opportunity to change.

Practical implications – Findings hold implications for public health messaging, highlighting the need for balance between being educational and informative but also supportive, so as to achieve maximum efficacy.

Originality/value – This study offers a novel and useful insight into how the public health and media messaging concerning COVID-19 risk and obesity is perceived by those with overweight and obesity.

Keywords Media, Communication, Stigma, Public health, Obesity

Paper type Research paper

Introduction

Research indicates that those with obesity are at a greater risk of adverse outcomes from COVID-19 (Docherty *et al.*, 2020; Földi *et al.*, 2020; Hamer *et al.*, 2020; Khawaja *et al.*, 2020; Yang *et al.*, 2021; Yates *et al.*, 2020). In response to this, the UK Government introduced a number of measures to reduce obesity prevalence within the UK, including legislative changes and a new public health campaign "*Better Health*" to reduce the risk of serious illness, including that caused by COVID-19 (https://www.nhs.uk/better-health/). This campaign launched a series of free tools designed to support individuals to eat healthily, get physically

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active and drink less alcohol. In particular, the new app "*12-week NHS Weight Loss Plan*" aims to help prevent weight gain by helping individuals to make healthier food choices. In addition, recommendations were made for calories to be added to restaurant menus. Further, this campaign was then covered by the media (e.g. print media, online media and social media) as a means to make both the evidence and the campaign accessible to the general public. Previous research suggests that public health campaigns can be helpful through improving knowledge and changing attitudes and subsequent behaviour (Kite *et al.*, 2018). The impact of public health messaging on obesity, however, is complex and raises issues of personal control, responsibility and blame (8). For example, public health messaging highlighting a behavioural model of obesity predicts stronger beliefs in weight being modifiable and controllable (Klaczynski *et al.*, 2004), which in turn can lead to greater weight-related self-efficacy (Burnette, 2010; Burnette and Finkel, 2012). In contrast, however, this approach has also been criticised for its emphasis on personal responsibility for weight and the link with weight bias which may undermine behaviour change (Pearl and Lebowitz, 2014). For example, research suggests that whilst exposure to weight bias messaging can promote motivation to lose weight, it also simultaneously decreases self-efficacy and increases negative affect (Major *et al.*, 2020) with studies reporting mixed result (Hübner *et al.*, 2016; Lambert *et al.*, 2019; Latner *et al.*, 2009; Puhl *et al.*, 2017; Stewart and Ogden, 2019; Wott and Carels, 2010). Furthermore, both weight bias and weight bias internalisation have been linked with increases in body weight and maladaptive eating behaviours and lower motivations for and levels of physical activity (Araiza and Wellman, 2017; Vartanian and Novak, 2011).

The UK Government therefore responded to evidence for the link between obesity and poorer outcomes to COVID-19 with a public health campaign which was subsequently described in the media. To date, the response to this campaign and coverage by the media is unclear, and whilst its goal was to motivate change, it has also been criticised for being stigmatising and illustrative of weight bias. The present study therefore aimed to explore how those who are overweight or living with obesity respond to the campaign using a qualitative think aloud protocol.

The think aloud method was developed as a reflective approach in which individuals verbalise aloud their thinking, offering a unique insight into internal narratives and decision-making processes (van Someren *et al.*, 1994). It has been used widely within research assessing sport and exercise, eating behaviour, addiction and illness cognitions (Crane *et al.*, 2017; Ogden and Roy-Stanley, 2020; Oort *et al.*, 2011; Whitehead *et al.*, 2015). The method is intrinsically participant led, minimising the role of the researcher and aims to tap into an un-interrupted stream of consciousness. Given the political nature of the focus of this study, the tensions existing in the obesity literature concerning behaviour change and weight bias and the potential for researcher bias, the think aloud approach was therefore deemed a novel and appropriate methodology to use.

Aims

The present study aimed to explore how those with overweight and obesity living in the UK respond to the public health and subsequent media messaging surrounding the relationship between obesity and COVID-19, with a focus on whether this was perceived to be motivational or stigmatising. Due to the exploratory nature of this research, a qualitative think aloud approach was utilised to minimise research bias and capture individuals' in-depth thoughts.

Methods

Design

The study used a qualitative design with a think aloud protocol, whereby participants were asked to think aloud whilst exposed to four sets of public health and media-based materials describing the link between COVID-19 and obesity.

Participants

A total of 25 participants expressed interest in participating in this study by responding to an advertisement on Twitter calling for those living with overweight or obesity to describe their thoughts about the messaging surrounding obesity and COVID-19. From those, 10 participants consented to participate. Eligibility criteria for those participants were: (1) English speaking, (2) over the age of 18, (3) had a BMI of 25+ and (4) had access to either a tablet, laptop or PC with a stable Internet connection.

Measures

Demographics. Participants reported their age, gender, self-reported BMI group (underweight, healthy weight, overweight and obesity), ethnicity and voting preferences. Participants also self-reported their height and weight to calculate BMI.

The think-aloud process. Participants were exposed to three forms of written information and watched one high-profile personal experience video describing the association between obesity and the outcomes from COVID-19. Participants were asked to read/watch the materials at their own pace and to share any thoughts and feelings provoked by what they read/saw, as they occurred to them, out loud. It was made clear that there were no right or wrong responses, and that the researcher was interested in their own unique experiences and thoughts. Participants were reminded of these instructions before reading/watching each material and were offered prompts such as *What are you thinking*? *What is going through your mind*? and *How does this make you feel*? If the researcher deemed it appropriate. When participants had finished reading/watching each material, they were offered an opportunity to share anything else that they deemed to be relevant.

The interventions. The communication surrounding COVID-19 took many different forms. In particular, it contained factual content about COVID-19 and obesity, emphasised government level interventions which could be described as "nanny-state" based on their interference with personal choice and freedom and emphasised individuals' personal responsibility or was based on personal stories.

The interventions were therefore developed to reflect each of those components of messaging. The materials were as follows:

(1) Factual press release describing the association between obesity and COVID

In July 2020 Public Health England (PHE) published a press release summarising a longer PHE report summarising findings that individuals with obesity increases the risk of serious illness and death from COVID-19 (retrieved from https://www.gov.uk/government/news/excess-weight-can-increase-risk-of-serious-illness-and-death-from-covid-19). The press release presents objective findings from the report such as the statistics highlighting the increased risk having overweight and obesity poses and contains quotations from health professionals.

(2) Newspaper article focussing on the need for nanny-state government interventions or personal responsibility

On the same day as the release of the PHE report two contrasting newspaper articles were published in the Guardian (retrieved from https://www.theguardian.com/society/2020/jul/25/public-health-england-calls-for-action-on-obesity-in-covid-19-fight) and the Daily Mail (retrieved from https://www.dailymail.co.uk/news/article-8557629/Overweight-people-THREE-TIMES-likely-die-Covid-19.html). These articles included details concerning the PHE report and although reflecting similar material, the content of the articles reflected two distinct narratives focussing on either: (1) nanny-state style government interventions and (2) the personal responsibility individuals have for their weight. To match the articles for length

and factual content, two composite articles were created by selecting relevant text to reflect each of these narratives, ensuring these also matched the PHE press release on length.

Nanny-state government interventions: This composite article reflecting nanny-state government interventions contains information from both the Guardian and the Daily Mail. It includes recommendations from public health experts such as a ban on junk food TV advertisements, in-store promotions and mandated publishing of calories on restaurant and takeaway menus in efforts to make it easier for individuals to lose weight.

Personal responsibility: This composite article reflecting the personal responsibility individuals have for their weight also contains information from both the Guardian and the Daily Mail. It includes information specifically relating to diet and exercise, with a particular focus on food shopping and unhealthy snacking habits, and physical activity levels.

(3) High-profile personal experience

Participants also watched a short two-min video clip published on YouTube (retrieved from https://www.youtube.com/watch?v=kmA9N-gikY4&t=56s) which consisted of the UK Prime Minister Boris Johnson describing how since his recent hospitalisation from COVID-19, he had lost at least a stone in weight. He describes the personal steps he took to lose weight such as increasing his physical activity. He describes the benefits both physically and psychologically of losing weight as a public motivational plea for individuals to lose weight and introduces the government's Better Health strategy.

Procedure

Participants registered interest in taking part in this study by providing an email address via an anonymous weblink to the survey host platform *Qualtrics*, in response to social media advertisements. Participants provided their informed consent and were reminded they could terminate the study at any point. Interviews took place on zoom were audio recorded and transcribed verbatim. Participants were presented the study materials in a randomised order to counter order effects. Participants read three written articles (PHE press release, government interventions and personal responsibility) and viewed a high-profile personal experience video. At the end of the study, participants were debriefed and completed a short demographic questionnaire. Interviews were conducted between October 2020 and January 2021 and took between 40 min and 1 h 30 min.

Data analysis

Thematic analysis is commonly used within qualitative research to identify, analyse and report patterns, providing researchers with a structured, yet flexible approach to in-depth exploration of qualitative data (Braun and Clarke, 2006). Given its widespread use and application to think-aloud interview studies, thematic analysis was deemed to be appropriate (Crane *et al.*, 2017; Ogden and Roy-Stanley, 2020). The thematic analysis was conducted in five stages (Braun and Clarke, 2006): (1) familiarisation with the data, (2) generation of initial codes, (3) searching for themes, (4) reviewing themes and (5) defining and naming themes.

Reflexivity

Numerous quality assessment frameworks have been proposed by researchers, however discussions surrounding the transparency of biases that researchers can bring to qualitative analysis is of particular relevance. In accordance with recommendations to reduce the impact of bias, the researcher made reflective notes throughout the analytic process and was careful to re-read transcripts in attempts to identify alternate interpretations and perspectives, to ensure the analysis remained grounded in the data (Yardley, 2000).

Results

Ten participants were interviewed via zoom. Participant ages ranged from 25 to 58 (mean = 37.5, SD = 12.43). Eight participants were female, and two participants were male. The majority of participants were White (n = 9), and one participant was Asian. Five participants identified to be overweight, four participants identified to have obesity and one participant identified as currently being of a healthy weight, but described how she had been overweight at the start of lockdown and had lost weight post-pregnancy (21 months post baby) in the past 12-months and was continuing to do so. Participant BMI values ranged from 24.83 to 48.85 (mean = 32.48, SD = 9.09). Given the political nature of the messaging participants also described their political affiliation as follows: No political party (n = 4), Liberal Democrats (n = 3), Labour Party (n = 1), Conservative Party (n = 1) and Alliance Party of Northern Ireland (n = 1). Participant demographics can be found in Table 1.

Three main themes with subthemes were identified through thematic analysis: *Flawed messaging; COVID-19 as a teachable moment*; and *barriers to change*. Transcending these themes was *the notion of balance*. These themes summarise how individuals respond to public health and media messaging describing the links between obesity and COVID-19.

Theme 1: Flawed messaging

Participants were very critical of the messaging describing how the use of fear mongering strategies and stigmatising language used made them feel, the impact it had upon them and could have upon others and how it lacked clarity and was inconsistent. The flawed messaging was described through five subthemes: *fear mongering*, *stigma*, *in-consistency of messaging* and the *costs* and *benefits*. See Table 2 for exemplar quotations.

Fear mongering. Participants described how the language surrounding body weight and COVID-19 in the messaging reflected fear mongering strategies, and how it was inciting fear as a means to instigate change. They also described the impact of this fear on their mental health, and some stated disapproval at how that they believed that the government was exploiting fear initiated by the COVID-19 pandemic to encourage others to address weight problems.

Stigmatising. The language used to convey the relationship between COVID-19 and weight was deemed to be stigmatising by several participants who also described how this stigma had negatively impacted upon their psychological well-being. Some participants also described experiences of stigma in their previous attempts to lose weight in response to the calls for individuals with overweight and obesity to be more active. Further, participants compared this current messaging with the cancer research and obesity campaign that was released in July 2019 and was widely criticised by the body positivity movement.

Table 1. Participant characteristics

Pseudonym	Gender	Age	BMI category	Ethnicity	Voting preferences
Claire	Female	25	Overweight (25–29.9)	Asian	No party
Amy	Female	33	Overweight (25–29.9)	White	No party
Harriet	Female	25	Obese (>30)	White	No party
Matthew	Male	40	Overweight (25–29.9)	White	Labour party
Lucy	Female	31	Overweight (25–29.9)	White	No party
Wendy	Female	58	Obese (>30)	White	Liberal Democrat
John	Male	52	Obese (>30)	White	Liberal Democrat
Beth	Female	26	Overweight (25–29.9)	White	Liberal Democrat
Diane	Female	35	Healthy weight (18.5–24.9)	White	Other (Alliance)
Jenny	Female	53	Obese (>30)	White	Conservative party

Theme and subtheme	Exemplar quotations
Flawed messaging	
Fear mongering	"*. . .from my perspective, it frightened me to death, and I had bouts of depression and felt terrible while I got my head round it, I just thought I was going to die*." – Wendy
	"*A bit insipid to capitalise on the fear of the virus*." – Matthew
Stigma	"*So, we've got a massive negative stigmatisation about fat being bad. How's that gonna make people with larger bodies feel? So, it just makes them go Oh God. So, you're made to feel non valuable, so straight into the weight stigma*." – Wendy
	"*I do not know if I like the idea of the advertising campaign make people fearful of weight . . . that backfired when they did it with the cancer advertisement. People just feel blamed and victimised*." – Diane
In-consistency of messaging	"*Do you know what makes me laugh here is they say there's an anti-obesity strategy. And then they say they did that food deal [. . .] Yeah help out eat out. But I feel like if, if obesity is such a problem and take away food is the problem then why is that being offered?*" – Claire
	"*The governments whole Eat Out Help Out scheme in August or whatever it was . . . they wanted to, you know, restart the hospitality industry to have restaurants and pubs and things, but actually, was that the best choice knowing that obesity is a big problem in the UK?*" – Amy
Costs	"*That's a rea conflict for me because yes absolutely you know we are facing a massive obesity crisis but equally, you know in an already anxious kind of world . . . eating disorders are on a rise and that's erm not to be discounted*." – Amy
	"*That is obviously something that might lead to more anxiety with erm people who have eating disorders*." – Harriet
Benefits	"*I used to really love going into Pret a Manger when I was working in the local city. And knowing that if I had 2 boiled eggs and some spinach, it was about 15 calories. And if I had the artisan French stick with ham, chicken, and mayonnaise, it was about 8,000 calories. I just like knowing that it was there. And sometimes it swayed my choice*." – John
	"*I'm somewhere like at the Starbucks, and they have the calories for their drinks, or snacks. There's definitely times I've gone in and been like you know what I'm just going to have the hot chocolate, I'm just gonna do it. And then you see, it's like, I do not know, 400 calories. And then you work through the board. And then you end up with a black Americano . . . again . . . because it's like four calories*." – Diane

Table 2.
Theme 1: flawed messaging exemplar quotations

In-consistency of messaging. Many participants commented on the inconsistencies in public health messaging, highlighting a need for clarity and in particular drew parallels with the government's *Eat Out to Help Out* scheme launched in the summer of 2020 which encourage the British public to eat out at restaurants. This conflict was described as frustrating and some alternative suggestions as to what could have been implemented in the place of *Eat Out to Help Out* such as discounts on healthier local produce.

Costs and benefits. Many participants commented on the provision of calorie contents on restaurant menus and discussed this in terms of the potential costs and benefits of doing so. Almost all participants described the publication of calories at restaurants to be something they approved of with some providing stories explaining how the publication of calories has informed healthier food and drink choices in the past. Some, however, highlighted concerns that whilst they themselves welcomed the change; it could potentially be problematic within the context of eating disorders.

In summary, this *flawed messaging* theme describes how individuals were critical of the messaging surrounding body weight and risk COVID-19 perceiving it as stigmatising and at times inconsistent. They also evaluated the costs and benefits of the government's new strategy, and whilst the publication of calorie content on menus was welcomed, they also shared concerns that such changes could lead to an increase in disordered eating.

Theme 2: COVID-19 as a teachable moment

Participants also described how the pandemic had at times motivated them to change their behaviour, and how this had been facilitated by the public health and media messaging.

COVID-19 was therefore considered a teachable moment which is characterised by four subthemes: *Risk of obesity, behaviour change*, *weight loss* and *future health*. See Table 3 for exemplar quotations.

Risk of obesity. Participants described how the messaging had helped to raise the salience of the risk of obesity to health both within the context of COVID-19, and in general. In particular, they described an increased awareness that their weight increases their risk of COVID-19 and discussed the role of other weight related co-morbidities such as heart disease and asthma. Some participants also described how the messaging has also made them more aware of the links between their weight-related co-morbidities and their future health risk regardless of COVOD-19.

Behaviour change. For many, the pandemic was seen as a teachable moment, and they described how the pandemic had made them more receptive to messaging about behaviour change. For example, by consolidating their intentions to make lifestyle changes such as reducing the number of take-aways. Participants, however, also described having an increase in unhealthy eating behaviours throughout the course of the pandemic and described having to find alternative ways to engage in physical activity whilst adhering to public health guidelines and legislation.

Weight loss. On reading the messaging, some participants described how COVID-19 had offered a moment to reflect on their weight which had reinvigorated their motivation to lose weight. They therefore regarded the messaging as impactful. Participants, however, also talked about actual weight change, during the COVID-19 pandemic and whilst the messaging had made them more aware of their weight and motivated to change this had been mostly translated into most managing to maintain their weight rather than put more weight on.

Future health. Participants also described being motivated to change their behaviour for benefits beyond a reduction in COVID-19 risk. In particular, participants recognised that

Table 3.
Theme 2: COVID-19 as a teachable moment exemplar quotations

Theme and subtheme	Exemplar quotations
COVID-19 as a teachable moment	
Behaviour change	"*I would not say I was worried before but it's kind of like [. . .] kind of solidified my resolutions to kind of have a healthier lifestyle, [. . .] This thing is actually dangerous. And you need to kind of, like lead a healthier lifestyle. And like, this is why it's bad.*" – Lucy
	"*I think my activity levels have changed. But I think it's different type of activity . . . rather than walking from one meeting to another, were trying to get started by going out for like one lunchtime walk or getting it in by doing long walks on the weekend.*" – Beth
Weight loss	"*I feel that now seeing looking and reflecting over the last nine to 10 months . . . I'm feeling like a revitalise, I need to do something, I need to refocus on my own health to lose the weight, get going and actually concentrate on losing that weight.*" – Jenny
	"*I have like gone through . . . kind of being overweight at the beginning of lockdown. And then like [. . .] I kind of started to lose weight to, um, kind of like . . . I'm still in the overweight category, but it's not far until I'll be down*" – Harriet
	"*I'm kind of proud to say that I did not gain any weight at all throughout the whole lockdown.*" – Lucy
Future health	"*It's pretty clear that it . . . losing the weight would help. It's not just about COVID and the pandemic. It's all about the cancers, your heart disease.*" – Jenny
	"*In the last six months, I've lost about a stone. So, I feel like it has helped . . . but I actually feel healthier for it. Like, with my condition with PCOS, it's a . . . it's a lot better, and the symptoms are better, and I'm only actually in pain now when I'm on my period. So, I feel like that its actually benefited me losing weight.*" – Claire

changing aspects of their behaviour had the potential to prevent other health conditions from developing in the future. Similarly, participants also described how changes in behaviour and weight as a result of the public health and media messaging had also been beneficial for the management of pre-existing chronic conditions and general psychological well-being.

In summary, for some, the COVID-19 pandemic and the resulting messaging can be a considered a teachable moment with participants describing an increased recognition of the risk of obesity and their future health resulting in changes to their eating and exercise behaviours and increasing their intentions to lose weight. For some, this translated into weight loss but for most, weight maintenance was the main outcome.

Theme 3: Barriers to change

Although participants described COVID-19 to be a motivator for change, they also described a number of barriers that are reflected in four subthemes: *Environmental barriers*, *social barriers*, and *political beliefs*. See Table 4 for exemplar quotations.

Environmental barriers. Participants discussed environmental barriers to engaging in behaviour change, largely taking the form of accessibility limitations reflecting legislative guidelines. For example, the closure of gyms and the stay-at-home message was described as making it more challenging to engage the types of physical activity they engaged in before the pandemic.

Social barriers. In addition to environmental barriers, participants also described a range of social barriers to behaviour change throughout the COVID-19 pandemic. For example, changes in work demands had impacted individuals' ability to prioritise their own health and well-being.

Political beliefs. The final barrier to behaviour change was the impact of the participant's political beliefs, which clearly impacted upon their responses to the messaging around body weight and COVID-19. Specifically, those who did not identify themselves to be a supporter of the conservative government were particularly frustrated and sceptical of the motivations surrounding government public health messaging which acted as a barrier to motivations to engage with this messaging and change their behaviour.

Theme and subtheme	Exemplar quotations
Barriers to change	
Environmental barriers	"*. . . in terms of being restricted to one's house and how you're stuck in your own room. How can you do sport if you're locked in for two weeks?*" – Matthew
	"*. . . exercise levels, it's not been increased. And for the first time . . . it's just come to mind that I guess that makes sense because gyms are closed pools are closed. And some people might not be able to exercise at home for whatever reason, and they might not have been able to get out.*" – Harriet
Social barriers	"*I think things started to settle, certainly in the NHS although it was still chaotic. We kind of knew what we were dealing with and things felt a bit more manageable. So . . . think I was able to start thinking about my own health a bit more [. . .] And then coming back into the second wave and winter. I think it hit that place of realising that this is not going away. There's no point in waiting for this to end before I do something.*" – Diane
	"*. . . the really, really militant kind of body positive people just will not even listen to any of this. Like if they read this, they would get really angry and just kind of disregard everything.*" – Harriet
Political barriers	"*I think, for me, this is not just about politics, it's about [Boris Johnson] as a character. He has no credibility with me whatsoever. So, in fact, it's just reinforced some of my beliefs . . .*" – Wendy
	"*I just do not trust [Boris Johnson]. Just feels like a publicity stunt.*" – Diane

Table 4.
Theme 3: barriers exemplar quotations

This theme *Barriers* describes some of the perceived barriers participants had to changing their behaviour or losing weight as a result of the public health messaging surrounding COVID-19 and body weight. These were present across a range of domains, including environmental barriers largely dictated by legislative guidelines, social barriers such as work demands and participants' political beliefs.

Transcending theme: notion of balance

Participants therefore responded to the public health and media messaging with by describing the messaging as flawed, seeing it as a teachable moment and describing a number of barriers to behaviour change. Transcending these three themes was the notion of balance. In particular, participants described how whilst the messaging had motivated them to change, this had been undermined by a number of barriers, and that they needed to find a balance between looking after their mental health in the here and now and improving their future health after lockdown by losing weight. Therefore, whilst the messaging had made them more aware of the risks of their weight to their health, the impact of the pandemic on their daily lives had resulted in a need for greater self-care which had undermined any desire for weight loss. See Table 5 for exemplar quotations.

Furthermore, their responses to the messaging also illustrated the need for balance in the language used, and whilst participants recognised that there was a need to communicate the relationship between weight and COVID-19, they felt that this should be done sensitively as stigmatising language was seen as undermining the extent to which the COVID-19 pandemic can serve as a teachable moment.

Discussion

The present study aimed to explore participants' responses to public health and media messaging surrounding COVID-19 and obesity. Overall, participants described the messaging as flawed for being stigmatising, inconsistent and lacking clarity. Further, whilst this messaging it had raised the salience of the health risks of obesity both in terms of the COVID-19 and more generally which had motivated behaviour change for some, the extent of this teachable moment had been limited by barriers such as working from home and the closure of gyms. Furthermore, participants described having to find a balance between their mental health in the here and now during the pandemic vs physical health in the future. Therefore, whilst the messaging around COVID-19 and obesity was deemed as problematic for some, it could be considered a teachable moment to facilitate change when individuals prioritise their physical health and future self. Yet, when focussing on their present self and placing the emphasis on mental health participants felt more overwhelmed by the barriers and were less likely to take the opportunity to change.

The findings from this study therefore hold important implications for public health messaging, highlighting a need for balance between being educational and informative, but

Table 5.
Transcending theme: the notion of balance

Exemplar quotations
The notion of balance
"*It is monstrously difficult; I think surviving lockdown is more important than trying to get people to lose weight in lock down I mean . . .*" – Matthew
"*So basically, I thought like on the scale of like, my life versus like several extra kilos, probably several extra kilos is a better outcome than losing my life*" – Lucy
"*People are trying to cope with lockdown on and lost employment but might have been told that you have to lose weight at the same time. It's quite unhelpful.*" – Diane

also supportive, so as to achieve maximum efficacy (Lillis *et al.*, 2009; Pearl and Puhl, 2018; Puhl and Heuer, 2010). The pandemic presents with a considerable risk to both an individual's mental and physical health (Banerjee and Rai, 2020; Földi *et al.*, 2020; Yang *et al.*, 2021; Yates *et al.*, 2020); therefore, it has been important for individuals to not only manage their health in the moment but crucially, to survive the experience. Participants described conceptualisations of their mental and physical health to be dichotomous entities, in which prioritising one negatively impacts upon the other. As such, individuals felt compelled to choose between preserving their mental health in the present, at the sacrifice of their future physical health. This was discussed through a recognition of the need for balance in public health messaging. Whilst it is acknowledged that it is undoubtedly important to communicate health information detailing the relationship between COVID-19 outcomes and body weight to increase knowledge, this needs to be done without stigma so as to support those who this message is targeted towards. Fear appeals are widely used in public health messaging and have been targeted towards a range of health behaviours including condom use, smoking and vaccinations (Peters *et al.*, 2013; Ruiter *et al.*, 2014; Tannenbaum *et al.*, 2015). However, the effectiveness of using such techniques has been demonstrated with mixed results yielding positive (Witte and Allen, 2000), null (Hoog *et al.*, 2008) or even negative (Peters *et al.*, 2013) effects.

The findings from this study therefore hold important implications for public health messaging, highlighting a need for balance between being educational and informative, but also supportive, so as to achieve maximum efficacy (Lillis *et al.*, 2009; Puhl and Heuer, 2010). Findings also raise important questions for research surrounding the notion of balance with relation to weight bias. In particular, it would be important for future research to investigate at what point is messaging such as this perceived to be motivational or stigmatising, especially in relation to the prevention and treatment of obesity. Although many of the participants perceived the public health messaging concerning the relationship between COVID-19 and body weight to be a key moment that prompted motivation to engage in lifestyle and behavioural changes, prior research suggests that stigmatising messaging can have a negative impact on behavioural motivations and well-being (Araiza and Wellman, 2017; Pearl and Lebowitz, 2014; Pearl and Puhl, 2018; Vartanian and Novak, 2011).

The findings from this study also hold implications and applications beyond the COVID-19 pandemic and obesity. All chronic health conditions involve a lifestyle or behavioural component, be this a contributing factor to the onset of the condition or its management, which implicate a degree of ownership, blame or behaviour change (e.g. PrEP use and HIV). Findings suggest that the balance between public health messaging being motivational vs stigmatising is complex. Getting this balance right could help to effectively prevent and manage chronic health conditions, whilst also improving the psychological well-being of those who this messaging is targeted towards.

Strengths and limitations

This study offers a novel and useful insight into how the public health and media messaging concerning COVID-19 risk, and obesity is perceived by those with overweight and obesity. However, there are some problems with the study. First, participants were interviewed between October 2020 and January 2021. During this time period, there were significant changes to legislation due to surges in cases of COVID-19 both locally and nationally. In addition, this time period saw significant advancements with regards to the development and roll-out of COVID-19 vaccinations. Both fluctuations in infection rates and the increasing availability of the COVID-19 vaccination are likely to shape an individuals' perception of risk. Second, those volunteering to take part in the study may well have not been representative of the population as a whole. For example, the sample was mostly female, which due to greater

concerns surrounding body image (Puhl *et al.*, 2018) could have influenced our findings. In line with qualitative research, however, the study does offer in depths insights into how people respond to the messaging rather than insights which can be generalised to a wider population. It is suggested that in light of these limitations, this paper offers a useful standpoint to encourage discussions and future research exploring the notions of messaging and the impact this has upon those it is targeted towards.

Conclusions

Findings from this study suggest that the messaging regarding COVID-19 and obesity is seen as flawed due to being stigmatising, inconsistent and lacking clarity. It also however raised the salience of the health risks associated with obesity and for some can be considered a teachable moment as it offered an opportunity for change. This change, however, was often undermined by a number of barriers together with the need to weigh up the balance between mental health in the here and now vs physical health in the future.

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Components of psychosocial health

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Abstract

Purpose – "Psychosocial health" is a new term to comprehend the already established factors involved in mental health and psychological well-being. The term has not been specifically defined and explained within the framework of psychology.

Design/methodology/approach – The study proposed and validated a new model of psychosocial health. Principal component analysis, exploratory factor analysis and confirmatory factor analysis were conducted by involving a total of 4,086 participants.

Findings – Psychosocial health was interpreted as the "sexual, emotional, social, environmental, cognitive, religious, moral and spiritual satisfaction" of a person. The proposed model of psychosocial health was statistically validated. The additional findings revealed significantly higher levels of psychosocial health in women and significant inverse correlations between psychosocial health and age.

Originality/value – The current paper provided a comprehensive picture of psychosocial health from a psychological perspective and presented a statistically reliable tool for measuring psychosocial health.

Keywords Psychosocial health, Sexual health, Emotional health, Cognitive health, Socioenvironmental health, Religious health, Moral health, Spiritual health

Paper type Research paper

Components of psychosocial health

Mental health has always been distinguished from physical health and has been regarded as a significant factor in one's quality of life. A comprehensive analysis of the literature, starting from Aristotle till now, reveals that philosophers and scientists have been struggling hard to conceptualize the different dimensions of mental health under different labels. The understanding of mental health has been changing from time to time. The concepts of happiness, satisfaction with life, well-being, wellness, quality of life and mental health have been used interchangeably (Keyes and Lopez, 2009; Tennant *et al.*, 2007; Cooke *et al.*, 2016; Singh and Jha, 2008). Measuring mental health has also been a confusing tradition focusing on the fulfillment of the purpose of life (Jung, 1955; Buhler, 1961), the gratification of human needs (Maslow, 1954, 1962; Parmenter, 1988) and desires (Stones and Kozma, 1980), and the match between idealized and achieved goals (Neugarten *et al.*, 1961; George, 1979; Edgerton, 1990; Na-Nan and Wongwiwatthananukit, 2020). The existing literature provides us with a lengthy list of factors that contribute to mental health, e.g. physical health of a person (Chang *et al.*, 2001), absence of psychopathologies (Westerhof and Keyes, 2010), possession of higher levels of positive personal attributes and lesser levels of adverse behaviors (Hinkley *et al.*, 2014), possession of a good living environment (Tennant, 1995) and adequate social status (Huang *et al.*, 2017), extraversion in personality (Argyle and Lu, 1990), optimism for future (Cummins and Nistico, 2002), happy marriage (Næss *et al.*, 2015; Liu *et al.*, 2013), sexual satisfaction (Woloski-Wruble *et al.*, 2010), body image (Moin *et al.*, 2009), financial stability and job satisfaction (Powdthavee *et al.*, 2015; Amah, 2009; Wright and Bonett, 2007;

Ethical statement: All the procedures performed in this study were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Sirgy, 2012; Yang *et al.*, 2018; Bjørnskov *et al.*, 2007; Boyce *et al.*, 2010; Proto and Rustichini, 2015; Loewe *et al.*, 2014), effective functioning in a social context (WHO, 2005; Keyes, 2002), healthy family relations (Briscoe, 1982), social comparison, public opinion, self-evaluation, inferiority and superiority complexes (Park and Baek, 2018; Boon *et al.*, 2012), social environment (Turner *et al.*, 1995; Ross, 2000), social events (Holmes and Rahe, 1967; Dohrenwend, 2000), social integration (Thoits and Hewitt, 2001; House *et al.*, 1988), social acceptance, social actualization, social coherence, social contribution (Albanesi *et al.*, 2007), social satisfaction (Mirowsky and Ross, 2003) and fear of missing out in social media engagement (Reer *et al.*, 2019). Some researchers have regarded mental health as a subjective matter of a person varying from person to person (Schimmack *et al.*, 2002; Diener *et al.*, 1985; Beckie and Hayduk, 1997; Lou *et al.*, 2008). Several scientists have also tried to come up with different models of mental health. These models include sets of elements or domains involved in understanding the broader concepts of psychosocial well-being, such as zest, resolution, congruence, self-concept and mood-tone (Neugarten *et al.*, 1961); self-acceptance, positive relations with others, personal growth, purpose in life, environmental mastery and autonomy (Ryff and Singer, 2000); happiness, quality of life, positive effect, self-acceptance, personal growth, purpose and meaning, environmental mastery, personal control, positive relations and morale (Keyes *et al.*, 2002); satisfaction of human needs (Diener *et al.*, 2002); competence, relatedness and autonomy (Deci and Ryan, 2008); mental, physical, social and environmental well-being (Kiefer, 2008); mental, emotional, social, physical, economic, cultural and spiritual health (Linley *et al.*, 2009); positive affect, emotional awareness and regulation, interpersonal communication and personal adaptation (Tsang *et al.*, 2012); inter- and intra-personal domains (Burns, 2015).

In the recent past, there has been a paradigm shift for the definitions of mental health from the diagnosis-based definitions to the person-focused definitions (Rutten *et al.*, 2013; Swarbrick, 2013). Researchers have been exploring mental health beyond the mere absence of mental disorders and are now concerned with the influences of social structures, social roles, cultural systems and environmental factors on mental health and illness (Barkham *et al.*, 2019; Hofmann and Hay, 2018; Keyes, 2002; Lahad *et al.*, 2018; Scheid and Wright, 2017; Slade *et al.*, 2014). Mental health is being considered a multi-dimensional framework and is being regarded more than the mere absence of psychological problems (Cooke *et al.*, 2016; Westerhof and Keyes, 2010). It is thought as the capacity of a person to attain full growth, to work effectively and creatively, to build positive strong relationships, to adapt socially well and to serve the community (Burns, 2016; Kinderman *et al.*, 2011; Sayers, 2001; Tennant *et al.*, 2007a). It is more like a process than an outcome (Deci and Ryan, 2008).

The current study, in continuation to the above literature, intended to compile and comprehend the previous understandings on mental health. It suggested that the concept of mental health could be best interpreted under the label of "psychosocial health" in our times. The term "psychosocial health" has not been used within the framework of psychology so far. It has been used by a few nonpsychologists who considered it as the harmony between an individual's self and the environment (Değirmenci and Vefikuluçay Yılmaz, 2020) and a mixture of depression, stress, self-efficacy and social support (Maxson *et al.*, 2016). The current study proposed a comprehensive model in this regard by involving the social, environmental, sexual, emotional, cognitive, religious, moral and spiritual components of psychosocial health. The proposed model was tested statistically for its reliability and validity.

Method

Participants

The study involved 4,092 conveniently selected participants from Islamabad, Pakistan. The first phase of the study conducted a principal component analysis by involving 1,517

participants, the second phase did exploratory factor analysis by involving 744 participants and the last phase of the study carried out a confirmatory factor analysis along with the convergent and discriminant validities by involving 1,831 participants (539 men and 1,292 women). All the participants were between 18 and 56 years of age with a mean age of 21.65 years.

The instruments

Psychosocial Health Evaluator (PHE) intends to measure psychosocial health through eight domains, i.e. sexual, emotional, cognitive, social, environmental, religious, moral and spiritual. The scale is in English and comprises 24 items. The response sheet involves a five-point Likert scale ranging from strongly disagree to strongly agree. The Satisfaction with Life Scale (Diener *et al.*, 1985) comprises five items in English and intends to assess the level of overall life satisfaction. The Depression, Anxiety and Stress Scale (Lovibond and Lovibond, 1995) comprises 42 items in English and measures the levels of depression, anxiety, and stress against the experiences of the recent past.

Procedure

The researcher approached the participants of the study individually while visiting different hospitals, clinics, educational institutions and public offices. The participants were informed about the purpose of the study, and their consent to participate in the study was appropriately taken. They were assured for the confidentiality of the data and were thanked for their participation. All the procedures performed in this study were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Analysis

The data gathered were recorded in the Statistical Package for Social Sciences and were cleaned by analyzing missing values, unengaged responses, outliers, linearity, homoscedasticity, multicollinearity, skewness and kurtosis. Principal, exploratory and confirmatory factor analyses were conducted to measure the reliability and validity of the scale.

Results

An item pool of 45 statements was developed in the first phase of the study. The items were evaluated by a panel of five clinical psychologists who agreed with the content and relevance of the items for psychosocial health. During the principal component analysis, 21 items were discarded. The exploratory factor analysis retained 24 items with a seven-factor solution. The confirmatory factor analysis was conducted by involving 1831 participants. Principal component analysis was employed for extraction. The rotation method was Varimax. Sampling adequacy, by using Kaiser–Meyer–Olkin's values (Kaiser, 1974), was found meritorious (Table 1; KMO = 0.894). Bartlett's test of sphericity (Bartlett, 1950) was used to analyze the adequacy of correlations between items and was found highly significant

N	α	KMO	BTS	Components extracted	Variance explained (%)
24	0.851	0.894	23,184.69*	7	67.81

Note(s): *N*=Number of items; *a* = Cronbach's alpha; KMO = Kaiser–Meyer–Olkin measure of sample adequacy
BTS= Bartlett's test of sphericity; *p = 0.000

Table 1. Reliability and data accuracy of Psychosocial Health Evaluator

(Table 1; BTS = 23,184.69; $p = 0.000$). The Cronbach's alpha reliability for the scale was good (Table 1; $\alpha = 0.851$), and the alpha for its sub-scales ranged between 0.420 and 0.957 (Table 2). In total, 67.81% variance was explained (Table 1). The factor structure of the scale reported seven factors (Table 3). The communalities for all the items ranged between 0.431 and 0.880 (Table 4), thus acceptable as all were above 0.4 (Osborne *et al.*, 2008). The item total and item scale correlations were highly significant for all the items (Table 4). All the sub-scales of PHE had significant positive correlations with PHE and within each other (Table 5) except the

Table 2.
Descriptive statistics of Psychosocial Health Evaluator ($N = 1831$)

Variable	Items	α	M	SD	%	Range Potential	Range Actual	Skewness	Kurtosis
Psychosocial wellness	24	0.851	86.11	13.68	71.76	1–120	44–120	−0.177	−0.272
Socioenvironmental	6	0.957	21.31	6.56	71.03	1–30	6–30	−0.630	−0.405
Religious	3	0.739	11.85	2.67	79.00	1–15	3–15	−1.034	0.803
Emotional	3	0.613	10.42	2.74	69.47	1–15	3–15	−0.302	−0.543
Cognitive	3	0.918	10.70	3.45	71.33	1–15	3–15	−0.546	−0.647
Moral	3	0.575	11.61	2.49	77.40	1–15	3–15	−0.675	0.040
Spiritual	3	0.553	11.24	2.55	74.93	1–15	3–15	−0.604	0.068
Sexual	3	0.420	8.94	2.65	59.60	1–15	3–15	0.119	−0.492

Note(s): α = Cronbach's alpha; M = Mean; SD = Standard deviation

Table 3.
Factor structure of Psychosocial Health Evaluator ($N = 1831$)

Item	Components of psychosocial health: Socioenvironmental	Religious	Emotional	Cognitive	Moral	Spiritual	Sexual
1.	*0.927*	0.032	0.014	0.127	−0.002	0.054	0.019
2.	*0.921*	0.075	0.029	0.110	0.010	0.029	0.017
3.	*0.916*	0.039	0.027	0.070	−0.004	0.077	0.004
4.	*0.902*	0.035	0.040	0.160	0.022	0.056	0.021
5.	*0.901*	0.045	0.095	0.135	−0.014	0.051	0.049
6.	*0.814*	0.067	−0.003	0.072	−0.012	−0.013	−0.062
7.	0.089	*0.858*	0.144	0.091	0.086	0.123	0.036
8.	0.055	*0.806*	0.060	0.114	0.032	0.119	−0.059
9.	0.086	*0.659*	0.162	−0.117	0.229	0.082	0.199
10.	0.007	0.076	*0.764*	0.085	0.046	0.064	0.078
11.	0.022	0.081	*0.736*	0.040	0.051	0.089	0.069
12.	0.089	0.156	*0.603*	0.065	0.086	0.124	−0.210
13.	0.507	0.076	0.065	*0.733*	0.074	0.046	0.070
14.	0.589	0.046	0.099	*0.685*	0.058	0.084	0.093
15.	0.609	0.080	0.056	*0.655*	0.065	0.099	0.025
16.	0.011	0.156	0.042	0.105	*0.764*	0.093	−0.111
17.	−0.057	−0.008	0.008	0.056	*0.715*	0.151	0.225
18.	0.048	0.129	0.191	−0.068	*0.681*	−0.050	−0.094
19.	0.054	0.091	0.148	0.108	0.122	*0.774*	−0.096
20.	0.088	0.144	0.115	0.107	0.040	*0.713*	−0.039
21.	0.051	0.079	0.034	−0.166	0.032	*0.618*	0.362
22.	0.008	0.086	0.050	0.156	−0.056	0.009	*0.775*
23.	0.057	0.140	0.534	−0.032	0.060	0.058	*0.421*
24.	0.027	−0.096	0.436	−0.255	0.119	0.018	*0.389*

Note(s): Extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization

Table 4.
Communalities, total item and item scale correlations for Psychosocial Health Evaluator ($N = 1831$)

Item	Extraction	Total item and item scale correlations							
		PHE	Soc	Rel	Emo	Cog	Mor	Spi	Sex
1. I always expect others to give me importance	0.880	0.701**	0.940**						
2. I try to follow existing social values	0.868	0.706**	0.931**						
3. I expect people to appreciate me often	0.852	0.690**	0.924**						
4. I always remain interested in decorating my home and office	0.847	0.713**	0.927**						
5. Most of the people I know understand me well	0.845	0.722**	0.921**						
6. My family is very important for me	0.677	0.576**	0.812**						
7. My religious beliefs guide my life	0.796	0.480**		0.876**					
8. I cannot lead my life without religion	0.688	0.392**		0.795**					
9. I practice my religion well	0.580	0.415**		0.765**					
10. I enjoy my routine tasks	0.609	0.396**			0.780**				
11. I stay happy most of the times	0.566	0.391**			0.763**				
12. I spare time to take rest	0.467	0.401**			0.714**				
13. I solve my problems without taking help from others	0.816	0.639**				0.907**			
14. I like to debate with others	0.847	0.698**				0.945**			
15. I usually give logical reasons for my arguments	0.825	0.691**				0.930**			
16. I respect difference of opinions in every matter	0.641	0.307**					0.753**		
17. I tolerate when others criticize me	0.591	0.253**					0.711**		
18. I usually forgive others easily	0.535	0.293**					0.750**		
19. I take interest in exploring the wonders of the universe	0.668	0.395**						0.750**	
20. Most of the times, I use my sixth sense or intuition	0.564	0.392**						0.711**	
21. I know the purpose of my life	0.551	0.301**						0.727**	
22. My sexual needs are being satisfied according to my wishes	0.638	0.251**							0.642**
23. I feel myself mostly fresh and active	0.494	0.392**							0.698**
24. I express my emotions easily in social gatherings	0.431	0.229**							0.702**

Note(s): **Correlation is significant at the 0.01 level (two-tailed)

Table 5.
Correlations between the sub-scales of Psychosocial Health Evaluator ($N = 1831$)

	Socioenvironmental	Religious	Emotional	Cognitive	Moral	Spiritual	Sexual
Psychosocial health	0.755**	0.528**	0.527**	0.730**	0.384**	0.492**	0.423**
Socioenvironmental		0.157**	0.123**	0.696**	0.026	0.143**	0.064**
Religious			0.301**	0.204**	0.276**	0.307**	0.193**
Emotional				0.166**	0.228**	0.265**	0.390**
Cognitive					0.108**	0.187**	0.079**
Moral						0.201**	0.129**
Spiritual							0.207**

Note(s): **Correlation is significant at the 0.01 level (two-tailed)

correlation between the moral and the social components, which was insignificant. The convergent validity of PHE was measured with life satisfaction. A positively significant difference was found between psychosocial health and life satisfaction (Table 6; $r = 0.832$; $p < 0.01$). The discriminant validity of PHE was measured in relation with depression, anxiety and stress. Inversely significant correlations were found between psychosocial health and depression (Table 6; $r = -0.892$; $p < 0.01$), anxiety (Table 6; $r = -0.822$; $p < 0.01$) and stress (Table 6; $r = -0.690$; $p < 0.01$).

The study revealed significantly higher levels of psychosocial health in women as compared to men (Table 7; $M = 90.69$ vs 75.14; $p = 0.000$; Cohen's $d = 1.328$). Women also had higher levels of psychosocial health for socioenvironmental (Table 7; $M = 23.72$ vs 15.54; $p = 0.000$; Cohen's $d = 1.512$), cognitive (Table 7; $M = 12.40$ vs 6.64; $p = 0.000$; Cohen's $d = 2.574$), religious (Table 7; $M = 12.13$ vs 11.19; $p = 0.000$; Cohen's $d = 0.358$) and spiritual (Table 7; $M = 11.38$ vs 10.92; $p = 0.000$; Cohen's $d = 0.179$) domains of psychosocial health. Age had a significant inverse correlation with the overall psychosocial health (Table 8; $r = -0.173$; $p < 0.01$) and all of its domains, i.e. social (Table 8; $r = -0.111$; $p < 0.01$), religious (Table 8; $r = -0.200$; $p < 0.01$), emotional (Table 8; $r = -0.081$; $p < 0.01$), cognitive (Table 8; $r = -0.120$; $p < 0.01$), moral (Table 8; $r = -0.094$; $p < 0.01$) and spiritual (Table 8; $r = -0.116$; $p < 0.01$), except the sexual domain, which had no significant correlation with age but was inclined towards a positive direction (Table 8; $r = 0.023$).

Discussion

Psychosocial health is a new term, which is not used by psychologists so far. The current study evolved the concept of psychosocial health by combining the similar earlier concepts, such as mental health, psychological well-being, satisfaction with life, quality of life, etc. The study, based on a comprehensive review of literature, proposed a model for psychosocial health comprising eight components or domains, i.e. sexual, emotional, cognitive, social, environmental, religious, moral and spiritual. The statistical procedures resulted in the valid approval of these components for psychosocial health.

Table 6. Correlation of psychosocial health with life satisfaction, depression, anxiety and stress ($N = 93$)

	Life satisfaction	Depression	Anxiety	Stress
Psychosocial health	0.832**	−0.892**	−0.822**	−0.690**

Note(s): **Correlation is significant at the 0.01 level (two-tailed)

Table 7. Gender based differences in psychosocial health ($N = 1831$)

	Gender						
	Men ($n = 539$)		Women ($n = 1,292$)		t	p	Cohen's d
Variables	M	SD	M	SD			
Psychosocial health	75.14	11.95	90.69	11.60	25.89	0.000	1.328
Socioenvironmental	15.54	6.01	23.72	5.14	29.48	0.000	1.512
Religious	11.19	2.98	12.13	2.49	6.98	0.000	0.358
Emotional	10.26	2.74	10.49	2.75	1.62	0.105	0.083
Cognitive	6.64	2.47	12.40	2.14	50.19	0.000	2.574
Moral	11.54	2.66	11.65	2.42	0.90	0.364	0.047
Spiritual	10.92	2.73	11.38	2.47	3.49	0.000	0.179
Sexual	9.05	2.66	8.90	2.65	1.08	0.279	0.056

	Psychosocial health	Socioenvironmental	Religious	Emotional	Cognitive	Moral	Spiritual	Sexual
Age	−0.173**	−0.111**	−0.200**	−0.081**	−0.120**	−0.094**	−0.116**	0.023

Note(s): **Correlation is significant at the 0.01 level (two-tailed)

Table 8.
Correlation of age with psychosocial health and its sub-factors ($N = 1831$)

Psychosocial health, therefore, was defined as the sexual, emotional, social, environmental, cognitive, religious, moral and spiritual satisfaction of a person. The sexual domain (Maslow, 1962; Woloski-Wruble *et al.*, 2010; Mulhall *et al.*, 2008; Wylie, 2004), the emotional domain (Diener *et al.*, 2002; Maslow, 1962), the cognitive domain (Wechsler, 1958; Sternberg, 2000), the socioenvironmental domain (Maslow, 1962; Tennant, 1995; WHO, 2005; Ryff and Singer, 2000; Holmes and Rahe, 1967), the religious domain (Lucchetti *et al.*, 2011; Huguelet *et al.*, 2011; Amaro *et al.*, 2010; Koszycki *et al.*, 2010; Mohr *et al.*, 2010; Koenig, 2004, 2009; Maselko and Kubzansky, 2006; Moreira-Almeida *et al.*, 2006; Rew and Wong, 2006; Lewis *et al.*, 2005; Soydemir *et al.*, 2004; Greene and Yoon, 2004; Hackney and Sanders, 2003; Ball *et al.*, 2003; Hill and Pargament, 2003; Larson and Larson, 2003; George *et al.*, 2002; Ferriss, 2002; Harris, 2003; Swinyard *et al.*, 2001; Koenig *et al.*, 2012; Pargament *et al.*, 2000; Chatters, 2000), the moral domain (Keyes *et al.*, 2002) and the spiritual domain (Jung, 1955; Ryff and Singer, 2000; Linley *et al.*, 2009) have been regarded important contributing factors for a person's psychological well-being.

As the term "psychosocial health" has been used for the first time in a psychological perspective, it has revealed some strange results too. Women were found with higher levels of psychosocial health as compared to men, which seems contradictory to the existing trends in clinical psychology (Husain, 2018; Seedat *et al.*, 2009). The feministic perspective, however, denies the labeling of women as more mentally ill than men (Husain *et al.*, 2021; Husain, 2021). Feminists refer this to gender inequality that is a global practice (Neumayer and Plümper, 2007), and women, in general, have been considered vulnerable to abuse and exploitation (Minganti, 2015). They are sexually objectified and are expected to be physically attractive (Husain *et al.*, 2021; Husain and Aziz, 2014; Husain and Gulzar, 2015) to please men (Vaughan-Turnbull and Lewis, 2015). They are mostly dependent on their husbands (Husain, 2020) and are expected to serve as housemaids (Cast and Bird, 2005) regardless of their willingness (Forssén *et al.*, 2005). They are condemned for being infertile (Husain and Imran, 2020) and humiliated for being a matter of shame for the family. These situations put women at a higher risk of several psychological problems (Husain, 2018; Husain and Qureshi, 2016; Husain and Faize, 2020), which stay unresolved (Husain, 2019). The findings of the current study serve as a fresh air for women by projecting higher levels of psychosocial health among them as compared to men. These findings also sensitize the clinical psychologists to revisit the conventional prejudiced attitudes towards women's mental health. Another interesting finding of the current study was the inverse correlation between psychosocial health and age, suggesting a gradual decline of psychosocial health with the increase in age. These findings suggest that the trends of existing clinical psychology can be changed if we try to measure psychosocial health instead of analyzing mental health in a conventional psychopathological way. Future researchers are advised to carry out studies on psychosocial health in different cultures to compile diversified results for comparison. The role of culture in psychosocial health can never be ignored. The scale proposed in the current study may result differently in different cultures. It must be tested in different cultures for establishing its test–retest reliability.

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How can we promote co-creation in communities? The perspective of health promoting professionals in four European countries

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Abstract

Purpose – The aim was to identify the competencies professionals need to promote co-creation engagement within communities.

Design/methodology/approach – Co-creation could contribute to building community capacity to promote health. Professional development is key to support co-creative practices. Participants were professionals in a position to promote co-creation processes in health-promoting welfare settings across Denmark, Portugal, France and United Kingdom. An overarching unstructured topic guide was used within interviews, focus groups, questionnaires and creative activities.

Findings – The need to develop competencies to promote co-creation was high across all countries. Creating a common understanding of co-creation and the processes involved to increase inclusivity, engagement and shared understanding was also necessary. Competencies included: How to run co-creation from the beginning of the process right through to evaluation, using feedback and communication throughout using an open

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action-oriented approach; initiating a perspective change and committing to the transformation of co-creation into a real-life process.

Practical implications – Overall, learning about underlying principles, process initiation, implementation and facilitation of co-creation were areas identified to be included within a co-creation training programme. This can be applied through the framework of enabling change, advocating for co-creative processes, mediating through partnership, communication, leadership, assessment, planning, implementation, evaluation and research, ethical values and knowledge of co-creative processes.

Originality/value – This study provides novel findings on the competencies needed for health promoting professionals to embed co-creative processes within their practice, and the key concerns that professionals with a position to mediate co-creation have in transferring the abstract term of co-creation into a real-world practice.

Keywords Co-creation, Health promotion, Community development, Competence, Professionals, Training

Paper type Research paper

1. Background

The field of health promotion has undertaken the challenge of "enabling people to increase control over and improve their health" (WHO, 1986, p. 1) with citizen's active engagement as a priority. Strong advocacy for citizen participation and engagement, participatory research designs and translational research are the cornerstones of efficient strategies to reduce health inequalities and to focus on the determinants of health based on solidarity and social transformations (Darlington and Masson, 2019). More specifically to the field of health promotion, improving citizen participation seems crucial at policy level with governance for health going beyond just including expert opinion (Kickbusch and Gleicher, 2014). The recent COVID-19 pandemic has shown the importance of participatory approaches in health promotion to enhance the uptake and adhesion to policy-level strategies (Jansen *et al.*, 2008; Jansson *et al.*, 2011).

The World Health Organization, Regional Office for Europe (2002), p. 10) defines participation as "a process by which people are enabled to become actively and genuinely involved in defining the issues of concern to them, in making decisions about factors that affect their lives, in formulating and implementing policies, in planning, developing and delivering services and in taking action to achieve change". Community capacity building is one of the tracks to improve the achievements of health promotion programmes and strategies along such participatory lines (Labonte *et al.*, 2002). However, the issue of how each player and knowledge is equally recognized creates challenges to promoting pathways to citizen engagement, particularly when reflecting on health-related issues.

In recent years, one of the popular strategies to increase citizen participation has been to promote "co-creation". The concept of co-creation originated in business management (Prahalad and Ramaswamy, 2000, 2004) and originally referred to a participatory process where customers, brands and businesses actively engage in interactive relationships to create on-demand and made-to-order products. The dialogue within this participatory process stimulates the exchange of knowledge to solve issues of mutual interest to meet needs and expectations (Pinar *et al.*, 2011; Ribeiro *et al.*, 2016). This business co-creation concept has been introduced and adapted to the education sector (Pinar *et al.*, 2011; Ribes-Giner *et al.*, 2016; Voorberg *et al.*, 2015; Whitehead *et al.*, 2003; Carvalho *et al.*, 2021) and to the health sector (Dean *et al.*, 2016; den Boer *et al.*, 2017; Greenhalgh and Shaw, 2016; Ramírez and García-Peñalvo, 2018; Voorberg *et al.*, 2015; World Health Organization, 2013). In both contexts, students (Pinar *et al.*, 2011; Carvalho *et al.*, 2021) and patients/clients (den Boer *et al.*, 2017; Greenhalgh and Shaw, 2016) are the "customers" (i.e. targeted end-users) in the co-creation process. In health promotion research, the use of co-creation is flourishing in some countries. This is especially occurring at local levels where additional resources are needed alongside scarcity of public funds and the need for sustainability (Torfing *et al.*, 2016). The EU Commission has embraced this need because modern societal demands are too complex to be met by the public sector alone [1]. This emphasis placed by the EU Commission on co-creation is visible, in particular, in the European Public

Employment Services (PES) Network, where flexibility, organizational responsiveness, creativity and cooperation with partners were emphasized. A paradigm shift occurred, from a simple business model of providing services to customer-centric organizations, where customer satisfaction is of strategic importance and co-creation was advocated as an appropriate approach to increase customer satisfaction and facilitate necessary social innovation (European Commission, 2016, 2019a, b). Co-creation is a shared process of problem formulation and problem-solving that will upscale solutions to complex societal problems (Torfing *et al.*, 2016). The anticipated benefits of co-creation include social cohesion, democratic participation as well as the design of more effective and relevant solutions to increasingly complex societal problems (Torfing *et al.*, 2016).

Nonetheless, a major shortcoming is the blurred outlines and often interchangeably used terms between co-creation and other types of collaboration (Barthe and Queinnec, 1999; World Health Organization, Regional Office for Europe, 2002). Many definitions can be found, which include characteristics of the relationship between stakeholders, joint activity, joint achievements (Bovaird and Loeffler, 2012), as well as coexisting concepts such as "co-creation" and "co-production", which are often used interchangeably (Torfing *et al.*, 2016). A parallel can be made with stakeholder participation, which can be modelled in different ways. Hart's ladder of participation (Hart, 1992) sets the focus on the involvement in the initiation of a project and the decisions made to implement it, while Heritage and Dooris propose a ladder of community participation which illustrates the different levels of control, participants' action and modes of such achievements (adapted from Brager and Specht, 1973; in Heritage and Dooris, 2009). The term co-creation is used inconsistently, carrying different meanings from consultation to partnership and collaboration (Darlington *et al.*, 2017). This lack of clear guidance on defining and thus promoting co-creation leads to heterogeneous participatory practices (Griebler *et al.*, 2017). In the worst-case scenario, so-called co-creation could even be perceived to mean mere consultation, which would potentially set the grounds for tokenistic manipulation. Co-creation has developed as a new paradigm in management literature, with the objective of companies and customers to create value through the interaction between suppliers and customers for the development of new business opportunities (Galvagno and Dalli, 2014). Following the same shifting paradigm, patient engagement in the planning, development, and analysis of health care has been assumed as a vehicle for maintaining the sustainability of the National Health Service (Armstrong *et al.*, 2013; Hardyman *et al.*, 2015). Therefore, the role of patients is also extending beyond being passive recipients of healthcare and even to becoming active participants in their own care, to engaging in innovation and co-creation by taking part in an active dialogue, which occurs within co-creation. Patients are considered equal partners of organizations and health providers, and the focus is set on areas of interest to all parties (Janamian *et al.*, 2016). In this sense, in this research, we argue that co-creation involves a transdisciplinary team which has to include end users and professionals who have a "formal responsibility" in the process. It is based on the shared understanding of a situation, the creation of a shared language, dialogue, the combination and mutualization of skills and interdependence, and involves the shared negotiation of goals. The underlying objective of the process is to initiate a process of change leading to a new prosperity.

Professionals from all sectors should be involved in health promoting community capacity building strategies and strengthened citizen participation (while being citizens themselves too) (Dempsey *et al.*, 2011). Professionals have the potential to support the development of community skills and knowledge, yet they need specific competencies to do so. Being able to apply these community skills is important for translating policy, theory and research into actionable and sustainable global health promotion and growth (Dempsey *et al.*, 2011). Core competencies that have already been identified include catalyzing change, developing leadership and building partnerships. Professional competency is constructed during professional activity. Such activity, which takes place in a social context, results from cognitive pathways and the motivation of

professionals and of the social value of the result expected from the task. To some extent, professional competency can be viewed as a capacity to adapt to new situations and solve complex problems (Albero and Nagels, 2011). Yet, the issue of what professionals' competencies are needed to promote co-creative processes underpinned by partnership and collaboration (not tokenistic consultation) still needs to be identified. This also includes the need to address the types of skills needed to promote co-creation within communities, so the processes are not just led by professionals, but all citizens feel engaged in the ability to co-create.

Following Trickett *et al.'s* (2011) argument that researchers must engage with professionals and stakeholders to understand and conceptualize community interventions, our group of researchers from Denmark, France, Portugal and the United Kingdom (UK) aimed to identify the competencies health promotion professionals need to promote co-creation in communities with an underlying health promoting view. Based on this data collection, the CCW training course material was co-constructed in the following four training themes and modules: (1) creating a common understanding of co-creation, (2) initiating the co-creation process through collaborative problem formulation and evaluation, (3) managing the co-creation process and (4) dissemination and communication of the co-creation process and its results. Our goal was to develop a training programme for health promoting professionals from the health, education and social sectors to develop co-creative processes in their community. Therefore, this paper will be focussed on the first part of the research project, which was developed to answer the following: What competencies do health promotion professionals need to support co-creation processes in communities? What competencies do health promotion professionals think communities need to engage in co-creation?

2. Methodology

2.1 Knowledge claim

This study was undertaken within an ERASMUS + co-creation project in welfare sectors (EC project number: 2016-1-DK01-KA202-022342). The pragmatic (Creswell, 2003) perspective used for this study follows the argument of Lansang and Dennis (2004), who call attention to the relevance of "research capacity building", whereby scientific knowledge is co-constructed to best fit field priorities, and researchers are free to use all relevant approaches to best meet their purpose. Our intention was to unpack and document professional knowledge and practices of co-creation in natural settings, in order to focus on professionals' views of co-creation and what their needs are in terms of competency development (Reeves *et al.*, 2013). Focussing on stakeholders' knowledge and experience was a means to enable the translation of findings into practice (Woolf, 2008).

2.2 Participants

The focus of this study was set on the professionals who promote or in a position to promote, mediate and support co-creation in communities, which we refer to as Co-creation Mediators (CoMeds). Within the scope of the ERASMUS + co-creation project, the CoMeds would assume the role of integrating and/or disseminating the future CCW training course, which was created taking into account the knowledge gained from the CoMeds. CoMeds were recruited across Denmark, France, Portugal and the UK. In each country, different samples of CoMeds were selected, depending on the national context of each group of researchers.

Table 1 shows an overview of the participants.

2.3 Data collection

Qualitative methods were used to collect the meaning and views of health promoting professionals (Creswell, 2003; Cohen *et al.*, 2018). The standpoint chosen is that of ethnographic research which focusses on the accounts of people of their own contexts and

Country	Type of sampling	Scope of samples	Social Sector	Number of participants
Denmark	Purposeful	National	The Youth and Young, Elderly and Handicap Employment and Social Affairs	22
			School and Education Sector	5
			Administrative and Planning Departments of Local Government	9
France	Purposeful	National	Social Design and Co-creation Network (NW)	3
			Health education and promotion NW	2
			Community health promoting centre for ageing migrants	2
			higher education lecturer specialized in health education, sustainable development education and health promotion	3
			School health promotion professionals (school nurses, teachers, teaching assistants, social workers, community workers, researchers, project managers)	46
Portugal	Purposeful	Regional	City Council–Department of Culture and Education	2
			Municipal Hospital	1
			Five Foster Care Residences (Residence carers, psychologists, teachers, social workers, education superior technicians and socio-educational animators)	29
			Three Schools (teachers, health promoting school coordinators, school psychologists, school principals)	12
UK	Purposeful	National	Four organizations that provide health-related services across local, regional, and national levels (key people in charge of co-creative or collaborative processes with the public)	5

Table 1.
Participants in each country

practices, using a range of tools and methods to fit the contexts, the unstructured aspect being accepted and encouraged (Reeves *et al.*, 2013). Each research team had regular contact with their CoMeds for a whole year and a half to complete this study. This included to apply one (Denmark, Portugal, UK) or several sequential data collection instruments (France) and to return the results to the respondents to discuss the implications of the obtained results for the construction and implementation of the CCW training.

Oral or written consent was obtained in France and Denmark, and Ethical Committee approval was obtained in the UK and Portugal. In all countries, confidentiality, anonymity, non-deceptive practice and minimization of possible harm in data collection and analysis were assumed as ethical principles.

An unstructured topic guide was developed to ensure that all researchers covered the same topics regarding their current setting, level of co-creative processes, their view of co-creation and how they would like to use co-creation, followed by the main topic of what competences participants would need to co-create with stakeholders and what communities need to engage in co-creation. Depending on their context, and opportunities with the CoMeds, each research team chose the most appropriate data collection tool. However, although there are specific questions for each context, there was a set of open-ended questions, which are analysed in this article, that were placed in the same way in all contexts, regardless of the data collection instrument that was used. This decision was taken to control

the limitations that could have arisen associated with the application of different data collection instruments in different contexts. The Danish team used an open-ended process mapping questionnaire, the Portuguese team used focus groups, the UK team used semi-structured in-depth telephone interviews and the French team used an open-ended questionnaire, unstructured interviews and creative activities producing documents and pictures as creative artefacts as data (Anastacio *et al.*, 2019).

2.4 Data analysis and analytical framework

All data collected were transcribed and analysed using the analytical framework of incidental learning to pinpoint competencies (i.e. professionals learn while doing and people identify learning opportunities themselves) (Marsick and Watkins, 2001). Shilton's definition of competency was used: "a combination of attributes such as knowledge, abilities, skills and attitudes which enable an individual to perform a set of tasks to an appropriate standard" (Dempsey *et al.*, 2011, p. 9). Content analysis was conducted on the data (Hsieh and Shannon, 2005) in two phases. In the first phase, data were categorized using an inductive category development method (Hsieh and Shannon, 2005). All open-ended responses, regardless of the data collection instrument, were transcribed verbatim.

Feedback from partner researchers on the categories and items derived from the analysis was given during a joint working session. The second round of analysis was carried out by the group to refine the final categories. When there was doubt about the category in which certain information should be placed, its interpretation was discussed. If no consensus was reached, the information was not categorized, as it was considered ambiguous information. In this article, the final results will be presented by country, regardless of the frequency with which they emerged in each research context because our aim is to discuss all novel findings, regardless of the intensity with which they emerged in each country.

3. Results

3.1 Incentives and added value of co-creation

In the UK, using co-creation was seen as an opportunity to extend reach and involvement of activities to be more inclusive to seldom heard groups and ensure that existing provision is inclusive. In so doing, CoMeds hoped to be more consistent in ensuring whole communities are involved because currently closer relationships occur with some local health partners than others. French participants emphasized that co-creation is about *"giving a special place to practice-based knowledge or citizen knowledge in our professional practice"*. The whole points are not just about co-creating the service improvement but also the engagement method itself *"not just about providing facility for patients, but they often come with their partner, and they can be enrolled as well. We seek evaluation, support, and feedback from them as well. We ask patients to complete an evaluation form and ask if their relatives want to complete one as well. That's then looked at by the team. If possible, we try and implement what they have suggested" (UK participant)*. Co-creation processes were hoped to initiate training activities using a variety of innovative formats with the aim to support social change based on the needs and expectations of the end-users.

Another respondent explained that local services support, develop and launch initiatives in the community, making a difference in the people's health and well-being. Co-creation processes may help to improve projects to be developed *with* the local community. To some participants, co-creation was a means to address new needs, for example, in one community they were faced with the new situation of having to improve family support, both in terms of prevention and of positive parenting. Community workers were expected to mediate with the families; therefore, they are expected to have training in the domain of parental education and/or involvement, as well as for the education of young children.

CoMeds highlighted the novelty of the co-creation concept as well as its similarity with networking and working in partnerships. Another important point raised by the Portuguese participants was to improve interdisciplinarity and interprofessionalism to achieve better results with projects and interventions by using co-creation. They believed the co-creation process might help to improve projects to be developed with the local community without reinventing the wheel and avoiding time-consuming interventions. A respondent stated that the interdisciplinary component of interventions is important to respond to the needs of beneficiaries. The participant also said that *"when these skills are shared and, above all, when they are received by the children and primary caregivers, they end up enhancing children's and young people's comfort and well-being" (Portuguese participant)*. French participants also mentioned strengthening their local network because of professional development in co-creation and advocating for co-creation and high-level participatory methods.

However, one of the key aspects questioned by Danish participants was the value of co-creation to the- CoMeds people taking part in co-creation. There was a concern that co-creation is just another way of implementing budget cut downs in communities.

3.2 Key principles to engage in and implement co-creation

Respondents from all countries expressed the essential need to create a common understanding of co-creation. Danish participants suggested that CoMeds need to promote a common understanding of co-creation amongst different sectors and professional backgrounds, so that good results and experiences could be spread from one sector to another.

Additionally, clear agreements and transparency in the co-creative processes, and how to develop such agreements are important. To co-produce new solutions, all partners need to know how and what kind of influence they can have in the process *"I think you need capacity on both sides, and resources" (Danish participant)*. Methods to shift from an expert approach to citizen knowledge and its use in professional practice are very much needed. This is done *"by involving community members from the start and throughout the project, and by imagining work methodologies which are adapted to them" (French participant)*. Danish participants emphasized the fact that CoMeds should shift from defining citizens by their needs to a more resource-focussed approach and partnership-based solutions based on strong communication with community members.

The majority of Portuguese CoMeds stated that to support co-creation in their working settings, they need to be able to engage key stakeholders from the very beginning of the collaborative problem formulation process. In this sense, and as an example, they indicated that one of the aims of teachers' professional development in co-creation was to be able to use students' perceptions about their well-being at school. A discussion of students' perceptions can be used as a starting point for co-creation, implementation and evaluation of a school-based well-being project involving key people in their local community. In the UK, feedback from stakeholders was also put forward as important: *"With our volunteer group we meet with them once a year and ask for feedback from them, how do you feel about the current service? Do you think our meet and greet is adequate for new patients coming in? Sometimes patients will feed back to our volunteer group instead of our clinical staff because they do not want to say anything that is deemed negative, and we try and tap into that as a resource as well."*

With regard to the tools which could be relevant for co-creation, participants from the UK indicated that social media can be used to involve patients and staff simultaneously in improvement activities. Social media can also be useful to see what conversations are emerging rather than one setting the topic. French participants suggested that CoMeds should implement co-creation techniques and tools that involve a variety of stakeholders (NGOs, Universities, etc.). They also mentioned being able to create and test tools stakeholders had created for themselves.

3.3 Learning suggestions from and for CoMeds

Suggestions for learning were put forward: learning about what CoMeds could due to promote co-creation processes; learning about methods to implicate end-users and other stakeholders from the start; learning about how to adapt existing methods or methods they use already; project management methods and tools could also be part of the learning. Informants also expressed the need for support on how to give feedback to those involved in co-creation on how they have contributed and the difference they have made, or if no changes occurred following their input, then explain why. The resources provided should be intuitive to use and include stories. They should be universal for all stakeholders (not separate ones for each group).

Professionals would also need to enable citizens to understand health services, the language used and politics that comes with it *"Usually if you address the public and ask them 'what do you want to do about this?', you get a blank stare, it is too technical, but if you say, 'we're thinking of doing this, what do you think?' That's very different. Occasionally someone will rise and say, 'why do not you do this?' But I would say that most members of the public do not understand how health services are commissioned, the way they are provided, the amount of money that is involved. It's quite removed" (UK participant).* This highlights the educational need to facilitate the early stages of the co-creation process to identify needs, problems and resources before moving forward to the solution finding stage (rather than proposing a solution and getting feedback). Danish participants also highlighted the need for methods on defining and understanding the problems to be solved and how to *"see documentation as a good friend and in a meaningful way"*.

According to Portuguese participants, CoMeds are expected to learn about a pedagogical strategy to interact with their public and improve their skills, namely communication and assertiveness. Resources are needed to improve partnership communications. Also, Danish participants pointed out that CoMeds should learn how to work with empowerment.

Another key learning is how to measure the impact and added value of co-creation to dispose of a more rigorous evaluation of the impact of the changes they implemented through co-creation. It would be useful to be able to measure how changes affect uptake and adherence to co-creation and understand what other added values could be measured. Danish participants emphasized the definition of success criteria and evaluation design in co-creation processes was one a key issue, along with how to identify end-objectives and results, and how to carry out the process-oriented evaluation. CoMeds would also need to learn about methods to progress to collect more compelling narrative and evidence about the productivity impact.

3.3.1 Suggested competencies for CoMeds. The overall point of view of the CoMeds in the four countries was that a core anchoring of essential professional competences is needed, having in mind that working together with other sectors and professions requires a very strong sense of professionalism. In the UK, developing co-creative competencies was viewed as a mechanism for creating time, capacity and energy for focussing on co-creation to develop resources and local expertise. Indeed, CoMeds need to reflect and identify what their expectations are, what community members' expectations are, as well as frame the working space: *"Being reactive to patient's needs and requests is very positive. However, sometimes it's trying to manage patient's expectations as well, of what they will get out of the service. Sometimes patients come with very high expectations or frustrations, and it's then that we need to try to work with our primary colleagues, which can be more of a challenge" (UK Participant).*

CoMeds wanted strong professional skills to facilitate co-creation and ensure that all those involved in the co-creation process work together to identify the problems and create feasible solutions for all: *"Would be useful to have facilitation skills. Important for patients to see something because of their input. Looking at a pathway of where we start off. Sometimes it is not possible to put suggestions in place, for example financial restrictions. That constraint is very tight these days. Facilitation training in that" (UK participant).* The expectations of all parties

are central as well as the working space available between all participants in the co-creation process.

CoMeds suggested the following as important attributes and attitudes, knowledge, abilities and skills (Dempsey *et al.*, 2011, p. 9):

3.3.1.1 Attributes and attitudes. The specific attributes and attitudes needed to implement and support co-creation include openness, embracing differences, creativity, realization, provision of skills, facilitating an understanding of operations, learning to give up, pushing the limits, let oneself be surprised, resilience, making processes fluid, audacity, agility, efficiency, accepting the wealth of others, putting one's skills to contribution to work for a project, to question oneselves, being open to the opinion of the other, an obligation to be open to the opinion of the other, meeting the needs of citizens, distancing from one's own representations of "the other person", a process that requires effort and which one may not be aware of, increasing one's skills, creativity, taking risks, daring, fostering skills, making things easier, building self-confidence, working in good relational conditions: listening, embracing, taking a step back, sending feedback.

An important personal attribute is the ability to commit oneself and be aware of the importance of personal competences (as much as the professional competences) when transforming co-creation from an abstract term to a "real life" process. This can include shifting from one's own point of view; being able to ask: "What might be the best for you?" being humble; being curious; creativity and courage; being able to turn the perspective from looking for well-known (professional) solutions to new possibilities.

3.3.1.2 Knowledge. Knowledge, evidence and research are also the roots of the development of co-creation. The respondents put forward the following items as the necessary knowledge they would need to be able to support co-creation as CoMeds (Figure 1).

Knowledge CoMeds need to initiate and maintain co-creation in their workplace was organized in a sequential, interconnected and flexible plan, which respects the order in which these needs globally emerged in CoMeds from all countries when they remembered or imagined how to initiate and develop co-creation in their professional contexts.

The first need of knowledge is categorized under the label "Citizen power and control approaches" to answer concerns of CoMeds, such as "I think it is not difficult for key people to join the group, what is difficult is for them to participate without fear when people with different positions are in the same group, for example the educational assistant at the school library defending a different idea from the school principal" (PT).

The second area of knowledge is about "What process facilitators, potentiators may promote co-creation processes and also what hinders it". Evidence on the facilitating factors and barriers associated with co-creation in different contexts was collected. As barriers emerged, for example, the difficulty of maintaining open dialogues with the group (PT, FR), not getting everyone in the group to feel committed to the co-creation processes (FR), situations of conflict within the group that imply need mediation (PT), people do not want to participate because they think they do not have time (UK, PT). The support of leaders (PT), have skills as a group facilitator (DK, FR, UK), have knowledge about co-creation (FR), emerged as facilitating factors. However, overall, it was observed that there was little awareness of these factors, the need to analyse them in context and to think of possible ways to overcome barriers, even before they arise.

The third area of knowledge is "How to adapt existing methods, or the methods they use". The intention of the co-creation processes is not to create a rupture with pre-existing methods but to reflect on how to enhance them, integrate them or abandoning them in a critical and reflexive way to promote collaborative work and shared narratives. It was observed that globally, even active participant-centred practices were often uncooperative and more focussed on individual than collective assessment. For example, in Portugal, role-play activities, theatre forum and simulated case studies were very common but aimed at

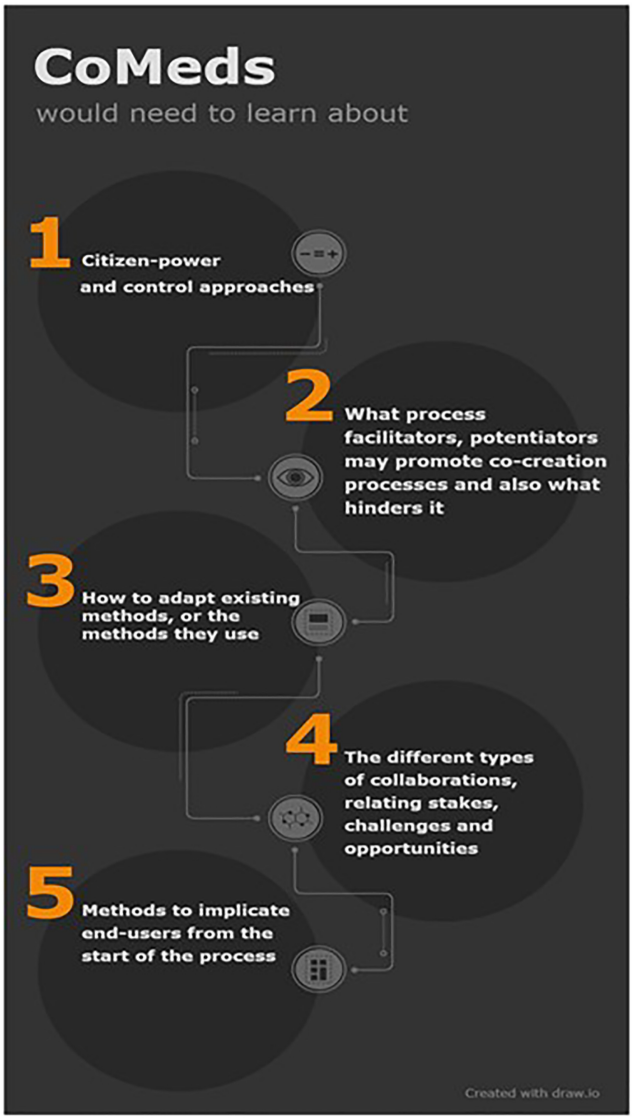

Figure 1.
Necessary knowledge CoMeds would need to support co-creation

evaluating the personal and social skills of each participant involved, as well as increasing his/her knowledge. Therefore, emerged the necessity to work with the CoMeds "The different types of collaborations, relating stakes, challenges and opportunities" and the "Methods to implicate end-users from the start of the process".

3.3.1.3 Abilities and skills. Communication skills were put forward as essential. Also, professionals supporting co-creation need to be able to deconstruct representations and personal projected knowledge and facilitate collective redefinition. This requires reflexivity, especially on one's attitude. Participants highlighted that reflexivity should be associated

with curiosity, the incline to make discoveries and the ability to assemble knowledge and talents together. Skills are very much related to professional identity and the goals set for the project. Professionals are expected to act rather than "react" to specific limitations and choose, for example, to change the time frame and the scale of the project. The following skills were explicitly mentioned as key:

(1) Communication skills
(2) Skills to present their thoughts on a subject
(3) Skills to create dialogue
(4) Project management skills
(5) Skills to develop the motivation of volunteers
(6) Skills to identify possibilities and run them in a co-creative and participatory way
(7) Skills to engage with end users more
(8) Skills to create an "open" method to elaborate action-oriented training
(9) Skills to support processes

The CoMeds also specifically addressed the need for skills to initiate a perspective change; the skills to engage in and create relationships, e.g., with volunteers and parents in day-care centres.

Table 2 provides an overview of the specific competences needed to implement and support co-creation.

Overall, the following areas of learning were identified and categorized within the phases of the project management cycle (Table 3).

4. Discussion

The conclusions presented in this study result from the crossed conclusions of four different contexts with different degrees of complexity and data collection instruments. Recognizing these limitations and concerns about generalization in case study research, the conclusions are presented as suggested for qualitative empirical research, in which assertions and generalizations are constructed, not as certainties but as interpretations with some built-in uncertainty (Creswell, 2003).

4.1 Key competences to carry out co-creation processes in communities

Based on Shilton's definition of competency as including "a combination of attributes such as knowledge, abilities, skills and attitudes which enable an individual to perform a set of tasks to an appropriate standard" (Dempsey *et al.*, 2011, p. 9), we identified two different types of professional competencies which are needed to support co-creation processes in communities: (1) competencies related to the processes of development of co-creation in the communities and their monitoring, impact assessment and dissemination; and (2) personal competencies based on attitudes and attributes. Regarding the first type of competencies, in all countries, the following main competencies necessary for a co-creation mediator in health promotion were identified: (1) being critical regarding citizen-power and control approaches; (2) being able to apply processes to promote co-creation, namely facilitating the early stages of the co-creation process to identify needs, problems and resources; applying project management methods and tools; and giving feedback to participants in the process of co-creation; (3) being able to adapt existing methods or the methods they use to promote co-creation processes; (4)

	DK	FR	PT	UK
Personal competences				
Openness	X	X	X	X
Shifting from one's own point of view	X	X	X	X
Being able to ask: "What might be the best for you"?		X		
Being humble		X	X	
Being curious	X	X	X	X
Resilience		X		X
Creativity	X	X	X	X
Building self-confidence	X	X	X	X
Audacity				X
Agility		X		
Efficiency				X
Procedural competences to promote open dialogue				
Listening	X	X	X	X
Embracing differences	X	X	X	X
Being open to the opinion of the other	X	X	X	X
Pushing the limits		X		
Learning to give up		X		
Let oneself be surprised		X		
Accepting the wealth of others				X
Working in good relational conditions	X	X	X	X
Procedural competences regarding co-creation				
Meeting the needs of citizens	X	X	X	X
Facilitating an understanding of operations	X	X	X	X
Making processes fluid	X	X		
Be aware of the effort co-creation process requires		X	X	
Taking a step back				X
Embracing change	X	X	X	X
Putting one's skills to contribution to work for a project	X	X		
Fostering skills/Provision of skills	X	X	X	X
Making things easier				X
Realization		X		
Reflection and coaching competences				
To question one selves		X	X	
Sending feedback		X	X	
Distancing from one's own representations of "the other person"		X		

Note(s): DK – Denmark; FR – France; PT – Portugal

Table 2. The specific competences needed to implement and support co-creation

being able to create different types of collaborations relating stakes, challenges and opportunities; (5) being able to implicate end-users from the start of the co-creation process and (6) applying methods and techniques to measure the impact and added value of co-creation (e.g. how to collect more compelling narrative and evidence about the productivity impact), and how changes affect uptake and adherence of participants to the process. The ability to reflect individually and collectively on practices to facilitate the collective redefinition of the action process were also considered very important. The attitudes and attributes identified as essential were related to the promotion of open dialogues (namely friendliness, empathy, confidence, respect – e.g. openness, embracing differences, being open to the opinion of the other – cohesion and listening) within co-creation processes, that require the development of competencies such as creativity, learning to give up, pushing the limits, let oneself be surprised, audacity, creativity, taking risks, daring.

		Questions raised during the research
Underlying principles to co-creation		
Promoting stakeholders' sense of legitimacy in the process	Promoting Equality in decision-making Promoting Equality in different types of knowledge (expert vs individuals' experiences) Learning to "step back"	How to avoid fighting for your own professionalism and the right to define the problem – hereby also the solution?
Promoting empowerment	Knowing about Citizen-power and control approaches Promoting ownership Including citizens in decision-making processes Learning about methods to implicate end-users from the start	How to involve citizens more in strategic decisions
Initiating the process of co-creation		
Creating a shared understanding of co-creation processes	Identifying the stakes for all stakeholders Shifting from consultation and tokenism	How can co-creation be implemented in different sectors but still be understood within the same frame?
Starting where people are	Pinpointing expectations, constraints, challenges, opportunities, and resources Clarifying the meaning of the process for citizens	What are the mutual expectations from each of the partners? Formal as well as informal
Implementing the process of co-creation		
Collaborative problem-solving	Mentoring Supporting active voluntary groups Welcoming "out-of-the-box-thinking" Promoting creative thinking methods, Co-design methods Learning to ask questions rather than look for answers Being able to pinpoint ideas and knowledge from selected evidence, and adapting it to local context Turning challenges into opportunities for out-of-the-box thinking	How to define and understand the problems to be solved? What is the product supposed to solve?
Supporting project development	Project management skills Knowledge of different types of collaborations and relating stakes, challenges, and opportunities Promoting motivation Creating adequate and tailored evaluation frameworks Promoting new partnerships Learning about how to adapt existing methods, or methods they use	How to upscale and activate the change agents in co creation?
Sharing the creation of tools	Promoting equality in needs analysis Understanding the stakes for all citizens involved Promoting creative thinking methods	

Table 3.
Areas of learning which should be included in a training programme to promote co-creation in communities and related questions raised during the study

(*continued*)

		Questions raised during the research
Facilitating the process of co-creation		
Promoting mediation competences	Considering the overarching context, constraints, and needs (policy, professional practice, social context, etc.)	How to communicate to open for new solutions and not just look for what we know we can present from a professional perspective?
	Supporting the creation of adequate and tailored tools and solutions	How can teachers be less experts and more facilitators?
	Shifting from an expert posture to a process facilitator	
	Understanding the stakes relating to the different sectors	
	Developing constructive communication skills	
	Being humble, curious	
	Changing perspective	
	Learning about what process facilitator, potentiators may promote co-creation processes	
Disseminating the approach	To address variability amongst stakeholders (horizontal relationships) and within the overarching systems of policies (vertical relationships)	How does the investment impact on outcomes of interest and social return of investment?
	Improving consistency and developing a shared vision of co-creation processes	
	Supporting advocacy for co-creation to promote the value and potential of the process	
Using existing resources	Drawing from Evidence-based knowledge	Lots of financial support possibilities – can or must they be (more) coordinated?
	Using New technologies	
	Finding funding	
	Promoting institutional and political support	
	Identifying and using existing tools	
	Being able to select adequate resources and adapting them to local context	
	Supporting the use of resources	

Table 3.

Our findings relate and can be categorized based on the CompHp Competencies (Barry *et al.*, 2012; Battel-Kirk and Barry, 2020; Dempsey *et al.*, 2011) to link co-creation practices to the specifics of health promotion competences:

(1) Enabling change: for individuals, groups, communities and organizations to engage in co-creative and participatory approaches to implement health promotion projects.

Enabling change is about promoting stakeholders' sense of legitimacy in the process of co-creation. CoMeds should make sure they promote community empowerment and ownership. Citizens must be included in the decision-making processes. This competency is about making sure participation levels shift from tokenism and consultation to citizen power modes. This competency needs to be developed in CoMeds, as above referred (see section Knowledge).

(2) Advocating for co-creative processes: to advocate with, and on behalf of, individuals, communities and organizations to upscale levels of citizen participation and improve health promotion actions.

It is essential to disseminate and advocate for co-creative processes with a view to promote the value and potential of the process. Advocating for co-creation also means finding funding. Advocacy should also be focussed on institutional and political levels as strong institutional and political support are needed. Also, a key point is for CoMeds to address the existing variability amongst stakeholders (horizontal relationships) and within the overarching systems of policies (vertical relationships). Volunteers from different social and economic backgrounds have different motives, which are very different from one another. Therefore, they must be treated and motivated differently.

Giving feedback to those involved in co-creation on how they have contributed and the difference they have made, or if no changes occurred following their input, then explain why, is also one of the CoMeds missions. Moreover, one of the issues raised was the need to embed co-creation in education rather than bolt on this way of thinking later in professional/citizen life.

(3) Mediating through partnership: to work collaboratively across disciplines, sectors and partners in an equitable process of co-creation to develop health promotion action.

Participants emphasized that one of the key terms to be used regardless of professional background is "voluntary work" to describe how citizens and private sector agents collaborate with the public welfare sector. The good effect of volunteering must be obvious and logic for all parties. Developing dialogues and approaches to co-create, as well as creating an alliance, citizens and professionals are a key element of success. Additionally, clear agreements and transparency in the co-creative processes are important. The process deployed to develop such agreements would need to be addressed in a CoMed training programme. When co-producing new solutions, all involved in co-creation need to reflect on how and what kind of influence they can have in the process. Therefore, it is not just about co-creating the service improvement but also the engagement method itself. The CoMed's role, then, includes to know how to "step back" and to demonstrate facilitative and mentoring skills while also acknowledging that they might need to be part of the co-creative process. The CoMeds should welcome "out-of-the-box-thinking" and promote new partnerships.

(4) Communication: to communicate effectively, using appropriate techniques and technologies for diverse audiences.

One of the main features in developing co-creation is to enable community members to exercise, develop and maintain the use of constructive communication skills. The CoMed would have to demonstrate mediation competences to support co-created projects. Furthermore, social media and new communication technologies can be used to see what initial conversations are emerging rather than the CoMed setting the topic themselves. The resources provided should be intuitive to use and include stories that community members can relate to. They should be universal for all involved in the co-creation. A point was made about the need to improve the resources available to improve partnership communications.

(5) Leadership: to contribute to the development of a shared vision and strategic direction for co-creation.

Respondents expressed the need to have a common understanding of co-creation. It is essential to create a shared understanding of co-creation processes and to clarify the meaning and improve the consistency of the process for citizens. The CoMed must clearly understand the stakes relating to different professional sectors and the collaboration between professional sectors. An element of concern for potential difficulties was also highlighted. Different co-creation approaches are used in the different sectors, and co-creation is

inconsistently used across the different local/regional areas. A suggestion was made to improve the consistency of practices across the country. The lack of consistency in the implementation of co-creative processes and what they mean and entail is a shortcoming that would have to be overcome by the CoMed. The irregular implication of citizen stakeholders, which was pointed out as an issue, was explained by day-to-day problems and concerns, as well as also constraints (health issues, social issues, etc.). CoMeds would also need to enable citizens to understand how health, education and social services work, the language they used and the politics that comes with it. They would need to be able to identify and use existing tools, select adequate resources and adapt them to the local context. An additional point was made on promoting the community members' motivation to use co-creation based on their different incentives to take part in the process.

(6) Assessment: to conduct assessment of needs and assets in partnership with stakeholders, in the context of the political, economic, social, cultural, environmental, behavioural and biological determinants that promote or compromise co-creation.

CoMeds would have to be able to identify the stakes for all stakeholders to start where people are. Being able to pinpoint expectations, constraints, challenges, opportunities and resources is one of the expected competencies for a CoMed. The whole process is about understanding the stakes for all the citizens involved. The overarching context, constraints and needs (policy, professional practice, social context, etc.) should be the base for the CoMed's support. This means that the CoMed would have to master co-creation methods and tools to be able to adapt and select the right way forward in a specific context.

(7) Planning: to develop measurable goals and objectives for co-creation based on assessment of needs and assets in partnership with stakeholders.

Not much was said about planning other than it involved supporting project development. This gap in knowledge was made evident during this study. We considered it a pressing need for training as participants did not consider planning an important issue in co-creation, and they showed little knowledge about it. Bearing in mind the aspects described above about the importance of project management, as an essential element of planning, training would have to integrate planning and provide key knowledge about project management.

(8) Implementation: to implement effective and efficient, culturally sensitive and ethical co-creation with stakeholders.

CoMeds should support the use of collaborative problem-solving, creative thinking methods and co-design methods. They should enable communities to share the creation of adequate and tailored tools and solutions, as well as adequate and tailored evaluation frameworks. New technologies could be useful in this process. Additionally, respondents identified the need to share good co-creation practices, as they thought it was lacking. Another suggestion was made to prepare a method catalogue starting from a political, professional and citizen perspective in collaboration with NGOs and associations, e.g. "Methods in citizen meeting". However, as pointed out by one of our respondents, one size does not fit all!

(9) Evaluation and research: to use appropriate evaluation and research methods, in partnership with stakeholders, to determine the reach, impact and effectiveness of co-created health promotion action.

According to our respondents, it is important to draw from evidence-based knowledge. Success criteria and evaluation designs should encompass results and process evaluation of co-creation processes. The increased sense of belonging, which resulted from higher levels of participation, was put forward because of co-creation. Respondents highlighted that they

would need support about measuring the impact and added value of co-creation and to dispose of a more rigorous evaluation framework to assess the impact of the changes they implemented through co-creation. It would be useful to be able to measure how such changes affect uptake and adherence to co-creation and understand what other added values could be measured. They would like to progress to collect more compelling narrative and evidence about the impact of co-creation.

(10) Ethical values: The ethical values and principles included in co-creation (equity and social justice, respect for the autonomy and choice of both individuals and groups, and collaborative and consultative ways of working).

According to the respondents, co-creation should take place based on the following underlying values and principles: equality in decision-making; equality in different types of knowledge (expert *vs* individuals' experiences); equality in needs analysis; shifting from an expert posture to a process facilitator; being humble, curious; changing perspective.

(11) Knowledge of co-creative processes and additional knowledge needed: a CoMed health promotion practitioner draws on a multidisciplinary knowledge base of the core concepts, principles, theory and research of co-creation in health promotion and its application in practice.

The development of adaptation skills can contribute to enabling professionals and communities to engage in innovations and/or customize and adapt existing solutions to fit their own purposes and needs (Rogers, 2010). In this respect, the development of professional skills to accompany the shift is not considered an end but as a tool for communities to expand and build up their own emancipatory competencies, especially in the field of health (Israel *et al.*, 1998). This approach is about giving communities the means to design and implement solutions themselves and be the agent of change in a "bottom-up" perspective (Laverack and Labonte, 2000). The CoMed's role is thus to support this process by providing space and resource rather than to take on the role of promoter of a solution targeting the community. Community capacity-building of developing skills, resources and sustainable commitments to increase and sustain health benefits (Hawe *et al.*, 2000) is, however, often underestimated. One of the reasons is that available funding often prioritizes population or topic-centred programmes and projects (Hawe *et al.*, 2000). However, the professional practice can be a lever to amplify community capacity, aiming to place the generation of knowledge in a dynamic and transdisciplinary continuum involving all institutional, professional and community stakeholders (Dankwa-Mullan *et al.*, 2010). The idea is not to reinvent the wheel but instead to design educational training to address these unmet competency-based needs to develop a common and sustainable capacity for all those relevant to the involvement of co-creation, including those at the organizational level, professional service delivery and receivers of services, such as students, patients and public members (Marsick and Watkins, 2001).

4.2 Implications of this study to increase the quality of the CoMed training programme

Based on the findings from this research, training should include formal and non-formal education based on the sharing of experience and knowledge of the participants, drawing for the richness of "complementarity" (Glasman, 2005 in Bier, 2010) as well as incidental learning. Three conditions are, however, necessary for the development of this type of learning: reflexivity, proactivity and creativity. We propose that the underlying perspective to training should be that of "organizational learning theory" as described by Levitt and March (1988) who argue that the learning of organizations occurs through experience and its interpretation (Levitt and March, 1988). The reflective capacity, also in focus in experiential learning (Kolb, 1984), is "constant in those who face singular situations, difficult cases, dilemmas, new

problems" (Perrenoud, 2001, p. 44). According to Nonaka, the "spiral of learning" finds its starting point in individual learning, which extends to the group and then to the wider level of the community and even of a country or group of countries, thanks to the "continuous interaction between individuals constituting these larger entities" (Bray, 2007, p. 6).

The development of community capacity standards has shown to require a practice-based approach (Allegrante *et al.*, 2009). We argue that the same approach is needed for the development of co-creation practices. Transformational and transdisciplinary research maintains and fosters a close relationship with the stakeholders and professionals affected by and engaged in health promotion and that participatory research designs are particularly important to address health inequalities (Dankwa-Mullan *et al.*, 2010). Participatory research methods could facilitate the uptake of research findings into health promotion practice and enhance interventions' reach and adoption (Glasgow *et al.*, 2003).

4.3 Linking back to existing participatory approaches

The competences put forward by the CoMeds relate to the concept of community competence as identified by Cottrell in 1976. Community competence can be described in terms of how stakeholders collaborate in identifying problems and needs in the community, work based on a consensus as to how to prioritize issues, set goals and design ways to achieve them, and implement solutions collaboratively and effectively (Eng and Parker, 1994). The process described by CoMeds could also be related to community empowerment, as described by Israel *et al.* (1994) , who suggest that a gain in understanding and control, which involves collective problem-solving will, promote beneficial action (Ruderman, 2000). "An empowered community is one in which individuals and organizations apply their skills and resources in collective efforts to meet their respective needs. Through such participation, individuals and organizations within an empowered community provide enhanced support for each other, address conflicts within the community, and gain increased influence and control over the quality of life in their community. Similar to an empowered organization, an empowered community has the ability to influence decisions and changes in the larger social system." (Israel *et al.*, 1994, p. 153). Community empowerment is the process of enabling citizens to gain understanding and decision power over the issues that concern them. When aiming to develop community capacity, it is key to improve stakeholder and community members' participation and leadership, develop problem assessment skills and increase analytical skills (Labonte *et al.*, 2002; Laverack and Labonte, 2000). The community organizing approach (Crisp *et al.*, 2000) consists of drawing from existing resources in the community, and developing awareness, skills and leadership within the community. This approach also involves creating opportunities for the community members to gain skills and knowledge. Community members become active drivers of change, as they recognize their own capacity and resources to trigger and manage such change. Ruderman (2000, p. 3) provide us with the dimensions of community competence as "commitment, self-other awareness and clarity of situational definitions (accurate perceptions of divergent viewpoints), articulateness, communication, conflict containment and accommodation, participation, management of relations with the larger society, and machinery for facilitating participant interaction and decision making. Social support and leadership development have also been added in some conceptualizations."

5. Conclusion

This study provides novel findings on the competencies needed for the professional development of health promoting professionals to embed co-creative processes within their practices and communities. The findings are of trans-national importance spanning welfare

contexts across Denmark, Portugal, France and UK Competencies identified highlight key concerns that professionals with a position to mediate co-creation have in transferring the abstract term of co-creation in real-world practice. Overall, learning about underlying principles, process initiation, implementation and facilitation of co-creation were identified as areas that need to be included within a co-creation training programme and a set of co-creation tools that can be used in practice. This can be applied in the future through the framework developed from these findings of enabling change, advocating for co-creative processes, mediating through partnership, communication, leadership, assessment, planning, implementation, evaluation and research, ethical values, and knowledge of co-creative processes.

Note

1. Horizon 2020 programme focussing on; "Europe in a changing world – inclusive, innovative and reflective Societies »

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Essential food and nutrition knowledge and skills for primary school children: Australian parents' opinions

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Abstract

Purpose – This paper examines the views of Australian primary school parents regarding the food and nutrition education (FNE) curriculum. Associations with personal values (Universalism and Hedonism) and demographic measures were also explored.

Design/methodology/approach – An online survey was conducted among 787 parents in March 2021. Parents rated the importance of 17 FNE topics. They were also asked about their support for six curriculum improvements and to state their own improvement suggestions.

Findings – Parents viewed the "Effect of food on health" and "Food hygiene" as the most important topics. Three FNE components were derived: (1) food safety and preparation, (2) health and nutrition information, (3) food origins and environmental sustainability. The "Food safety and preparation" component score was associated with both universalism-nature and hedonism values but negatively associated with parental education. The "Health and nutrition information" component score was associated with universalism-nature value and main language spoken at home. Lastly, the "Food origins and environmental sustainability" component score was associated with universalism-nature value. The two personal values, universalism-nature and hedonism, were more strongly associated with parents' views of curriculum topics than parental demographic characteristics. Parents had several criticisms of current FNE, including school food environments not resonating with FNE taught in the classroom and that FNE might increase the risk of eating disorders. They also suggested that the FNE curriculum should support both parents and teachers by providing relevant resources and training.

Originality/value – Australian parents' views of the importance of FNE topics and how to improve FNE in primary schools have been under-examined.

Keywords Health education, Primary schools, Parents, Food and nutrition, Children

Paper type Research paper

Introduction

Food and nutrition education (FNE) in schools can help children become active participants and future leaders in developing food systems that supply healthy and sustainable diets (Food and Agriculture Organisation, 2020). More countries are incorporating FNE into their education system, school health and school food policies and initiatives, recognising its

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impact on children's food attitudes and behaviours and those of their parents, families and communities (Hawkes *et al.*, 2015; WHO, 2018).

The primary school years (elementary school, 5–12 years old) are an opportunistic time to provide FNE because primary school children become more independent as they grow older and develop more autonomy (Vaughn *et al.*, 2015). Many children in affluent countries such as Australia begin spending money at school and elsewhere during the primary school years (Booth *et al.*, 2009). With a rise in dual-career families and single-parent homes in paid jobs (Australian Bureau of Statistics, 2016), as well as a greater reliance on pre-prepared and convenience foods (Venn *et al.*, 2017), children have fewer opportunities at home to learn many of the essential food and nutrition-related skills. Thus, schools are ideal settings to deliver FNE to children as schools have continuous, intensive contact with children and reach all children and their families (Bucher Della Torre *et al.*, 2010; Hawkes *et al.*, 2015).

Most Australian primary schools already include some form of FNE. Unfortunately, however, most schools devote less time to FNE than the suggested minimum of 18 h per year, of which 12 h is recommended to be practical (Ballam, 2018; Jamie Oliver Food Foundation, 2017). This is mainly due to a crowded curriculum (Love *et al.*, 2020; de Vlieger *et al.*, 2019). Therefore, it is crucial to determine what the essential food knowledge and skills are so that they can be the focus of FNE in primary schools.

Parents' views about school FNE are likely to be crucial for curriculum development and implementation success (Worsley, 2008) as parents play a vital role in the formation of children's eating habits (Birch *et al.*, 2007; Shloim *et al.*, 2015). Despite parents' central role in their children's health, there is a paucity of research about parents' views of essential FNE topics to be taught in primary school. To date, only our previous qualitative study (Blinded, 2021) has explored which FNE topics Australian parents' believe should be taught in primary schools. Because of the limited generalisability of those qualitative findings, a larger comparative study is needed to further investigate the current role of Australian primary schools in promoting healthy eating through FNE. Therefore, the first aim of this study was to identify the FNE topics that parents consider should be taught and to explore their ideas to improve the current status of FNE in the school curriculum. These findings can then inform the development of a more comprehensive FNE programme for Australian primary school children.

The study's second aim was to examine likely predictors of the perceived importance of these FNE topics. These included parents' demographic characteristics and their personal values, as these can influence food and nutrition related views and expectations (Thomson *et al.*, 2017; Lee *et al.*, 2014; Xiao and Kim, 2009). It was hypothesised that parents' demographic characteristics and personal values would both be associated with parents' views of curriculum FNE topics.

Methodology

Design and sampling

An online cross-sectional survey was administered via the Qualtrics platform to obtain parents' views of Australian primary school FNE. Respondents were eligible to participate if they were currently living in Australia and were a parent/primary carer of a child attending an Australian primary school. The study was advertised on Deakin University social media platforms, Facebook and Twitter. Respondents could take the survey via the link provided in the online advertisements. The survey was conducted between March and April 2021. The Deakin University, Faculty of Health, Human Ethics Advisory Group granted ethics permission for this study (HEAG-H 13-2021).

Questionnaire

A previous qualitative study conducted by the authors in relation to parents and teachers' views of primary school FNE (Aydin *et al.*, 2021a, b) and previous literature related to school FNE and

food-related knowledge and skills informed the development of the instrument. A detailed description of the questionnaire has been reported elsewhere (Aydin *et al.*, under review).

Parents were asked "*How important is it that the FNE topics listed below are taught at all primary schools?*" and were requested to rate 17 FNE items such as "cooking" and "food hygiene" (Table 1) on a five-point Likert scale. After inspection of the rating distributions, these five categories were aggregated as "Not important" (1,2), moderately important (3) and "Important" (4,5). The item orders were rotated to reduce fatigue effects.

Parents were then given six statements and asked "*Below are some suggestions to improve food and nutrition education in primary schools. To what extent do you agree or disagree with the following statements*?" (Table 5) such as "Practical tasks (e.g. cooking, gardening) should

	n (%)
Gender	
Female	757 (96)
Male	26 (3)
Prefer not to say	4 (1)
Marital status	
Married/de facto	678 (86)
Single/divorced/widowed	91 (12)
Prefer not to say	18 (2)
Highest level of education	
Postgraduate degree	242 (31)
University degree	323 (41)
Trade/certificate/apprentice	152 (19)
Year 12 or less	70 (9)
Age group (years) (N = 785)	
20–29	36 (5)
30–39	368 (47)
40–49	346 (44)
50+	35 (4)
State of residency (N = 786)	
Victoria	437 (56)
Western Australia	150 (19)
New South Wales/ACTs	112 (14)
Queensland	54 (7)
Tasmania/South Australia/Northern Territory	33 (4)
*Geolocation** (N = 786)	
Major cities	517 (66)
Rural and remote areas	269 (35)
*SES level*** (N = 786)	
High-SES	425 (54)
Mid-SES	292 (37)
Low-SES	69 (9)
Main language spoken at home	
English	728 (93)
Other	59 (8)

Note(s): *All areas outside of Australia's major cities are classified as "rural and remote" Classification was done by using Accessibility and Remoteness Index of Australia (ARIA+) indices which is based on the measures of road distance between populated localities and service centres
**SES levels were identified by residential postcodes mapped to the Socio-Economic Indexes for Areas (SEIFA; index of advantage and disadvantage)

Table 1. Demographic characteristics (N = 787)

be included". They were requested to rate the statements on a five-point Likert scale. These five categories were aggregated as disagree (1,2), neutral (3) and agree (4,5).

This question was followed by an open-ended question *"Are there any other improvements you would like to see in terms of food and nutrition education? If yes, please list."*

Personal values. Nine items were selected from the 57 item Schwartz Personal Values inventory (modified to be relevant to both male and female respondents) (Schwartz *et al.*, 2012). Universalism-nature, universalism-concern and hedonism values were included in the survey (three items per value) as they have been shown to be associated with people's food-related practices and beliefs (Nijmeijer *et al.*, 2004; Farragher *et al.*, 2016; Worsley, 2003; De Jong *et al.*, 2017). Previous studies demonstrated the association between people's universalism values and their consumption of healthier food (Farragher *et al.*, 2016), their support for healthy eating policies (Worsley, 2006) and initiatives that promote fruit and vegetable consumption (Worsley *et al.*, 2011). In line with these previous findings, we expected those with high universalism values to be more in favour of FNE components to be taught in primary schools, whereas, in contrast, hedonists would be expected to be less in favour.

Respondents were asked: "*To what extent do the following statements describe you and your approach to life*?" They were asked to estimate each scale's importance separately on a five-point Likert scale. Internal reliability was measured for each personal value and found to be 0.79 for hedonism, 0.80 for universalism-concern and 0.82 for universalism-nature. The respondents' personal value scores were obtained by computing the mean ratings given to the items for each personal value.

Demographic characteristics of the respondents. Seven questions were asked about the respondents' demographic characteristics (Table 1). We hypothesised that parents' demographic characteristics would each be associated with parents' views of FNE topics.

Data analysis

The responses to the questions were analysed using SPSS statistical software (IBM Corporation, Version 27 (Chicago, IL). An exploratory principal component analysis (PCA) with varimax rotation (Pallant, 2020) was performed on the non-aggregated data associated with the 17 FNE items. The Kaiser–Meyer–Olkin (KMO) measure was 0.908, exceeding the recommended value of 0.6. Bartlett's test of sphericity indicated the appropriateness of the data set for PCA (Pallant, 2020). The PCA constructed three FNE components (Table 3). The components' internal reliabilities were assessed by calculating Cronbach alpha coefficients. The cut-off for rotated factor loadings was 0.32 (Tabachnick and Fidell, 2007). The items loaded on each component were summed to generate total component scores, and then the mean component scores were computed by dividing by the number of items. The three mean scores were stored as separate variables. These component scores were then used in stepwise multiple regression analyses to determine the predictors (demographics and personal values) for each component. Preliminary analyses were carried out to check that the assumptions of normality, linearity, multicollinearity and homoscedasticity were not violated (Pallant, 2020).

Open-ended responses to the question "*Are there any other improvements you would like to see in terms of food and nutrition education? If yes, please list.*" were loaded into the Leximancer software (Version 5, Leximancer Pty Ltd, 2021). Leximancer is a machine-learning-based qualitative data analysis software that enables fast visual generation of themes and related concepts automatically derived from qualitative data (Nunez-Mir *et al.*, 2016). Unlike manual coding, Leximancer scans textual data and automatically identifies concepts and themes by word occurrence and co-occurrence frequencies (Cretchley *et al.*, 2010). In the final step of the analysis, these identified concepts were displayed as a concept map. The large circles represent the themes, and the dots represent the concepts in the map

created (Figure 1). Leximancer labels the most prominent concepts as themes in terms of their interconnections with other concepts (Harwood *et al.*, 2015). The themes were also "heat mapped to demonstrate their relative connectivity with the other concepts (Angus *et al.*, 2013). The Leximancer themes were manually renamed to provide more meaningful names through the repeated reading of the respondents" comments under each theme (Indulska *et al.*, 2012). Keeping the original concepts unchanged, relevant and similar themes were merged to facilitate the content analysis by using a (Scalable Vector Graphic) SVG editing tool (https://boxy-svg.com).

Results

Twelve-hundred and fifty-nine respondents opened the survey link, and 787 completed the survey giving a completion rate of 62%.

Demographic characteristics of the respondents

The demographic characteristics of the respondents are summarised in Table 1. The parents represented a wide range of age, education, geographical region and socio-economic level categories. Almost all participants (95%) were female, and most were married (86%). Most respondents had at least a university degree (72%). In total, 66% of the respondents were from major cities, which is similar to the distribution in the Australian population, where 71% live in major cities (Australian Bureau of Statistics, 2018).

Parents' ratings of the importance of FNE topics. The topic that most parents (91%) believed was important to teach at all primary schools was "effects of food on health". This was followed by "food hygiene" (78%) and "nutrient content of food and their functions" (76%). The topic least parents rated as important was "food budgeting skills" (44%) (Table 2).

Factor analysis and FNE components. The three derived principal components accounted for 54% of the variance in the parents' ratings of their preferences for FNE topics. The loadings of individual items on each of the three FNE components are shown in Table 3.

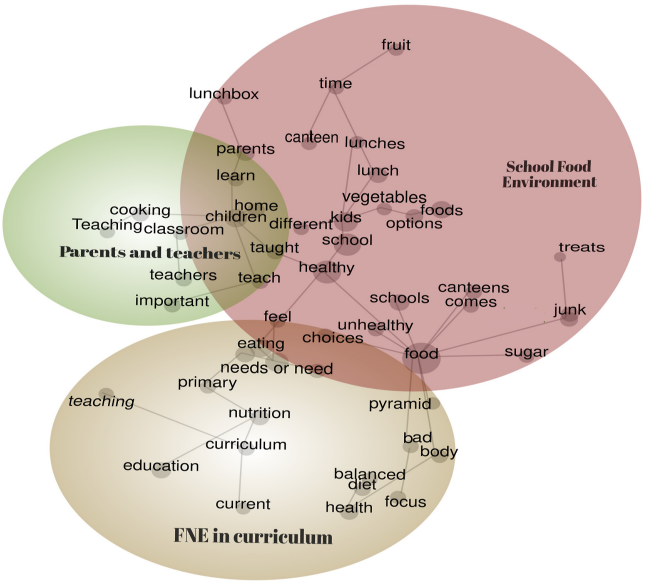

Figure 1.
Leximancer concept map

	Very important or extremely important (%)	*Moderately important (%)*	*Not at all important or slightly important (%)*
FNE topic			
Effects of food on health	91	7	2
Food hygiene	78	16	6
Nutrient content of food and their functions	76	19	6
Where food comes from and food production	75	20	5
Reducing food waste	74	21	5
Allergies and intolerances	65	26	9
Environmental impacts of food consumption and production	63	25	13
Cooking	62	27	11
Food gardening	61	28	12
Australian Guide to Healthy Eating (AGHE)	61	25	14
Food safety and storage	60	27	13
Portion sizes	59	28	13
How to read food labels	56	27	17
Food cultures/different cultural food	53	36	12
Food advertising and marketing	51	31	18
Preparing food without cooking	50	28	12
Food budgeting skills	44	29	27

Table 2. Parental ratings of the importance of 17 specific FNE topics *(n = 775)*

Items	Factor loading
Component 1. Food safety and preparation (Cronbach's alpha = 0.79)	
Allergies and intolerances	0.69
Food safety and storage	0.74
Cooking	0.51
Food hygiene	0.79
Preparing food without cooking	0.60
Component 2. Health and nutrition information (Cronbach's alpha = 0.75)	
Effects of food on health	0.74
Australian Guide to Healthy Eating (AGHE)	0.69
Nutrient content of food and their functions	0.71
Portion sizes	0.58
How to read food labels	0.50
Component 3. Food origins and environmental sustainability (Cronbach's alpha = 0.74)	
Reducing food waste	0.64
Food advertising and marketing	0.54
Food gardening	0.62
Where food comes from and food production	0.73
Environmental impacts of food consumption and production	0.69

Note(s): "Food cultures/different cultural food" and "Food budgeting skills" were not included due to not loading on a single component

Table 3. The three FNE components identified by principal component analysis

The two items "food cultures/different cultural food" and "food budgeting skills" did not load on any of the components and therefore were removed from the analysis. The three components were provisionally named by considering the highest loading items on each of them as follows: (1) *food safety and preparation*, (2) *health and nutrition information*, (3) *food origins and environmental sustainability*.

The calculated component mean score was the highest for *health and nutrition information* (mean (SD) = 3.87(0.69)), followed by *food origins and environmental sustainability* (mean (SD) = 3.80 (0.70)) and *food safety and preparation* (mean (SD) = 3.77 (0.72)).

Universalism-nature and hedonism emerged as significant predictors of several of the parents' FNE component scores in linear multiple regression analyses (Table 4): Universalism-nature predicted parents' greater FNE component scores for all of the FNE components (health and nutrition information, food safety and preparation, food origins and sustainability), explaining the largest proportion of the variance in such measures (ranging from 5 to 15%). Hedonism predicted higher scores for "Food safety and preparation" component. Of the demographic variables, only "highest level of education" and "main language spoken at home" emerged as significant predictors of the FNE component scores. Having a university degree was associated with lower scores for "Food safety and preparation". Being a non-native English speaker was positively associated with higher "Health and nutrition information" scores (Table 4).

Table 4.
Multiple linear regression data with parents' personal values and demographic characteristics as predictors of parents' FNE component scores

	Health and nutrition information $R^2 = 0.07$, $F(2,329) = 11.645$ $p < 0.001$		Food safety and preparation $R^2 = 0.08$, $F(3,328) = 9.898$ $p < 0.001$		Food origins and sustainability $R^2 = 0.15$, $F(1,330) = 59.566$ $p < 0.001$	
	Std.β	*p*	*Std. β*	*p*	*Std. β*	*p*
Universalism-Nature	0.218	<0.001	0.207	<0.001	0.391	<0.001
Hedonism			0.122	0.026		
Education			−0.130	0.014		
Main language spoken at home	0.13	0.015				

Table 5.
Distribution of parents' responses to six suggestions to improve FNE in primary schools

N = 787	Strongly disagree or disagree	Neutral (%)	Strongly agree or agree
Foods provided at school should be consistent with the messages taught in the classroom	2	8	90
Food and nutrition education should be taught regularly at each grade level	3	8	89
Practical tasks (e.g. cooking, gardening) should be included	3	9	88
More time should be allocated to food and nutrition education	5	18	77
Food and nutrition education should be integrated into other subjects (like maths, writing, reading etc.)	6	21	73
Well-balanced, healthy free school lunches should be provided at school to all students	16	30	53

Parents' agreement with suggestions to improve FNE. Approximately three-quarters of parents agreed with five out of the six suggestions (Table 5) to improve FNE. The statement "Well-balanced, healthy free school lunches should be provided at school to all students" only had agreement by half of the parents. "Foods provided at school should be consistent with the messages taught in the classroom." had the highest percentage agreement (90%).

Qualitative findings – improving FNE in primary schools

Theme 1. School food environments (Leximancer labels: food, junk, lunches). Most parents criticised the food provided at school canteens and through lunch orders. They believed most of the foods provided do not align well with what is taught in the classroom. For example, a parent commented:

> Schools need to be more aware of subliminal messages children are receiving i.e. taught about "everyday foods" but then lots of "sometimes foods" on offer at the canteen. [in the current Australian curriculum, essential foods are named as "everyday foods" and discretionary foods as "sometimes food"] Parent 265

The parents felt that school rules should be stricter to ensure that the schools have healthier food environments by restricting certain types of food sold and consumed at school, such as lollies. They also believed that unpackaged food policy (nude food policy) should be encouraged more.

> Stricter rules on what children can bring to school (no chips, chocolate, lollies etc.) Parent 284

> Schools should all be encouraged to be "nude food". Parent 269

Growing food at school through school gardens and improving edible school gardens were among the suggestions to establish healthier school food environments.

> Grow food around the school so kids can see it growing and more likely to try it Parent 109

> Increased presence of fruit trees and vegetable patches at school Parent 156

Parents also discussed the issues relevant to school lunchtimes. Some argued that the time allowed for eating at lunchtime was insufficient, especially for younger children. They believed children chose to play over eating, so school lunch becomes an improper eating experience.

> 10 min for a Year 1 to eat a proper lunch (not a Sandwich) is not enough time. Parent 293

> More time for the kids to eat and healthy and warm lunch provided by the school (canteen system) Parent 223

Theme 2. FNE in the current curriculum (Leximancer labels: teaching, education, focus). One of the common concerns among parents was the potential of triggering more disordered eating and body image issues among children by teaching FNE in an improper way. They believed FNE should not focus either on the restriction of certain food types, demonising them or children's bodies, but rather should focus on a balanced diet.

> In my limited experience, the way this is done sets some foods up as "bad" and fetishises them-it's really counterproductive and has the potential to lead to disordered eating. Parent 124

> Promotion of ALL food in a positive manner, more emphasis on what food provides us both physically, socially and emotionally, …., promotion of body positivity ["Health at every size" campaign] Parent 249

Some parents mentioned that they were in favour of holistic, regular teaching over time rather than for short periods or once-off teaching. Moreover, practical components were frequently suggested by parents. These practical components included cooking and gardening.

> I would love to see normalising healthy food knowledge into the everyday, so it is better embedded in a holistic way as this would hopefully create more change (as opposed to the ineffective once-off Life Ed van [an independent preventative drug and health education program] each year. Parent 133

> More practical information, examples and uses. School gardens are an amazing idea. Parent 220

There were also some comments about the content of the current FNE classroom curriculum. Parents suggested that various FNE-related topics could be incorporated into the current curriculum. Whilst many different topics were proposed for inclusion, one topic (the food pyramid) was consistently suggested to be removed. Some expressed their mistrust in the food pyramid.

> I'd like the "food pyramid" to be thrown in the trash where it belongs. I'd like proper studies to be done on food and nutrition, that are not paid by Australian dairy or wheat companies. Parent 343

Theme 3. Parents and teachers (Leximancer label: parents). This theme focussed on the two important stakeholders of FNE, namely parents and teachers. The importance of parental education was discussed and along with ways schools could support parents to help improve FNE for their children.

> It is important to teach children, but it is more important to educate parents prior to conception and on-going through childhood. Parent 87

> Maybe it's a school lunchbox suggestion list or a booklet "getting ready for school" that government departments can support. Parent 187

Several parents suggested that schools may have some training opportunities to involve parents to improve their food and nutrition-related knowledge and skills.

> More training available for parents/teachers on how to teach children. Parent 226

> Classes for parents and kids to have fun cooking, preparing foods together. Parent 48

Some parents criticised teachers because they rewarded children with food. For example:

> And NO lolly rewards by teachers. Parent 186

> Don't encourage food as rewards by teachers Parent 65

A more frequent criticism of teachers was over the "policing" of lunch boxes. Many felt that commenting on lunchboxes was shaming, damaging for children and not helpful.

> The role of teachers as nutritional police officers is unhealthy, unhelpful and often totally inappropriate. Children are shamed and negatively affected by individual personalised feedback on food from teachers. Parent 322

Discussion

Importance of FNE topics

This study explored the views of Australian parents regarding the importance of FNE topics in primary school curricula, a topic that has not yet been presented in the literature. The study found the "Effect of food on health" and "Food hygiene" rated very/extremely important by the highest number of parents. Our study findings were consistent with other Australian studies investigating essential FNE topics for secondary school students. For example, the most favoured topics were similar to ones reported in an Australian study on consumers' views of essential FNE knowledge and skills for secondary school students (Burton *et al.*, 2018). This study reported the findings from surveys conducted in 2012 and 2014 and found that "the effects of food on people's health" and "how to prepare food safely" were the most

important knowledge and skills for Australian secondary school students (Burton *et al.*, 2018). In another two Australian studies, home economic teachers (Ronto *et al.*, 2016b) and adolescents (Ronto *et al.*, 2016a) identified "Food safety and hygiene practices" and "Healthy and unhealthy foods" as the most important topics for adolescents to be taught at school. These similarities indicate the stability of the public opinions on the most essential FNE topics during recent years. Strong parental support for food hygiene topics might be due to children's current low levels of knowledge, which is very likely to cause foodborne illnesses. Australian secondary school students and university students were recently reported to have poor knowledge of food hygiene (Mullan *et al.*, 2015), and it is not surprising that foodborne illness is extremely common in Australia. Approximately 4.1m domestically based cases of foodborne gastroenteritis occur each year (Kirk *et al.*, 2014).

In our study, "Food budgeting skills" were viewed as a very/extremely important topic, by only 44% of the parents, similar to the views of home economic teachers (Ronto *et al.*, 2016b) and adolescents (Ronto *et al.*, 2016a). Adolescents found the topic irrelevant but recognised them as important later in life (Ronto *et al.*, 2016a). It is likely that parents in our study also believed it is currently irrelevant for their children as they are not independent food consumers and most of the time do not have to do the food shopping for themselves. It should also be noted that except for "Food budgeting skills", all of the FNE items were identified as very/extremely important by more than 50% of the respondents.

The current study revealed that more parents placed importance on the teaching of knowledge of *health and nutrition information*, rather than knowledge or skills for *food safety and preparation* and *food origins and environmental sustainability*. As primary school children are usually not responsible for food preparation and are highly dependent on their parents for the provision of food, parents may think that food preparation related knowledge and skills are not the most important one for that age group. Similarly, Australian adolescents ranked food skills as less important in comparison to the knowledge component of food literacy. However, they did recognise that food skills, such as preparation and cooking, will be crucial when they live independently (Ronto *et al.*, 2016a).

Improving FNE in primary schools

The study also revealed parents' opinions on how to improve FNE in primary schools. It identified several themes on this matter. Among the statements proposed to improve FNE in schools, parents' highest ratings were given to "Foods provided at school should be consistent with the messages taught in the classroom". This demonstrates the importance parents place on school food environments and the need for consistency between what is taught in the classroom and what is done in practice. This finding aligns with an earlier study in 2005 in which Australian parents expressed strong criticism for unhealthy school food environments (Bell and Swinburn, 2005). These findings also match those observed in previous studies that reported inconsistent implementation of canteen policies in Victoria and low adherence to canteen policy (Lawlis *et al.*, 2016) with many discretionary food items and lack of healthy food items on the canteen menus (Woods *et al.*, 2014). International studies previously reported similar criticism of school canteens and highlighted inequity across schools (Rachmadewi *et al.*, 2021; Porto *et al.*, 2015; Fitzpatrick *et al.*, 2017). For example, Indonesian and Brazilian school canteens have heavily promoted non-nutritious snacks to children (Porto *et al.*, 2015; Rachmadewi *et al.*, 2021). Findings from industrialised nations such as Canada also reflect similar unhealthy school environments (Fitzpatrick *et al.*, 2017). Our finding is also consistent with the growing interest and international calls to make school food environments healthier (Mikkelsen *et al.*, 2016; WHO, 2021).

Most parents supported the delivery of FNE regularly at each grade level, inclusion of practical tasks, allocation of more time and integration of FNE into other school subjects.

However, only 53% of them agreed with the suggested provision of free lunches at schools. Although acknowledgement of school meals as a pedagogical opportunity to teach FNE is becoming more common, and there are some examples from some countries such as Sweden, Denmark and Japan (Osowski *et al.*, 2013; Waling and Olsson, 2017; Lintukangas and Palojoki, 2016; Tanaka and Miyoshi, 2012), over 50% of Australian parents demonstrated support in our study. This finding is consistent with another Australian study that indicated healthy meals subsidised by the government was supported by approximately half of the parents (Worsley, 2006). Around 30% of parents in our study felt doubtful about their school's lunch provision. However, an evaluation of a recent lunch provision trial in three Tasmanian [a state of Australia] primary schools indicated that 90% of the children's parents who were exposed to the programme were in favour of it being implemented every day (Smith, 2021). These parents believed their children were provided with a variety of healthy lunches and given the opportunity to try new foods (Smith, 2021). This indicates that providing successful examples of healthy lunch provision at schools is likely to gain the support of parents.

Parents also discussed the content of the FNE curriculum. They believed FNE should not focus on restricting certain food types or demonising them and should not focus on body images so as not to trigger eating disorders. The increase in the prevalence of eating disorders in Australia might be the reason behind parents' concerns (Da Luz *et al.*, 2017). These same issues regarding inappropriate messages have also been raised regarding Australian public health advertisements. Whilst imagery and words evoking disgust have been prevalent in such Australian public health advertisements (Lupton, 2015), it can also cause the target population to avoid processing relevant healthy eating information, and develop negative attitudes towards the intended healthy behaviour (Cho and Salmon, 2006). Despite the good intentions of FNE programme designers, O'Dea (2005) pointed out the potential of unsupportive explicit or implicit messages that teachers may deliver during the delivery of FNE, such as suggesting diet or weight-loss techniques, promoting nutrition misinformation or stigmatising and blaming the students. This points to the need to adopt a positive FNE approach following the principle "first, do no harm". (O'Dea, 2005).

Lastly, parents discussed the needs of parents and teachers for the improvement of FNE. As parents and teachers are the main stakeholders in FNE, similar to the findings of our study, the importance of parents' engagement in FNE programmes and teacher training has been previously identified as one of the key factors for the success of primary school FNE interventions (Sadegholvad *et al.*, 2017; Murimi *et al.*, 2018). Similarly, in two earlier studies, Australian parents reported their need for communication from schools along with the implementation of FNE curricula (Nash *et al.*, 2020; Pettigrew *et al.*, 2014). This emphasises the importance of considering FNE in a broader context than just what may or may not occur in schools and exploring the potential to promote important FNE topics within the supportive home environment (Sadegholvad *et al.*, 2017).

Some parents also criticised teachers' use of food rewards and lunchbox policing practices. Although many health organisations, including the World Health Organization, advise that food should not be used to reward, motivate or entertain children, this practice is still widespread in classrooms worldwide (Turner *et al.*, 2012; Metos *et al.*, 2019; Fedewa and Davis, 2015). In addition, the governing of lunchboxes is an ongoing project and lunchbox surveillance is commonly employed as a pedagogical device in both England and Australia (Leahy, 2012; Rich, 2010). Australian teachers have been encouraged to deploy the "silent treatment" for lunchboxes deemed to be unhealthy [highlighting good choices when they are noticed, not providing any comment on unhealthy choices or expressing "tsk tsk"] (Pike and Leahy, 2012). Similarly, a minority of Australian parents recently reported their unpleasant experiences with lunchbox auditing (Tanner *et al.*, 2019). This practice has also been critiqued with calls for greater recognition of the structural and social factors that influence people's access to food and eating habits (Pike and Leahy, 2012; Gibson and Dempsey, 2015).

Predictors of the perceived importance of FNE topics of parents

As hypothesised, parents' personal values appeared to play a role in predicting whether they thought each of the topics was important for primary school children to learn. Universalism-nature value emerged as a positive predictor of all three components, and it explained 15% variance for parents' component scores for "Food origins and environmental sustainability" component. Universalism-nature is one of the subtypes of Schwartz's universalism values, defined as the "understanding, appreciation, tolerance and protection for the welfare of all people and nature" (Schwartz, 2017). Thus, the finding that respondents with higher universalism-nature values perceive "Food origins and environmental sustainability" component to be more important likely reflects their belief that all nature should be appreciated and protected. In addition, those with higher hedonism scores placed higher importance on the knowledge of "Food safety and preparation" component, which does not support the hypothesis outlined in the methodology section. Previous studies showed that people with hedonist values tend to use convenience food outlets more (De Jong *et al.*, 2017) and are more likely to consume unhealthy food (Thomson *et al.*, 2017). However, our study showed that they support food safety and preparation related skills to be taught to their children in primary school. Nevertheless, personal values predicted relatively little (less than 15%) of the three component scores. Previous studies have investigated other predictors such as personal interests in food preparation and cooking, nutrition-related skills, consumer behaviours (Fordyce-Voorham, 2016), healthy habits and food knowledge (Burton *et al.*, 2018). These previous studies also demonstrated that personal values were better predictors of individuals' attitudes towards FNE topics than demographic characteristics (Burton *et al.*, 2018; Fordyce-Voorham, 2016). This suggests that factors additional to socio-demographics and personal values play a larger role in predicting parents' FNE component scores. More research is needed to confirm and examine this finding. Identifying the factors that predict peoples' perceptions of what is important to teach will has significant implications for the development of an ideal FNE curriculum. This may help determine which topics to concentrate on and the best methods for teaching them.

Implications

As our findings demonstrate strong parental support for the teaching of many FNE topics in primary school, these topics should be taught in the curriculum and facilitated by the provision of appropriate and adequate resources for teachers. Furthermore, school canteens, lunch orders and events that include food such as fundraising and fairs should be taken as an opportunity to support FNE in the classroom. In addition, parental concern over content focussing on body image and demonising particular foods must also be taken into account in any FNE in primary schools to increase their support and involvement to FNE.

Strengths and limitations of the current study

The main strength of this study was that it explored the primary school FNE opinions held by many parents from various demographics across Australia. The findings are novel as it is the first survey to explore parents' views of the importance of FNE topics and how to improve FNE in Australian primary schools. However, causal relationships between the variables could not be examined due to the study's cross-sectional nature. In addition, parents were presented with 17 FNE items. There might be more aspects of FNE that were not included in the present study.

Conclusion

This study suggests that parents, important stakeholders in education, have strong opinions regarding the importance of FNE topics and ways to improve FNE, which should be considered when developing and implementing school FNE programmes. The study also revealed some predictors/mediators of parents' views about the importance of FNE topics.

These findings provide useful directions for the improvement and delivery of FNE that better meets the expectations of its intended recipients: school children and their families.

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Principals' intentions and anticipated challenges in implementing nutrition education

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Abstract

Purpose – This study aimed to know principals' intentions of implementing nutrition education (NE) and explore the challenges they may anticipate while implementing NE in their respective schools.

Design/methodology/approach – The study employed a sequential mixed-method design using a questionnaire and interviews to collect data. The quantitative data were collected from 378 secondary school principals, while 16 school principals were interviewed.

Findings – The study found principals with positive intentions towards implementing NE. The results also highlighted challenges related to capacity building, resources (both human and physical), policies and plans, roles, and responsibilities of the implementers (teachers and principals), support from higher authorities, community participation and teachers' unions. This study concludes that principals' intentions remain central to the implementation of NE in schools. However, it is necessary to overcome those challenges before its implementation.

Research limitations/implications – The study sought to ascertain principals' intentions rather than their actual behaviour of NE implementation and hence remains limited in this area, which future research may consider. Furthermore, the research is limited to the principals' opinions on the anticipated challenges associated with NE implementation. The study did not solicit the opinions of other stakeholders, such as education managers, policymakers, teachers and communities.

Originality/value – The article is significant in terms of NE being implemented in schools to improve students' physical and academic wellbeing. The critical role of principals has been investigated by determining their intentions and the anticipated challenges associated with implementing NE. The authors declare the originality of the data.

Keywords Nutrition education, Principal, Intentions, Developing country, Challenges

Paper type Research paper

1. Introduction

Child nutrition has been of central importance concerning their growth and development. Research has shown a favourable correlation between children's adequate nutrition intake and academic achievement and physical wellbeing (Anzman-Frasca *et al.*, 2015; Fahlman *et al.*, 2008; Marwat *et al.*, 2019; O'Dea and Mugridge, 2012; Waling *et al.*, 2016). In the absence of balanced nutrition, children are prone to poor academic performance (Anzman-Frasca

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et al., 2015; Eastman and Zimmenrmann, 2018; O'Dea and Mugridge, 2012) and susceptible to communicable diseases (Cheah *et al.*, 2010). An alarming number of Pakistani schoolchildren suffer from micronutrient deficiencies, including vitamins and minerals (World Health Organization, 2018). These deficiencies potentially increase the number of malnourished children every year, leading to decreased productivity, increased absenteeism at schools, lower physical, mental and academic potential.

Preventing communicable illnesses in children and improving their academic performance entails enhancing their nutrition knowledge and developing optimal nutritional intake behaviour (Bauer *et al.*, 2014; Mozaffarian, 2016). In this regard, as McCaughtry *et al.* (2012) and Scherr *et al.* (2020) point out, actual classroom learning needs to integrate nutrition knowledge and skills to address children's dietary behaviours. Such knowledge could be imparted through nutrition education (NE). According to Continento (2011), NE is any combination of educational strategies supplemented by environmental supports that increase voluntary adoption of healthy food choices and other nutrition- and food-related behaviours that promote health and wellbeing. This study refers to NE as a planned, sequential educational program that provides knowledge and skills to help students adopt and maintain life-long healthful eating patterns (Briggs *et al.*, 2003). Making NE integral to students' learning experiences, as Dorado *et al.* (2020) and Kostanjevec *et al.* (2012) posit, improves their optimal food intake.

Recognizing the crucial role of children's optimal food intake, Pakistan has launched various nutrition-related programs in the past, such as Tawana Pakistan (Niazi *et al.*, 2012). Tawana Pakistan, for example, offered schoolchildren free meals and food items (Badruddin *et al.*, 2008). However, the initiative remained confined to promoting children's enrolment from impoverished and disadvantaged communities by giving free food products. The program, unfortunately, did not integrate NE into the child learning experience to enhance their knowledge of optimal nutrition intake. A recent Multisectoral Nutrition Strategy (MSNS), under the scaling up nutrition (SUN) movement, strategizes involving the relevant departments such as agriculture, health and education to meet child optimal food intake. The MSNS, along with its goal of addressing child malnutrition, has implications for the Balochistan Compulsory Education Act (BCEA) that encompasses providing a daily free meal to schoolchildren. However, since MSNS is in the planning phase, it is unclear how nutrition-related information and skills would be imparted via school-level NE. It remains valuable that along with providing a daily meal, under the BCEA, the MSNS and other such programs primarily focus on developing healthy eating habits of schoolchildren. So, these programs remain significant in enhancing children's nutrition intake and healthy eating habits by making NE part of their classroom learning experiences. In so doing, as Chrisman *et al.* (2020) argue, schools have a pivotal role to play in informing children's habits of healthy food intake. Implementing school-level interventions is closely linked with how school principals lead and respond (Jogezai *et al.*, 2020), and their role remains significant in implementing NE (Lai-Yeung, 2011). The existing body of research (e.g. Aziz *et al.*, 2018; Marwat *et al.*, 2019; Saeed *et al.*, 2016) has examined the relationship between nutrition awareness and food choices, as well as the effect of a balanced diet on children's academic performance but has not examined the role of school principals in implementing school-level NE and elucidating the challenges they may face.

This study is significant for three reasons. The first is developing an understanding among policymakers, schools and academics that NE implementation is embodied into schools' educational programmes, rather than just providing food items to boost student enrolment, as has been the case with previous projects. That is why schools are seen as critical venues for reaching youngsters and fostering good eating habits in them (Chan *et al.*, 2020; Delors, 2013; Lee, 2009). Developing healthy eating habits is believed to be a component of any government-funded NE programmes at the school level. Consequently, future

nutrition-related interventions will integrate appropriate food consumption into learners' classroom learning experiences to enhance their physical and intellectual wellbeing. The second is to realise the implementation of NE at schools from a leadership standpoint since principals play a significant role in this respect (Dycus, 2007; Lai-Yeung, 2011). Research has studied school leadership role in Pakistan concerning educational innovation and change (e.g. Jogezai *et al.*, 2020). However, nutrition intake associated with the change in ones' behaviour towards food selection requires knowing the leader's own behaviour and intentions (May and Supovitz, 2011). According to May and Supovitz (2011), their intentions have been critical for successfully implementing educational plans. Others, such as Yan and Sin (2014) and Schooler (2013), inform about principals' intention with a pivotal role in implementing NE in their schools.

The third significant contribution of the study is exploring the challenges the principals face while implementing NE. There is no research on the challenges pertaining to school-based NE available in Pakistan. The available literature (e.g. Mansoor and Akhtar, 2015; Razzaq and Forde, 2012) highlights specific challenges faced by school principals while implementing other school-level interventions. The challenges include insufficient school infrastructure, schools' capacity, less policy support and a nonsupportive school community. Research elsewhere in the world (e.g. Pineda-Báez *et al.*, 2019) has also identified similar challenges in implementing school-level programs. Implementing NE as a change initiative may be challenging for principals. More importantly, the challenges may affect principals' intentions towards implementing NE. Chrisman and Diaz-Rios (2019) rightly emphasise the need to identify such challenges while implementing nutrition-related initiatives. Schools in developed countries, such as the United States of America, characterized by a lack of human capital and policy limitations when implementing NE (Resor *et al.*, 2021). The same may be true in developing countries such as Pakistan, where schools, according to Baloch (2020), face challenges in terms of basic infrastructure, personnel capability or professional development and community engagement. However, the challenges to implementing NE in schools are little understood (Cheung *et al.*, 2017); in particular, such understanding is rare in developing countries like Pakistan.

The objectives of the study are as follow:

(1) To investigate secondary schools' principals' intentions towards implementing NE in their schools.

(2) To explore challenges the principals face while implementing NE.

2. Theoretical framework

The studies conducted on school leadership behaviour, intentions and disposition emphasize principals as an influential aspect of school-level reform (DeMonte and Pennington, 2014; Kowalski and Dolph, 2015; Schooler, 2013; Yan and Sin, 2014). According to Qian *et al.* (2016), school leaders must address the factors such as knowledge, attitudes, self-efficacy, norms, behavioural control and skills. They believe that only then they will be able to make the initiatives successful. The implementation of NE as a behaviour-related phenomenon calls for considering leadership behaviour and intentions. The theoretical framework perceives that the behavioural intents of school principals could be more critical to explore before their actual behaviour for the implementation of NE. It is because the implementation of NE in Balochistan is in its infancy. Consequently, it requires knowing principals' intention towards its implementation.

Research exploring intentions related to food intake have used Ajzen's (1985) theory of planned behaviour (TPB) (Baloch *et al.*, 2020). Exploring principals' intentions and assuming

a favourable influence on NE implementation, as guided by research (e.g. Schooler, 2013; Tekleselassie and Villarreal, 2011; Yan and Sin, 2014), this study found Ajzen's theory of planned behaviour to be particularly relevant. An individual's intention or behaviour is formed by the elements of attitudes, subjective norms and perceived behavioural control.

A person's attitude towards an object is their subjective appraisal of its good/bad, harmful/beneficial and likeable/dislikeable features (Ajzen, 2011). Subjective norms relate to social factors and involve the pressures from important others regarding performing a behaviour. Perceived control behaviour refers to the perceived ease or difficulty of performing a behaviour.

It is considered that the greater a person's desire to perform a behaviour, the more likely he or she is to do so when the opportunity arises. Thus, the intention is regarded as a direct determinant of performing a behaviour. However, an individual may not perform a particular behaviour in some situations due to specific challenges they confront. The research demonstrates that despite one's best intentions, school-level intervention could not be implemented owing to contextual variables such as time, resources and a lack of professional development (Milner *et al.*, 2012). It is, therefore, vital to identify potential challenges that, despite principals' positive intentions, might obstruct NE implementation.

3. Method

The study used a sequential mixed-method design. However, it was partially mixed sequential dominant status designs wherein the qualitative method was most prominent (Neuman, 2014). As Tashakkari and Teddlie (2003) defined mixed method as, "a type of research design in which QUAL and QUAN approaches are used in types of questions, research methods, data collection and analysis procedures and inferences" (p. 711). In this sequential mixed-method design (Neuman, 2014), the quantitative method aimed at exploring principals' intentions while the qualitative method explored the challenges that principals anticipated while implementing NE. Creswell and Clark (2011) conceptualize integration integral to a mixed-method design. In this study, the integration occurred through linking the methods of data collection and analysis (Creswell and Clark, 2011).

The quantitative data collection and analysis was followed by qualitative data collection and analysis (Cresswell and Clarke, 2011; Neuman, 2014). The quantitative part of the study aimed to collect data from a larger pool of school principals to have a broader view of their intentions for implementing NE (Stangor, 1998). On the other hand, the qualitative approach supported the researchers in digging deeper into the challenges the principals anticipated while implementing NE (Creswell, 2009).

Krejice and Morgan (1970) were used to identify the sample size for the quantitative part of the study. The table indicated that about 350 school principals would be representative of the total population of secondary school principals in Balochistan. A list of all school principals was obtained from Education Management Information System (EMIS), which served as a sample frame from which 350 participants were selected through simple random sampling (Neuman, 2014) by using a web-based random sample selection tool. Written permission for the data collection was obtained for the education department and a letter of participation was sent to the selected schools' principals through the education department with an explanation of the purpose of the study. In addition, principals were individually contacted via phone for their participation in the study. Out of 350 principals contacted, 278 (79.4%) returned the filled questionnaire.

The interview participants were selected through convenience sampling (Creswell, 2009; Neuman, 2014). This is because Balochistan is in larger geographical proximity and occupies 44% of the total land of Pakistan. Hence, schools are situated far from each other incurring

enough time and resources. Convenience sampling as was very much appropriate for this study (Neuman, 2014). Their selection was based on easy accessibility, geographical proximity, availability at a given time and the willingness to participate in the study (Dörnyei, 2007). A total of 16 school principals (eight men and eight women) were selected and interviewed. Such sample size was appropriate for generating a detailed picture of the challenges the principals anticipated while implementing NE (Neuman, 2014).

The demographic data (Table 1) depict participants' gender and length of service. The majority of the participants (60.1%) were found with 11–15 years of experience as school principals.

3.1 Data collection

The study was conducted in the Balochistan province of Pakistan and the public secondary school principals served as research participants. The provincial public-school system stands the largest concerning student enrolment. The major proportion of students' enrolment comprises children from the middle and lower-middle-class segments (Baloch, 2020). Secondary schools consist of pre-primary, primary, middle and secondary sections. Secondary school principals are responsible for managing the school including all the sections. However, after the 18th constitutional amendment, devolution has given principals more influence over the execution of school-level initiatives, resulting in a significant shift in school-level management. Their role to monitor and evaluate teachers' performance, manage parent–teacher school management committees (PTSMC), oversee continuous professional development of teachers, take initiative by establishing and implementing school improvement plans remain key features of their empowerment. They have also been provided with an increased annual budget for school management. So, the school-level management relies more on school principals (Jogezai *et al.*, 2020). NE as a school-level intervention was understood through exploring principles intentions and anticipated challenges.

A survey instrument was used to explore principals' intentions, while qualitative data were collected using semi-structured interviews. A five-point Likert Scale questionnaire (1 = strongly disagree to 5 = strongly agree) was adapted from previous research (e.g. Ates, 2019; Baloch, 2020) and modified as suggested by Ajzen (2006) concerning the constructs of subjective norms, perceived behavioural control and intentions.

As a qualitative data collection instrument, semi-structured interviews fostered quality insights (Patton, 2015) related to the challenges the principals anticipated while implementing NE. Before the data collection, the interview protocols were framed (Jones *et al.*, 2014), following Montoya's (2016) four phases. These four phases consisted of making interview questions aligned with the research questions, constructing inquiry-based conversations, receiving feedback on protocols and piloting the interview protocols.

3.1.1 Constructs of the intention questionnaire. A 29-items intention questionnaire was developed using TPB constructs. The constructs included Attitudes (ATT), Subjective Norms (SN), Intentions (INT) and Perceived Behavioural Control (PBC). The construct of

Variables	Description	Frequency (n = 278)	Per cent
Gender	Men	153	55
	Women	125	45
Length of service	1–5	12	4.3
	6–10	99	35.6
	11–15	162	60.1

Table 1.
Principals' demographics

ATT had six items aiming to know principals' personal beliefs about the program. The sample item, for ATT, comprised of "For me, the implementation of NE is good/bad; useful/harmful". SN included six items to study subjective norms or the beliefs of important others that principals consider while implementing NE. The SN sample item included "Most people that are important to me think that I should implement NE". INT consisted of three items with the sample item of "I will try to implement NE in the next three years". The construct of PBC comprised of five items with the sample item "If I want, I can easily implement NE in my school". PBC relates to principals' consideration of the contextual factors regarding the implementation of NE.

Confirmatory factor analysis was used to check the validity and reliability of the questionnaire. The loadings of all factors were in the acceptable threshold (>0.4) and CR and AVE in the acceptable range (Gaudamgnoli and Velicer, 1988). The Cronbach alpha remained 0.92 for attitudes, 0.93 for subjective norms, 0.95 for perceived behavioural and 0.92 for intentions Table 2).

3.1.2 Interview questions. The interview questions were articulated around the challenges the principals anticipated while implementing NE. The interview questions, for example, included "how would you perceive the implementation of nutrition education in your school in terms of any issues related to it? "How do you find the intensity of these challenges integral to disrupt the implementation of NE?" In addition to these main interview questions, the respondents were asked probing questions for further clarity about the anticipated challenges.

3.2 Data analysis

The quantitative data analysis involved descriptive analysis using mean, median, SD and frequency to identify principals' intentions. The qualitative data analysis employed thematic analysis (Boyatzis, 1998; Roulston, 2001), aiming to identify, analyse and report patterns (themes) within data (Braun and Clarke, 2006). Within the thematic analysis, the deductive approach of data analysis was used to provide flexibility while dealing with the data about the challenges anticipated by principals towards the implementation of NE. Braun and Clarke (2006) six steps thematic analysis guidelines were followed. These steps included getting familiar with the data, generating initial codes, searching for themes, defining and naming themes, and reporting the data.

4. Results

4.1 Principals' intentions

Research question one aimed at explaining principals' intentions towards implementing NE. Table 3 illustrates the summary of participants' responses to each of the 29 items of the questionnaire. The majority of participants (60.8%) rate themselves as "agreed" and 28.1% as "strongly agreed" on questions relating to their intentions to implement NE. The findings indicate that most principals had positive intentions for implementing NE, whereas a minuscule number (11.2%) was rated on the "neither agree nor disagree" scale. Table 4

Constructs	Cronbach alpha
Attitude	0.92
Subjective norms	0.93
Perceived behavioural control	0.95
Intentions	0.92

Table 2.
Cronbach alpha

presents the overall mean scores of principals intentions ($M = 4.61$, SD = 1.37). The data indicate principals with positive intentions towards implementing NE.

4.2 Anticipated challenges

The data analysis revealed challenges related to teachers' professional capacity, their role, policy related issues and support from higher authorities and the community. It also included challenges related to infrastructure, human resources and interference from external groups such as teacher unions.

4.2.1 Capacity-related challenges. Capacity development was recognized by respondents as a potential future obstacle to NE implementation. It included the absence of pre and in-service professional development programmes, since majority of principals did not participate in any capacity building programme prior to or after their appointment. A few principals informed about their engagement in the capacity building program related to school management, but these were project-based and lacked continuity after the project concluded. A principal in this regard stated, "I attended a program once, throughout my ten years tenure as principal, but that was from a foreign-funded project . . . it was helpful, and we expected continuity of such training, but it disappeared once the project concluded".

Teachers' capacity enhancement in relation to NE was also a priority for the principals. Teachers, according to them, needed relevant training to implement NE successfully. The principals perceived capacity building for themselves and their teachers as critical to implementing NE and determining its success.

4.2.2 Human resources–related challenges. The principals also predicted that teacher shortage would be a big concern. In one instance, there were only two science teachers for teaching science (Biology, Chemistry and Physics) to an overcrowded class of around 100 students. In such a scenario, the implementation of NE was considered to distract their current performance and negatively affect or even make the NE arduous. The principals demanded the deployment of more teaching staff to achieve the purpose. They were also of the opinion that schools were already confronted with overcrowded classes. At instances, such as at the primary level, teachers would also engage in multigrade teaching. In multigrade teaching, as a principal informed, "one teacher teaches too many classes at a time which requires enough time and energy from the teachers". Due to the shortage of teaching staff, a single teacher taught multiple subjects, according to the principals. As a result, the implementation of NE was seen as increasing the workload of teachers.

Table 3.
Summary of responses on intention seven-likert scale

Scales	Value	Frequency ($n = 278$)	Per cent
Agree	6	169	60.8
Strongly agree	7	78	28.1
Neither agree nor disagree	4	31	11.2
Slightly agree	5	0	0.00
Slightly disagree	3	0	0.00
Disagree	2	0	0.00
Strongly disagree	1	0	0.00

Table 4.
Mean score for principals' overall intentions

Variable	Intentions	
	Mean	SD
Intention	4.61	1.37

4.2.3 Challenges related to the roles and responsibilities of the teachers. Principals considered the roles and responsibilities of teachers central to implementing NE. Their non-awareness in this regard was anticipated as an enormous challenge. According to the principals, increasing teachers' awareness of the program could help them become more prepared, which can only be accomplished by improving their understanding of the program. In this respect, a principal noted, "We cannot expect teachers to be ready for implementing a programme if they are unaware of it and have no knowledge on its objective and processes for execution."

Besides, a sense of failure arising from teachers' past experiences in terms of unsuccessful programs may demotivate them to implement NE. In this respect, a principal reported that they had encountered failures in implementing previous interventions due to a lack of clarity on teachers' roles and responsibilities. He stated:

> Their [teachers'] non-involvement in the pre and planning stage of the program design and implementation was not considered, that did not allow them having the clarity of their role in the implementation . . . they [teachers] instead considered those programs irrelevant for them.

According to the principals, the clarity of teachers' roles and responsibilities was of utmost importance before implementing NE. Their non-participation in the pre-planning and planning phases is nevertheless required to create their ownership of NE and help them understand their roles and responsibilities in its implementation.

4.2.4 Infrastructure-related challenges. Principals determined that inadequate infrastructure and the absence of essential amenities such as drinking water, washrooms and toilets posed a threat to children's health. A principal in this regard stated that:

> Though we miss the basic facilities such as furniture for students, non-availability of pure drinking water, washrooms and toilets is our main concern as far as students' health is concerned. The same will have implications for nutrition education as they will remain vulnerable to particular communicable diseases despite orienting them with a healthy and nutritious food intake.

In several cases, washrooms were constructed but remained inoperable due to a lack of water and staff availability. As a result, administrators were forced to prohibit pupils from using washrooms, deterring many girls from attending school. They argued that the government must comprehend and recognize the sensitivity and significance of cleanliness in childrens' health and nutrition and offer the required facilities to enhance school health and hygiene conditions.

4.2.5 Policy-related challenges. The principals were sensitive to the policy issues that surrounded the implementation of NE. Their main concern was inconsistencies and frequent alterations in educational policies and programmes, resulting in a lower level of commitment to their execution. A principal in this regard argued, "I have always witnessed changes in policies, which makes us uncertain about any interventions". According to the principle, the abrupt policy shifts and periodic alterations to the associated procedures and the absence of relevant capability were a challenge for them. A principal shared that their recent cluster-based educational management was innovative yet, bringing enough challenges in its implementation. For example, arranging resources, like furniture and learning material, required them to have budgeting and resource management skills that were not clearly defined. They feared the same with the implementation of NE. The principals also highlighted the lack of a proper evaluation mechanism integral to policy implementation, a key challenge in implementing any intervention and anticipated the same concerning NE.

The principals pushed for concise, straightforward policy guidelines that would be easy to comprehend and follow. Policies written in English made life tough for them, their teachers and their communities as a whole. According to them, a similar approach to NE might be a

significant challenge. They recommended that NE plans be specific, transparent and written in Urdu and local languages to make them easier to comprehend and execute.

4.2.6 Challenges related to support from higher authorities. Nonsupportive higher authorities at the local and provincial levels regarding guidelines' clarity and uniformity were significant barriers to NE implementation. According to the principles, each new officer employed management techniques distinct from their predecessors in policy implementation guidelines and directives. As a result, it seemed difficult for them to follow conflicting instructions, and they eventually became confused about whom to follow. Additionally, principals reported that their officers visited schools mostly to monitor teacher attendance and halt absent teachers' salaries. As revealed by the principals, in many situations, the officers took the attendance record with them and provided it only upon valid written request. The principals wanted their officers to assist them in implementing NE rather than limiting their responsibility to attendance monitoring. As one principal put it, "Their tour to schools ought to be focused on the type of help they can bring to us and our teachers." The principals suggested that proper key progress indicators (KPIs) are devised for the officers and principals. So, their performance is evaluated against those KPIs by providing standard monitoring and program evaluation guidelines. Principals believed that there was no periodic assessment of the progress against the plan. For the successful implementation of NE, the principals considered the same priority measures by the higher authorities.

4.2.7 Community-related challenges. Principals perceived community participation as very much crucial for the implementation of NE. They did, however, identify some difficulties with community engagement. These included the community's unrealistic expectations and their ineffective participation with little knowledge of the initiative. According to the principals, foreign-funded project-based interventions were held mainly at public schools. They placed a high value on community engagement and provided financing for that reason, but they seldom lasted beyond the project's lifespan. They got the community's attention by presenting their enrolled children with vital delicacies such as cookies, food supplements, cooking oil and milk. Given such initiatives, the community may have high expectations of NE, as the principals noted. They may be more concerned with obtaining free meals for their children than with developing kids' and teachers' ability for a balanced diet and its critical role in their health and academic wellness.

Another difficulty cited by principals was parents' apprehension about any action involving student health since situations involving severe health threats had occurred. Once, some pupils were hospitalised after vaccinations administered by project workers as part of their school's immunisation programme. As the principal noted, they may be meticulous about any intervention involving kids' health. Additionally, administrators revealed that the school management committee was more concerned with financial matters than with concerns such as teacher absenteeism, student enrolment and retention. As a result, they may assess the implementation of NE from a financial standpoint and may request more funds. The same, according to principals, may remain another major hurdle concerning community support. However, as the principals recommended, it is vital to involve communities in the planning phase of the NE to boost their understanding for its implementation.

4.2.8 Interference from teachers' union. The principals recognised that teachers' balkanization into separate groups representing diverse teachers' unions, associations and political organisations caused risk to collaborative efforts needed for NE implementation. The principals also mentioned that the teachers had favourable outside support. A principal stated: "if a teacher remained absent, misbehaved, or did not show satisfactory performance, we could not warn them due to strong support from his/her group and forcing us not to take any disciplinary actions against those teachers". Teachers had gone on strike in some instances when disciplinary action was taken against a colleague. Such groups, according to the principals, sometimes worked as pressure groups. Such external pressure was believed to

affect the effective implementation of NE since teachers were fragmented into several groups, impeding synergy and collaboration. The principals proposed the representation of teachers' union in the planning stages of NE implementation so that they could comprehend its significance and take ownership.

5. Discussion

The study discovered that principals generally have positive intentions towards implementing NE and they expressed their interest and responsiveness to the program. Their interest and responsiveness to the program remain worthy and predict a positive beginning of NE that the government may initiate. The results are similar to Yan and Sin (2014) and Schooler (2013), who also found school principals with positive intentions towards implementing an educational intervention at their respective schools. The findings, however, contrast with Kowalski and Dolph's (2015), who found principals' negative intentions towards identifying teachers' evaluation. The favourable intentions of principals in this study show that they understand the value of implementing NE for students' physical and academic well-being. Such realization remains very encouraging and could be significant in implementing NE in schools in Pakistan. Principals' willingness, portrayed through their positive intention, will test their abilities to translate their intentions into the actual implementation of NE (DeMonte and Pennington, 2014). However, principals' positive intentions towards implementing NE, as Schooler (2013) rightly argues, may also add to their existing responsibilities. Therefore, principals will also need to be more vigilant and capable of dealing with NE implementation. This study's results support the available body of research (e.g. DeMonte and Pennington, 2014; Kowalski and Dolph, 2015; Schooler, 2013) that principals' positive intentions remain fundamental in implementing school-level reforms such as NE.

Qualitative findings regarding anticipated challenges with NE implementation revealed some fundamental issues that may influence principals' intentions. Frequent changes in the policy formulation and implementation were identified as significant challenges. Capacity building for principals and teachers, clarity of their roles, support from higher authorities, missing facilities, high expectations from the community and interference from teacher unions were among the challenges. This research discovered obstacles comparable to those identified by Mansoor and Akhtar (2015), including teachers' shortage and ineffective teacher deployment, as a significant problem impeding school-level interventions. The study also supports Razzaq's and Forde's (2012) idea that changes in policies through political interference had made the policy realm faced with inconsistency and ad-hoc-ism. Principals being afraid of any contingent changes and modifications, as this study found, leave them with uncertainty while implementing an intervention. The same, as a consequence, makes the prospect of program implementation at risk. It is clear that policies, if unclear, may make the implementation of an intervention ambiguous.

Principals had rightly pointed out the clarity and consistency of the policies governing the implementation of NE. They suggested their involvement in the policy formulation for their clarity and ownership of the program and their further communication to the teachers and school community to earn their support. It was evident that principals were previously not involved in policy formulation, and they expected the same regarding NE. As a result, the lack of clarity on the objective and procedure may offer significant difficulties for school administrators and impede the effective implementation of NE.

Similar to Razzaq and Forde (2012), this study found that principals had grave concerns regarding their capacity. The findings support Lai-Yeung (2011) that principals in Hong Kong had low awareness of the essential role of school food and nutrition programs in developing healthy food habits. The fear of not considering their own and teachers' capacity

building of NE appeared a big challenge while implementing NE. This research supports Razzaq and Forde (2012)'s contention that the engagement of practitioners and their training (capacity development), good coordination in implementation and, lastly, the policy's stability are all necessary for the effective implementation of NE.

The scarcity of resources, both human and material, was perceived as an enormous challenge by the principals. Schools were discovered lacking essential amenities such as washrooms, classrooms, toilets and potable drinking water. These findings support Mansoor and Akhtar (2015) reporting the scarcity of necessary facilities in schools in Pakistan. Missing facilities like water, sanitation and hygiene (WASH) were considered to have very negative implications for implementing NE. The principal was correct in assuming that these amenities had a direct bearing on child health. The absence of WASH facilities might obstruct the maintenance of a health-friendly atmosphere and nutrition in schools (Khan and Azid, 2011), hence impeding the implementation of NE to a considerable degree. There is a need to provide all these missing facilities before implementing NE to commit that the program is genuinely concerned about child health and NE.

The insufficient number of staff in highly populated schools at the secondary level was highlighted as a hurdle in the implementation of NE. Education policies in Pakistan are merely access-conscious, focusing highly on increased enrolment in schools, which, according to the principals, negatively affected quality learning. Similarly, concerning NE, the policy of "every child in the school" had left the principal with no denial for admission. With a mismatch between enrolment policy and the available resources, implementing NE seemed very much challenging. The principal rightly suggested that every child in the school policy must consider the available infrastructure and other physical and human resources.

The community's engagement in the implementation of NE has been identified as a difficult obstacle for principals to overcome. Previous research has shown this as a persistent challenge for schools in Pakistan (Mansoor and Akhtar, 2015; Razzaq and Forde, 2012) and elsewhere (e.g. Pineda-Báez *et al.*, 2019). According to the previous research, the community's conventional worldview hampered change implementation. However, as shown by this research, the community, other than being nonsupportive, were expected to have high expectations from the program. Nevertheless, the community's higher expectations may be considered a positive indication for implementing NE if schools properly communicate their purpose.

Interference by teachers' unions was seen as a significant impediment by principals. It, at upfront, had consequences for overall school management and the implementation of NE. For example, principals could not take any action against teachers for their nonsupportive behaviour or assigning any responsibility regarding the implementation of NE. Teachers representing different groups had established balkanization in schools, which the principals feared to impede collaborative efforts towards NE implementation. Similar to what Kariuki *et al.* (2012) contend these results may also hamper school-community relationships, compromising successful NE implementation in schools due to local politics. Nonetheless, similar to community engagement, the representation of teachers' unions in developing NE policies and plans would be a viable way to secure their support for the program's successful implementation.

6. Implications

The study has significant implications for policymakers, educational managers, school principals, teachers and communities concerning NE implementation at schools. It is evident that combating child malnutrition and helping them in their physical and academic wellbeing necessitates a conducive environment and instructional mechanism at schools that help them improve their eating habits. Addressing children's healthy dietary behaviour will require the

policies to consider NE integral to their learning experiences. Consequently, calling for capacity building of the relevant departments, such as teachers' professional development institutes, curriculum development entities and textbook boards. So, they may support schools in managing NE by enriching curriculum and learning material and transforming pedagogies. Transforming schools' environment for supporting NE implementation will need to equip schools with essential infrastructure, notably those connected to health and hygiene, such as clean drinking water and sanitation.

The role of communities in their children's learning has been vital, and their support will be as crucial in the implementation of NE. However, schools need to address parents' reconceptualization of NE as part of their children's learning experiences instead of availing free food as a token to their children's enrolment in schools. Mothers' role remains critical in this regard as they are closely associated with preparing food for their children (Baloch *et al.*, 2020). Schools have to get mothers onboard considering their capacity enhancement for preparing healthy and nutritious food for their children. Khan and Azid (2011) rightly recognize mothers' related knowledge with phenomenal significance in this regard. Schools' role also becomes critical in earning the support of contextual groups, such as teachers' unions, as part of the school community; however, their involvement in policy formation will remain critical.

7. Limitations

The study aimed to know principals' intentions rather than their actual behaviour of implementing NE and hence remains limited in this regard, which future research may consider. The investigation of anticipated challenges from the principals' perspective remained vital as they have a fundamental role in implementing any school-level interventions. However, the study's restriction to eliciting principals' perspectives is another limitation that future research may address via the inclusion of policymakers, educational managers, communities and teachers.

8. Conclusion

The results suggest that principals are eager to implement NE in their schools. Their positive intentions may contribute significantly to treating malnutrition and preventing chronic illnesses among schoolchildren (Anzman-Frasca *et al.*, 2015; O'Dea and Mugridge, 2012), and improving their academic wellbeing (Mozaffarian, 2016; Baue *et al.*, 2014). However, the study does identify several fundamental challenges that principals may face while implementing NE. Ambiguous policy guidelines, unclear roles and responsibilities, scarcity of capacity building opportunities and a nonsupportive school community continue to be inevitable obstacles. The presence of these challenges seems to affect principals' intentions towards NE implementation. The findings suggest considering these issues before implementing NE to have principals highly inclined towards NE implementation and the program bears a measurable impact.

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Segmenting children's active school travel behaviour: insights on caregivers' perceived risks and social norms

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Abstract

Purpose – Active school travel (AST) programmes aim to change commuting behaviour to improve children's physical and mental health. However, very limited health education programmes for children use segmentation to create tailored solutions that understand the specific characteristics of each group of children and their caregivers in order to yield better results. The aim of this study is to use a statistical segmentation analysis (two-step cluster analysis) to gain insights on the examination of specific groups to design future health education interventions and campaigns that can improve children's health.

Design/methodology/approach – Guided by the Ecological and Cognitive Active Commuting (ECAC) framework, a market segmentation analysis was performed. An online survey was designed to collect data from caregivers of children between 5 and 12 years attending school and responsible for taking the child to and/or from school in Victoria and Queensland, Australia. Using 3,082 responses collected from Australian caregivers of primary school children, a two-step cluster analysis was performed.

Findings – Analysis revealed the most important variables for group formation were previous child walking behaviour, distance from school and caregiver income. Perceived risk of the physical environment was the most important psychographic segmentation variable for group formation, followed by social norms. Four distinct groups with different characteristics were identified from the analysis.

Originality/value – This is the first study that applies the ECAC framework to perform market segmentation in the AST context. Results revealed four market segments that demand different tailored solutions. Findings shed light on how to better design AST interventions and campaigns to promote children's health using segmentation techniques.

Keywords Active school travel, Active commuting, Physical activity, Health behavior, Children, Perceived risks, Social norms

Paper type Research paper

Introduction

Active school travel (AST), which refers to children using active means of transportation such as walking and cycling to commute between school and home, has been proven to improve children's physical health (Larouche *et al.*, 2014; Schoeppe *et al.*, 2013), mental wellbeing (Stark *et al.*, 2019; Ramanathan *et al.*, 2014) and to have a positive impact on the environment (Marshall *et al.*, 2010). Besides the physical benefits such as cardiovascular fitness (Larouche *et al.*, 2014), studies indicate that children that use active transportation to school have a higher degree of activation (mood, alertness and activity) on the trip and during school (Westman *et al.*, 2013; Stark *et al.*, 2019) and have positive emotions during the school trip (Ramanathan *et al.*, 2014). Additionally, AST is incidental which means no additional effort is needed as well as economical compared to other forms of physical activity for children, where caregivers do not need to pay for physical activities. Yet, a decline in AST has been observed in recent years (Lu *et al.*, 2015; Pang *et al.*, 2017a; Rothman *et al.*, 2018).

Factors that influence children and adolescents' modes of transportation to and from school have been investigated to understand the decline of AST (Lu *et al.*, 2014). As the Rothman *et al.* (2018) review indicates, the distance to school is the factor most strongly associated with AST. Furthermore, individual, parental and societal factors, including child's

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age, parents' educational background, income and other income related factors, race and attitudes towards AST, have moderately positive associations with AST (Rothman *et al.*, 2018). Moreover, previous research has compared objective factors, such as urban form, to individuals' perceptions of the environment around them, finding that objective factors have a stronger and more direct relationship with children's AST behaviour (Lu *et al.*, 2014). Another recent review also found that AST was associated positively with safety, walkability and neighbourhood social interactions and, in line with the literature, negatively associated with travel distance and car ownership (Ikeda *et al.*, 2018). More importantly, factors affecting AST include individual caregivers and parents perceptions. For instance, parent attitudes toward AST have shown a moderate relationship with AST (Rothman *et al.*, 2018). Parental concerns about road safety issues are an important barrier to children's active commuting behaviour (Pang *et al.*, 2017b). Thus, parents or caregivers 'attitudes towards AST play a main role in their children's AST behaviour, where parents decide if they will allow or promote their children walking to school depending on these multiple factors.

Behavioural theories are increasingly used to explain health behaviours to understand their determinants and create more effective health interventions (Tuti *et al.*, 2017; Prestwich *et al.*, 2014). Behavioural theories aid in identifying factors that influence behaviour change for different groups or audiences (Schuster *et al.*, 2015; Kubacki *et al.*, 2017a). From a theoretical perspective, social-ecological models propose that behaviour is determined by multiple levels of influence including individual, interpersonal, community, policy and built environment factors (Sallis *et al.*, 2006; Giles-Corti, 2006). Social ecological theory has been frequently applied to design and evaluate AST interventions. Lu *et al.* (2014) systematic review of factors preventing AST identified that 14 out of 16 included studies used social ecological theory. Nonetheless, social ecological theory has been widely criticised for its lack of sufficient specificity which might lead to overlook crucial personal constructs such as attitudes and intentions, thus, portraying an incomplete picture and possibly biased results (Lu *et al.*, 2014; Pang *et al.*, 2017b). Hence, Sirard and Slater (2008) proposed the Ecological and Cognitive Active Commuting (ECAC) model, which incorporates elements of the social ecological framework, social cognitive theory and McMillan's framework (McMillan, 2007). Figure 1 presents a diagram of the ECAC model and main variables. Sirard and Slater (2008) explain that objective physical environment refers to the built environment on the way to school and includes factors such as traffic, street and intersection density, and neighbourhood walkability. Objective social context refers to the social environment of the neighbourhood, including area-level social-economic status and population density

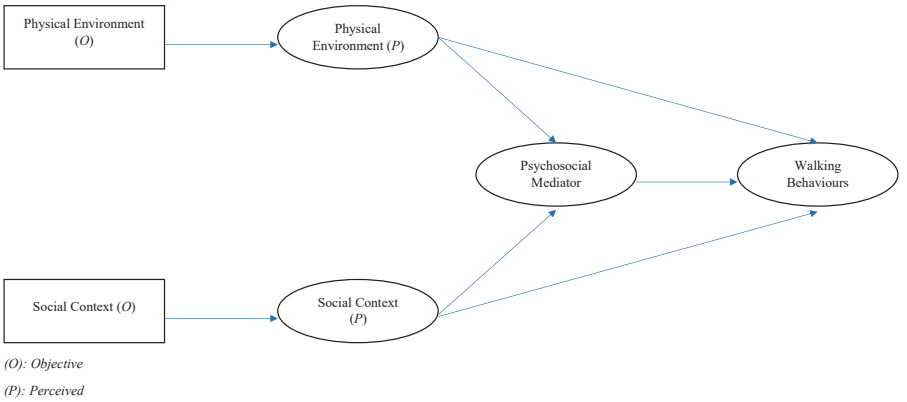

Figure 1.
Ecological and Cognitive Active Commuting (ECAC) model

(Pang *et al.*, 2017b). Perceived physical environment and perceived social context are influenced by objective physical environment and objective social context respectively and refer to how parents/individuals perceive the objective factors (Sirard and Slater, 2008). The psychosocial mediator refers to the attitudes towards AST (Pang *et al.*, 2017b).

More recently, Pang *et al.* (2017b) empirically tested the ECAC model, indicating three main factors associated with AST: attitudes towards AST, perceived risks and social norms (descriptive and injunctive). Injunctive social norms refer to "what people feel is right based on morals or beliefs" (Berkowitz, 2004), whereas descriptive social norms refer to the specific individual's perceptions of the behaviour of the majority (Cialdini and Goldstein, 2004). Moreover, the ECAC model was identified as the most comprehensive behavioural exploratory model for children's AST behaviours as it offers as high as 53.4% of variance explained (Pang *et al.*, 2017b). Thus, theoretical evidence of factors that explain AST behaviour may aid to understand individual differences and characteristics of specific groups that influence the uptake of AST for children.

Segmentation is a technique that seeks to develop accurate, robust and meaningful understandings of population subsets that share common characteristics (French, 2017). Thus, segmentation identifies segments (or groups) with common characteristics within a programme's target audience, enabling tailored solutions for the specific requirements of each segment (Kubacki *et al.*, 2017a). Segmentation can increase the efficiency and effectiveness of health education and behaviour strategies (Kubacki *et al.*, 2017b). When health behaviour change interventions do not account for individual differences in salient moderating factors, effects might not turn out as expected (Hardcastle and Hagger, 2016). Yet, when segmentation is applied, it has been often based on demographic factors and not on the psychological and behavioural factors shown to have important effects on behaviour (Hardcastle and Hagger, 2016). Moreover, segmentation is crucial for health education interventions and campaigns, where resources are often very limited. Recently, social media has enabled behaviour change practitioners to target smaller market segments efficiently and engage with audiences who may have been hard-to-reach in the past (Kubacki *et al.*, 2017a). The use of segmentation to tailor interventions has been increasingly applied in the health behaviour context (Forthofer and Bryant, 2000). More specifically, the literature shows very limited studies that have adopted psychographic segmentation applied to health behaviours. Some examples include physical activity (Boslaugh *et al.*, 2005; Staten *et al.*, 2006), food choice (Byrd-Bredbenner and Abbot, 2008), obesity (Wills *et al.*, 2015), anti-smoking (Walsh *et al.*, 2010), electricity conservation (Gray and Bean, 2011) and HIV prevention (Rimal *et al.*, 2009). However, segmentation is still underutilised in health education and behaviour programmes that target children (Schuster *et al.*, 2015). Exceptions of interventions for children that applied segmentation and targeting efforts are Power Play (Keihner *et al.*, 2011) and Team Nutrition (Levine *et al.*, 2002), designed to improve eating behaviour and physical activity. This study aims to contribute to address this gap in the literature using an approach focused on behavioural theory applied to segmentation techniques.

In a recent study, Schuster *et al.* (2015) applied segmentation to gain insight into changing AST behaviour in children, revealing three distinct segments of caregivers differentiated by 14 geographic, demographic, psychographic and behavioural variables. Yet, this study employed the Theory of Planned Behaviour (TPB) (Ajzen, 1991), that has shown to explain only 32% of the variance in physical activity intentions and 28% of behaviour itself, applied in the context of adults (Rhodes and Courneya, 2003). The purpose of the current study is to use a similar method to Schuster *et al.* (2015), the two-step cluster analysis approach, to gain insights on the examination of market segments in order to design future interventions and campaigns for caregivers and children to better improve children's health. In contrast to the previous AST segmentation study (Schuster *et al.*, 2015), this research employs the novel ECAC theoretical framework, that has been identified as the most comprehensive

behavioural exploratory model for children's AST behaviours (Pang *et al.*, 2017b). Two main research questions guide this study:

RQ1. What are the main ECAC model variables that influence caregivers' and their children's walking to school behaviour?

RQ2. What are the main segments that differentiate caregivers' and their children's walking to school behaviour?

Method

Target population

The target population for this research was caregivers (e.g., parents, grandparents) responsible for getting a child to and/or from school in Victoria and Queensland, Australia. An eligibility screening question was placed at the beginning of survey asking whether the respondent was a carer of primary school students. No geographic or demographic constraints were added as a comprehensive group of respondents was expected in this study. Victoria and Queensland were selected due to their large population sizes as well as similar cultural and economic backgrounds.

Online survey

Ethical approval was obtained through university ethics committee. An online survey was designed to collect data from caregivers of children between 5 and 12 years attending school and responsible for taking the child to and/or from school in Victoria and Queensland, Australia. Survey links were shared through university owned mail lists and social media advertising (Facebook geo-targeted ads).

Sample

The survey collected a total of 3,082 responses. Out of the 3,082 responses, 2,545 were from Victoria and 537 were collected in Queensland.

Measures

ECAC model components were measured using 7-point Likert scales. Objective physical environment is measured by Walk Score (2021), which measures the walkability of any address between 0 and 100. Walk Score was calculated based on the walking routes to nearby amenities, population density, road metrics such as block length and intersection density. Walk Score has been used in environmental studies such as Gilderbloom and Meares (2020) and Gilderbloom and Meares (2020). Objective social context was measured by the Socio-Economic Index for Areas (SEIFA) score (Australian Bureau of Statistics, 2016). SEIFA scores include diverse attributes such as income levels, employment status, educational background, occupation and household arrangement. Perceived physical environment was represented by perceived risks, including danger of streets, traffic, crime, proximity and difficulty. Data that was used to calculate the SEIFA score were collected by ABS to ensure reliability and validity. SEIFA scores have been widely used in health promotion and physical activities studies such as Agostini *et al.* (2018), Gearon *et al.* (2020) and Gunn *et al.* (2020). Both the walking behaviour and the distance to schools were self-reported in the survey (see supplementary file). Perceived social context was operationalised by descriptive and injunctive norms, which measure the perceived social norms of walking to school behaviour, including the general public and the people important to caregivers. The psychosocial mediator construct was measured by eight attitudinal items about the walking to school behaviour.

Data analysis

ECAC constructs for this analysis were validated in a previous study (Pang *et al.*, 2017b) using confirmatory factor and subsequent path analysis in SPSS AMOS Ver. 23. Good convergent scores were observed using Cronbach's alpha across all multi-item factors. For this study, a two-step cluster analysis was undertaken using the five ECAC measures and additional demographic segmentation variables for carers and children. A total of 16 analysed variables covered the four bases of segmentation: geographic (approximate distance from school, Walk Score), demographic (SEIFA score, caregiver employment, education, income, number of cars, gender, age, number of children, child age and gender), psychographic (perceived risks, descriptive and injunctive norms, attitudes), behavioural (walking behaviour).

Cluster analysis is a term describing a range of statistical techniques for classifying individuals or objects into distinct groups or "clusters" with maximal intragroup homogeneity and maximal intergroup heterogeneity (Hair *et al.*, 2006). The main advantages of this method are the ability to manage both categorical and continuous variables, automatic selection of the number of clusters and the ability to analyse large datasets (Norusis, 2005; Ballestar *et al.*, 2018). Two-step cluster analysis is appropriate in situations where the sample size is large and where the researcher does not know in advance the number of clusters required to adequately segment the sample (Norusis, 2005). Similar to previous segmentation studies (Lamont and Jenkins, 2013; Tkaczynski *et al.*, 2010), two-step cluster analysis was appropriate for this study because of the large sample size (n = 3,082) and because there was no previous basis for specifying the number of clusters required to segment the sample. Moreover, two-step cluster analysis is considered most appropriate for market segmentation and has been widely used in health behaviour studies (Dietrich *et al.*, 2015; Tkaczynski, 2017), as well as to the context of this study–children's walking behaviour (Schuster *et al.*, 2015).

Results

Two-step cluster analysis in SPSS 25 was used to group carers based on their attitudes and preferences on their children walking to school behaviour. A four-cluster solution was achieved from the data set using 16 segmentation variables including the five ECAC model variables. Evaluation of the consistency of the clustering structure was performed using silhouette validation (Rousseeuw, 1987), which measures cohesion between elements within a cluster and separation between clusters. The silhouette measure of cohesion and separation is an index ranging from −1 to 1, where−1 means that the model is poor and 1 means that the model is optimal (Rousseeuw, 1987). The silhouette measure reflects the efficacy of a cluster solution in maximising within-cluster homogeneity and maximising between-cluster heterogeneity (Kaufman and Rousseeuw, 2009). The silhouette measure of cohesion and separation was 0.1, which is commonly used in segmentation studies (Schuster *et al.*, 2015; Lamont and Jenkins, 2013). The four clusters varied significantly across the 16 segmentation variables, as validated by chi-square and one-way ANOVA tests.

The importance predictor measures the relevance rather than the accuracy of the model (Ballestar *et al.*, 2018). An importance rating of between 0.8 and 1.0 indicates the variable was highly important to cluster formation, whereas a rating of between 0.0 and 0.2 indicates the variable was less important (Norusis, 2005). In the present study, cluster formation was determined by nine highly important variables: walking behaviour (importance = 1.0), distance to/from school (importance = 1.0), income (importance = 0.66), perceived physical environment (importance = 0.64), employment (importance = 0.42), perceived social context (importance = 0.40), number of vehicles (importance = 0.34), caregiver gender (importance = 0.29) and caregiver education (importance = 0.25). Furthermore, cluster

size was relatively homogeneous, ranging from 473 to 693. Please refer to Table 1 for more details on each cluster.

The four groups found had different characteristics. First, the clusters with shortest distance from school were Group 1 and Group 3. Group 1 with 21.2% of participants ($N = 473$), was composed by the caregivers that lived 1 km or less than 2 km from school. Yet, they had comparatively lower walking behaviour ($M = 0.88$, SD = 1.4) than Group 3 with 26.2% ($N = 483$) of participants that lived less than 1 km from school, which had the highest walking behaviour ($M = 3.46$, SD = 1.7). The majority of Group 1 had a higher income of $2,000 Australian dollars or more per week (34.2%), had the highest employment from all segments (96.2%), owned two cars (49.9%) and were aged between 40 and 44 years (36.4%). Interestingly, Group 1 was the segment with most mixed gender of caregivers compared to

	Importance	Group 1 21.2% $n = 473$	Group 2 31.0% $n = 693$	Group 3 21.6% $n = 483$	Group 4 26.2% $n = 586$	Significance (p)
Walking behaviour	1.0	0.88 (1.40)	0.14 (0.50)	3.46 (1.74)	0.63 (1.37)	0.001*
Distance	1.0	1km–less than 2 km (47.4%)	5 km or more (42.4%)	Less than 1 km (78.3%)	5km or more (33.3%)	0.001*
Income	0.66	$2 k or more per week (34.2%)	$2 k or more per week (46.3%)	$2 k or more per week (31.5%)	$600 - $799 per week (21.7%)	0.001*
Physical Environment (Risks)	0.64	4.19 (1.54)	5.27 (1.26)	2.62 (1.22)	4.84 (1.55)	0.001*
Employment	0.42	Employed (96.2%)	Employed (74.9%)	Employed (70.8%)	Home duties (51.4%)	0.001*
Social Context (Norms)	0.40	4.08 (1.26)	3.33 (1.20)	5.12 (1.13)	3.67 (1.32)	0.001*
Number of cars	0.34	Two (49.9%)	Two (85.3%)	Two (61.1%)	One (58.2%)	0.001*
Carer Gender	0.29	Female (56.7%)	Female (97.3%)	Female (87.6%)	Female (93.0%)	0.001*
Carer Education	0.25	Bachelor (33.8%)	Bachelor (35.8%)	Bachelor (25.3%)	Certificate (37.7%)	0.001*
Carer Age	0.22	40–44 years (36.4%)	35–39 years (45.9%)	40–44 years (34.4%)	35–39 years (25.3%)	0.001*
Physical Environment (Walk Score)	0.11	54.39 (20.82)	42.26 (22.09)	56.06 (21.04)	45.82 (21.76)	0.001*
Psychosocial Mediator (Attitudes)	0.10	5.16 (1.62)	5.51 (1.45)	6.25 (1.09)	5.48 (1.39)	0.001*
Social Context (SEIFA Score)	0.09	1015.92 (62.87)	1007.84 (57.23)	1021.56 (56.06)	983.23 (58.68)	0.001*
Child Age	0.06	11 years old (17.3%)	7 years old (19.0%)	6 years old (21.7%)	6 years old (15.4%)	0.001*
Number of children	0.03	1 (65.8%)	1 (51.5%)	1 (56.3%)	1 (65.9%)	0.001*
Child Gender	0.01	Female (51.2%)	Male (53.1%)	Male (56.7%)	Female (56.0%)	0.001*

Note(s): * significant positive effects (at $p < 0.05$)

Table 1.
Four-cluster solution

other segments, with only 56.7% being female. On the other hand, the majority of Group 3 had a high income of $2,000 Australian dollars or more per week (31.5%), a lower employment rate (70.8%) (yet not the lowest), owned two cars (61.1%) and were also aged between 40 and 44 years (34.4%). Compared to Group 1, Group 3 had predominantly female caregivers with 87.6% females. Most importantly, perceived risks of the physical environment were very high in Group 1 ($M = 4.19$, SD = 1.5) that lived 1–2 km from school, compared to Group 3 that lived less than 1 km from school and had the lowest perceived risk from all groups ($M = 2.62$, SD = 1.2). In contrast, Group 1 had slightly lower social norms ($M = 4.08$, SD = 1.3), compared to Group 3 ($M = 5.12$, SD = 1.1).

The groups with longest distance from school were Group 2 and Group 4. Group 2 with 31.0% of participants ($N = 693$) and Group 4 with 26.2% of participants ($N = 586$), were both composed by a majority of caregivers that lived 5 km or more from school, with 42.4 and 33.3% correspondingly. Group 2 had the lowest walking behaviour from all groups ($M = 0.14$, SD = 0.5) and Group 4 the second lowest with ($M = 0.63$, SD = 1.4). The majority of Group 2 had a higher income of $2,000 Australian dollars or more per week (46.3%), had high employment (74.9%), owned two cars (85.3%), were aged between 35 and 39 years (45.9%) and were mostly female (97.3%). In contrast, Group 4 had the lowest income of all groups with $600 to $799 Australian dollars per week (21.7%), the majority were engaged in home duties (51.4%), owned one car (58.2%), were aged between 35 and 39 years (25.3%) and were mostly female (93%). Compared to all other groups where the majority of caregivers had a bachelor's degree education level, Group 4 had a majority of caregivers with certificate level (37.7%). Moreover, both segments that had the furthest distance from school had very high perceived risks of the physical environment. Group 2 had the highest perceived risks of all groups $M = 5.27$ (1.3) and Group 4 also had very high perceived risks ($M = 4.84$, SD = 1.55). Additionally, both groups had similar scores for social norms: Group 2 ($M = 3.33$, SD = 1.2) and Group 4 ($M = 3.67$, SD = 1.3).

Discussion

The purpose of this study is to apply a two-step cluster analysis approach, to gain insights on the examination of caregiver market segments (or clusters) in order to design future interventions and campaigns to better improve children's health. This research employs the ECAC model, to investigate what are the main variables that influence caregiver's and their children's walking to school behaviour, and what are the main groups that differentiate caregiver's and their children's walking to school behaviour.

A four-cluster solution was achieved from the data set using 16 segmentation variables including the five ECAC model variables. Analysis revealed the most important variables for group formation were previous child walking behaviour, distance from school and caregiver income. Perceived risk of the physical environment was the most important psychographic segmentation variable for group formation, followed by social norms. The four distinct clusters identified through the analysis had different characteristics for caregivers and children.

Our results present valuable practical implications and market insights that may inform future AST programmes for children and their caregivers. This study identified four clusters that could be targeted by different health promotion programmes. Consistent with previous research, walking behaviour and distance from school were the most important variables to determine the groups (Schuster *et al.*, 2015; Pang *et al.*, 2017a). Thus, a crucial group to target is residents who live close the school but refuse to walk to school, as they have favourable conditions to achieve behaviour change. Potential solutions include better communication campaigns that provide information on the benefits of walking as well as interventions that promote knowledge and skills to organise everyday schedules. Yet, proximity should not be a

barrier to facilitate such behaviours. Different behaviour change strategies and policies such as safety infrastructure (e.g., improving road safety (Bringolf-Isler *et al.*, 2008), walking routes (Staunton *et al.*, 2003)), drop-off zones (Østergaard *et al.*, 2015), walking school buses (Nikitas *et al.*, 2019; Scharoun Benson *et al.*, 2020), or designated meeting points (Schuster *et al.*, 2015) that may allow children to walk shorter distances in their commute. These initiatives would have to be implemented for Group 2 and 4 due to the crucial barrier that distance represents for them.

In addition to the findings by Schuster *et al.* (2015), our results revealed that perceived risks of the physical environment were the most important psychological variable for the segmentation (importance = 0.64), which was, however, ignored in the TPB model. Interestingly, we found that Group 2 and Group 4, both of which show very high perceived risks of the physical environment are the residents who live further away from the school. In order to achieve changes in any of the groups who live further to the school, our study showed that perceived risks and social norms are crucial variables practitioners and policy makers must consider. Perceived risks could be improved via policy changes (state, council and school) (Gustat *et al.*, 2015) such as speed limits, improving road safety (Bringolf-Isler *et al.*, 2008) and implementing better walkways. Other ways to improve caregiver's perception of safety would be to assign safety officers to patrol around school areas (Pang *et al.*, 2017a) and implement safety information programmes (Mutrie *et al.*, 2002).

Further, social norms can change perceived risks. Contradictory to most of the studies in the AST literature, the social context in our study had less importance in cluster formation (importance = 0.40), ranking sixth in comparison. This also differs from Pang *et al.* (2017b) which explains that social norms are the most dominant variable in the ECAC model (2017). The results show that Group 3 had the highest perceived social norms ($M = 5.12$, SD = 1.13) while Group 2 had the lowest social norms ($M = 3.67$, SD = 1.32) towards children walking to school. This perception of the social context may be attributed in part to the longer distance from school for both clusters. To address perceived risks due to longer distance, social norms are essential for AST programmes. When caregivers perceive that peers and people closer to them accept and/or practice children AST they are more likely to let their children walk to school. Thus, health education interventions and campaigns should work with communities and neighbourhoods to reinforce children's walking behaviour (Daniels *et al.*, 2014). For instance, creating school-based (or neighbourhood) community events to gather parents to discuss and exchange information on the benefits and concerns of walking to school. This could improve knowledge and beliefs, additionally allowing the creation of walking groups, which may reduce risk perception from caregivers. Other recent AST interventions include outdoor activities in the surroundings of schools and inquiry sessions about urban mobility (Humberto *et al.*, 2021), which observed positive changes in children's perceptions and in caregiver's social norms about transportation.

Social norms are positively associated with the socio-economic status of a local area (Pang *et al.*, 2017b). Consequently, in this study the groups with higher social norms, also have higher income and employment rates. Compared to Schuster *et al.* (2015), employment (importance = 0.18) and income (importance = 0.09) had higher importance in cluster formation (importance = 0.42 and 0.64 correspondingly). Furthermore, it is relevant to summarise other demographic results important to cluster formation. In regards of number of vehicles, most caregivers owned two cars (groups 1, 2 and 3) while most of Group 4 owned only one car. Additionally, most caregivers were females, while Group 1 was the most diverse, with only 57% female caregivers. This is an important insight because, according to our ECAC model segmentation, this is one of the two groups most likely to change behaviour. This way, practitioners can tailor any intervention or campaign to both male and female caregivers. Caregiver gender in not considered in Schuster *et al.* (2015) previous study.

On the other hand, three ECAC framework constructs were significant but had very low importance in cluster formation. Perceived physical environment (importance = 0.64) and social context (importance = 0.40) were crucial for cluster formation compared to their predictors: objective physical environment (importance = 0.11) and objective social context (importance = 0.09). This may be due to the similarity in scores of the objective measures between groups. These results are in line with Pang *et al.* (2017b) ECAC model evaluation where the two objective variables are the least important, while perceived risks, social norms and attitudes have higher influence in the model. Nonetheless, in this study, attitudes (psychosocial mediator) had very low importance in cluster formation (importance = 0.10).

The results found in this study demonstrate the importance of psychographic variables applied to segmentation. Results show that the main psychographic variables in this evaluation of the ECAC model deferred to the main variables in TPB applied to AST. More specifically, perceived risks of the physical environment was the most important psychological variable for the segmentation using the ECAC model and was not considered in the TPB model. Future research should continue to evaluate the most appropriate theoretical health behaviour model to apply psychographic segmentation to AST. In a study comparing the results of segmentation for physical activity based on either demographic, health status or psychosocial variables alone, or a combination of all three types of variables, results showed that more groups with greater variability in physical activity were created using psychosocial versus health status or demographic variables and that a combination of the three outperformed any individual set of variables (Boslaugh *et al.*, 2005). Thus, simple segmentation strategies such as those relying on demographic variables alone may provide little improvement over no segmentation at all. Market segmentation appears to yield more homogeneous subgroups when psychosocial and health status factors are combined with demographic variables (Boslaugh *et al.*, 2005).

This study contributes to the literature in many ways. First, it applies market segmentation into a health behaviour context. Particularly, the research provides insights to improve children AST, specifically, addressing caregiver's perceptions. Furthermore, using the ECAC model, this research extends behaviour theory application into market segmentation. Further, this research extends on Schuster *et al.* (2015) study, comparing the previous TPB approach to the ECAC model and generating new insights. Moreover, this research investigates the value of the ECAC model variables to generate market insights in the AST context.

Finally, there are five major limitations in this study that warrant future research. Firstly, it may present self-reporting bias and a degree of social desirability cannot be excluded. Secondly, purposive sampling of urban regions limits the generalisability of the results to other contexts. Third, the use of the two-step cluster analysis method is novel to AST research and was only noted once before (Schuster *et al.*, 2015). Further research should compare clustering methods for segmenting AST. This could be tested by using the two-step cluster analysis method and then cluster the same data set using more traditional clustering methods (Tkaczynski *et al.*, 2010). Additionally, cluster analyses limitations should be noted, such as the instability of the cluster solution according to variables entered in the models. Further, this study did not examine if the clusters identified would have different responses to behaviour change programmes. Future longitudinal research should investigate differential responses. Finally, this study only applied the ECAC model without making any modifications or improvements, given that this paper took a theoretically driven approach for segmentation. Although having been tested before, the ECAC model still needs to be further developed in terms of its compatibility to the ACT behaviour, its inclusiveness of other environmental, social, or psychographic factors as well as how the model can be used to predict future behaviours. Future research should consider how to improve the ECAC model therefore its application can be wider and more indicative.

Conclusion

The aim of this study was to use the ECAC model to segment primary school children in terms of factors impacting caregivers' decision for their children to walk to school. Our results revealed that the most important variables for group formation were previous child walking behaviour, distance from school and caregivers' income. Perceived risk of the physical environment was the most important psychographic segmentation variable for group formation, followed by social norms. The four market segments identified demand different tailored solutions. Findings shed light on how to better design AST interventions to promote children's health.

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Supplementary

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Role of factors in eHealth literacy in period of COVID-19: a study of Turkey

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Abstract

Purpose – This study aims to understand the eHealth literacy skills of chronic patients and to explore the relations, patterns between eHealth literacy skills and different factors such as demographics, search strategies and health information sources and to explain their effects on eHealth literacy in Turkey in Izmir in COVID-19 outbreak.

Design/methodology/approach – A quantitative method was used in the study including a questionnaire. A total of 604 chronic patients responded to the questionnaire who applied the five popularly identified hospitals in Izmir in Turkey. CHAID analysis method was implemented to explore the strongest correlation between eHealth literacy and independent variables.

Findings – Using different social media types were correlated with patients' eHealth literacy scores. Using Facebook, Twitter were the supportive predictors for the eHealth literacy scores. However, digital literacy was highly important for eHealth literacy.

Originality/value – This study shows that the social media channels which provides much more information such as Facebook and Twitter for the chronic patient. This could be beneficial for the eHealth tools and social media content developers in terms of the supply of health information. Moreover, the study gives ideas about the effect of digital literacy and the importance of health information provided.

Keywords eHealth literacy, Chronic patients, COVID-19, Digital literacy, Web-based information, Social media

Paper type Research paper

Introduction

As the COVID-19 pandemic requires isolation from people, face to face health-care visits have been decreased. During COVID-19 pandemic, people spent time at home due to curfews and had no access to physicians and hospitals when the rate of infected people was increased since the governments cancelled all routine appointments. Since COVID-19 has spread out so fast, traditional health-care methods should have been changed with the technological methods (ehealth methods) (Brørs *et al.*, 2020) and it is crucial that patients swiftly take the health information accurately (Eysenbach, 2020). As a result of this, the use of Internet media, the way of accessing health knowledge and the interaction type with the health knowledge

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became more important to evaluate. In sum today, the need of reaching health information by using information technologies has increased very much for not only societies both for individuals in and after the period of COVID-19 (Fagherazzi *et al.*, 2020).

Especially for patients with chronic diseases who should be cared for regularly, the Internet and information technologies are regarded as important tools for self-management of their chronic conditions. Chronic patients are counted as a special group because they always seek for specialized and sometimes sophisticated health information to sustain their health conditions. With regard to this, online health information can be counted as a focus health information source for chronic patients (McCray, 2005). In addition, since chronic patients tend to be older patients and they have less chance to go to hospitals especially after COVID-19 (Paige *et al.*, 2017; Chudasama *et al.*, 2020), the need for chronic patients became more prior in terms of the use of eHealth.

One of the concepts that explain individuals' eHealth behaviors is eHealth literacy. eHealth literacy is a kind of literacy that explains the individuals' capability to collate, understand and evaluate the online health information. As the concept of eHealth literacy comprises different skills such as digital literacy and information literacy (Norman and Skinner, 2006), it is affected by different factors such as sociocultural or behavioral factors (Griebel *et al.*, 2018). However, versatile developments in social media varied with information finding methods, new social attitudes emerged, thanks to the digitalization that generated new learning styles and challenged the eHealth literacy skills (Chang and Schulz, 2018). The socially intensive use of the Internet shapes the ways of obtaining health information by affecting the social behaviors of patients, thus individuals try to adapt their health information behaviors through online platforms. Therefore, eHealth literacy has become an essential topic for researchers to use such information and services (Zhang *et al.*, 2017). Especially for more traditional and collectivist societies such as Turkey, it may be important to investigate eHealth literacy, because traditional ways of acquiring health information – for example, asking friends and relatives – may conflict with modern methods. In that context, it becomes critical to understand the components of eHealth literacy especially for the period of COVID-19 and later conditions.

In that context, it is appropriate to investigate the eHealth literacy in chronic patients with its relational components such as demographics, health information sources and search strategies. Demographics are the crucial components for eHealth literacy in terms of different characteristics. For example, studies have shown that there is a relation between individuals' education level and eHealth literacy scores. Age is also a very important component for eHealth literacy scores (Tennant *et al.*, 2015; Choi and DiNitto, 2013). The use of social media was also another data counted as an important component for eHealth literacy lately (Li and Lui, 2020). In addition, different health information sources such as traditional ones – friends, family – or Internet have a direct influence on eHealth literacy (Chang *et al.*, 2021), whereas search strategies as a subcomponent of digital literacy have an implicit effect on eHealth literacy. With regard to all these accounts, this study is conceptualized with the analysis of the correlation between eHealth literacy, demographics, health information sources and online search strategies to generalize the findings and generate some results for COVID-19 and later periods for chronic patients.

Research questions

Considering all these components in this study, eHealth literacy skills of the chronic patients, and the use of different sources, and digital strategies used by the patients for gaining the health information in the period of COVID-19 were examined to understand the effects of those different variables. With all of them to fill the gap in the studies from Turkey, this study was designed accordingly.

In that context, the following three research questions in the study were proposed:

RQ1. To what degree does demographics of patients correlate the differences in eHealth literacy in the period of COVID-19?

RQ2. To what degree do online search strategies which patients use correlate the differences in eHealth literacy in the period of COVID-19?

RQ3. To what degree do information sources which patients use correlate the differences in eHealth literacy in the period of COVID-19?

With these questions, the study aims to find the general correlations between eHealth literacy, demographics, health information sources and search strategies for the current situation and future conditions. It has been established to detect general aspects of eHealth literacy and related factors under the effect of the COVID-19 period and for the later progress. The data were collected in the middle of COVID-19. It was a general tendency to evaluate the COVID-19 as a first stimulus by patients. However, the study was designed to get general information by using the scales. Because of that in the study, only the collected data based on scales were mentioned and evaluated. When the results are evaluated, the general tendency and the other studies' standing points were included for the evaluations, then the inferences were made accordingly.

Literature review

Recent studies have shown that chronic patient populations with the use of information technologies for health information from all over the world were high. In the USA, approximately 86% of patients looked for health information online (Fox and Rainie, 2002). In Hong Kong, 78% of patients used the Internet for health-related information (Wong andCheung, 2019), while in Israel, 62% of the respondents used the Internet for the health information (Lev, 2013) and in Germany, 74.6% of the patients applied to the Internet as a source of health information (Knitza *et al.*, 2020). This rate was also 71% in Europe (Nangsangna, 2019) – now it is expected that the rate increases after COVID-19.

However, eHealth literacy skills are dynamically affected by different components such as different literacy skills and self-learning skills. Some studies have shown that if eHealth intervention is wanted to improve chronic patients' health conditions, self-management skills and their engagement for eHealth care services are required (Duff *et al.*, 2017; Wildevuur and Simonse *et al.*, 2015). Moreover, a study conducted in Hong Kong has revealed that background knowledge about diseases and social media use are important for eHealth literacy. It has been pointed out that eHealth literacy and web-based health information are crucial concepts for preventive behaviors (Guo *et al.*, 2021). Similarly, according to another study, it has been shown that there is a relation between eHealth literacy skills and healthy lifestyles (An *et al.*, 2021).

Some other studies focused on related factors which can affect the eHealth literacy skills during COVID-19. Socioeconomic status was one of the emphasized factors for getting a better web-based health information. It was shown that socioeconomic disparities influence eHealth literacy negatively (Guo *et al.*, 2021). Digital divide and some demographics such as age and education level were determinants of the eHealth literacy skills during COVID-19 (Vollbrecht *et al.*, 2021). There were also studies that focused on the issue in rural areas. The studies have come up with the idea that eHealth literacy skills should be developed with the help of educational sources and telehealth could be the supportive eHealth tool to supply health services (Rush *et al.*, 2021; Manoharan and Shanmugam, 2020).

However, there are studies that aimed to evaluate the eHealth literacy for different diseases during COVID-19. While some studies focused on the general groups of people who applied directly to the hospitals (Do *et al.*, 2020), some other studies researched outpatients who get health-care services from hospitals (Vollbrecht *et al.*, 2021). Another group of a study

worked on patients with psychological diseases such as depression and anxiety (Zhu and Yang, 2021). Psychological well-being has been found as an important factor for eHealth literacy during COVID-19 (Yang *et al.*, 2021). Similarly, cancer was the other group of diseases that was researched. According to the literature, telehealth is one of the efficient sources for the management of diseases especially during COVID-19 which is also based on eHealth literacy (Peterson *et al.*, 2021).

Nevertheless, during COVID-19, adults and especially older adults were one of the main populations for eHealth literacy studies. For example, a study conducted in the USA for general adults has shown that eHealth literacy is an important factor to get valid and right health information against COVID-19 (An *et al.*, 2021). Since COVID-19 is a serious disease particularly for older adults, the studies suggest that eHealth literacy has a critical role for older adults to access the health information sources (Lee *et al.*, 2020; Xie *et al.*, 2020). For example, older adults who have cardiac diseases should be protected against the digital divide in terms of eHealth literacy to have better opportunities for health information (Astley *et al.*, 2021).

Generally, in the studies, it was found that eHealth literacy might help patients and the public to promote their health status and help with the precautions about COVID-19 (Nguyen *et al.*, 2021). Since eHealth literacy is a valid tool to assess the health behaviors during COVID-19 (Do *et al.*, 2020; Li *et al.*, 2021), it is also acceptable to evaluate the eHealth skills of the patients with measurement method.

Method

In this study, a survey was conducted between December 2020 and March 2021 in Izmir Turkey. After getting ethical committee approval from the Educational Sciences Institution of Ataturk University, the patients were asked to participate in the study.

Design and participants

This study was a cross-sectional, questionnaire-based, descriptive research that was performed with chronic patients in Izmir Turkey. Cross-sectional studies show the present situation in questioning (Neutens and Rubinson, 2014), and the survey method shows the intentions in attitude (Creswell, 2012), Therefore, it was appropriate to understand the current eHealth literacy situation for the short period of present time in Turkey. Thus, this can indicate some clues for the current situation of COVID-19.

The survey was conducted after patients were asked to participate in the study. The volunteer patients took the online survey via text messages. The survey took approximately 6 min to complete. Because of the COVID-19 conditions, the data were gathered online by using Google form. The people who mentioned that they are not interested in the subject, or they have no knowledge of the subject, were excluded from the study.

The population of this study includes chronic patients who applied to identified hospitals in Izmir Turkey. The patients were chosen according to the cluster sampling method because there were two purposive criteria in the population selection (Creswell, 2012). First, with the highest population, three public hospitals in Izmir were chosen in the study. Second, since neurological, cardiac and internal diseases comprise very wide populations, the study population is aimed at these polyclinics. However, the patients who applied to those hospitals had also different diseases such as cancer which may be forceful for them to answer the questions. Because of that only patients with better conditions have responded to the questions.

The total number of patients who applied to these branches in these hospitals was 966,913. The sampling formula with validity and acceptable margin of error level which is

"$n = Np(1–p)/[(d^2/Z^2_{1–\alpha/2}*(N–1)+p(1–p)]$" has been used for the calculation of the sample (Han *et al.*, 2021). With the number of population, which is 966,913, and with the $d = 0.5$ margins of error, the minimum sample size was calculated as 542 with the 95% confidence level and 664 with the 99% confidence level.

Instruments

Three different scales were included in the study. First, eHealth literacy scale was used as a dependent variable. The others are search strategies and health information sources scales as independent variables. Demographic data were also evaluated as independent data to reveal related factors for eHealth literacy.

Demographics

Seven questions related to the characteristics of the participants were asked to participants. These questions were age, gender, education level, the technologies that the patients use (computer, laptop, notebook, tablet and mobile phone), Internet usage frequencies and the social media channels that the patients use for the health information (Facebook, Instagram, Twitter, YouTube and Pinterest). The first four demographics are commonly used variables to understand the differences in eHealth literacy (Yusif *et al.*, 2017; Suri *et al.*, 2016). And other demographics were asked for understanding the correlates of the use of the technology and Internet and social media on eHealth literacy skills (Alhuwail and Abdulsalam, 2019).

eHealth literacy scale. For eHealth literacy, an eHealth literacy scale which is developed by Norman and Skinner (2006) was used. Since this study focuses on the patients' general ability in the first step, eHealth literacy scale (Norman and Skinner, 2006) was adopted because of its general aspect (Chang *et al.*, *2021*). Although there are some newly developed eHealth scales (Gilstad, 2014; Paige *et al.*, 2018), Norman and Skinner's eHealth literacy scale was preferred because of its strength and simplicity (Giudice *et al.*, 2018), which was the aim of the current study.

As the eHealth literacy scale is one of the extended, easily useable, valid in many languages and literacy scale for eHealth (Sudbury-Riley *et al.*, 2017) has been developed to measure online health behaviors for health information, it was a suitable scale for the study. In addition, the scale was used for lots of different studies in different cultures (Chung and Nahm, 2015) and it has been applied in different cultures and considered a valid tool in the COVID-19 period (Xu *et al.*, 2020).

There are eight questions on the scale. It contains a five-point Likert scale and assesses the ideas and perceptions of the participants against health information issues on the Internet. The participants get scores between 8 and 40. The higher scores indicate higher literacy skills.

The Turkish version of the scale was adapted by Gencer. The validity and reliability test were conducted. The factor analysis of Kaiser–Meyer–Olkin was found to be 0.860. Cronbach's alpha validity value is 0.915. Internal consistency validity factor is 0.863 (Gencer, 2017).

Search strategies

Search strategies scale was developed by Neter and Brainin (2012). Because different search strategies were affected on patients' eHealth literacy skills which may cause problems for using the health information in the previous studies (Vaart *et al.*, 2013), it was important to discover the relationship between search strategies and eHealth literacy skills. However, the search strategy scale was the only scale that collects general strategy methods in a scale that is coherent with the eHealth literacy, although there were some other previous studies that

investigate the search strategies with different methods (Vaart *et al.*, 2013; Mitsutake *et al.*, 2016).

The strategies were examined by evaluating the following actions:

"In order to find health information on the Internet you usually do the following?"

(1) use a site that my physician recommended;

(2) follow links that appear on websites;

(3) ask questions in forums;

(4) use my Favorites list; and

(5) use a site that a friend recommended.

Each action contains a five-point Likert scale. The highest scores show the highest use. The Cronbach's alpha score was calculated as = 0.67. Confirmatory factor analysis yielded an acceptable fit level $p < 0.001$, GFI = 0.9, AGFI = 0.9.

The Turkish version of the scale was adapted by making the necessary statistical measurements and translations. The validity and reliability tests were conducted. The relation rate between Turkish and English forms was high ($r = 0.71$ and $p < 0.01$). To measure the internal validity, Cronbach's alpha value was calculated by applying the scale to 94 people (the Cronbach's alpha = 0.78). According to the data, the relation between Turkish and English versions seems equivalent.

Health information sources. eHealth literacy comprises media literacy, information literacy, health literacy and digital literacy (Levin-Zamir and Bertschi, 2018). And the media for information transfer is very important for all these literacy skills, Because of that reason, it was important to understand the health information sources to correlate with eHealth literacy skills. Although there were different studies that evaluated the relationship between health information sources and eHealth literacy (Chang *et al.*, 2021), there was no other systematic and general scale for assessing the correlation. Thus, the health information source scale was preferred as an appropriate, general and simple scale for the current study.

The health information source scale was developed by Nether and Brainin (2012) to inquire about the traditional and modern information sources that are used for health information. The scale includes different traditional and modern methods for getting health information. Health information sources were examined by asking;

How often do you get health information from the following sources?

(1) Internet;

(2) radio or television;

(3) newspaper, magazine or books;

(4) pharmacist, nurse, or physician; and

(5) family members or friends

Each source contains a five-point Likert scale. The highest scores show the highest use. The Cronbach's alpha score in the scale was calculated to be 0.64. Confirmatory factor analysis yielded an acceptable fit level $p < 0.001$, GFI = 0.94, AGFI = 0.92.

The Turkish version of the scale was adapted by making the necessary statistical measurements and translations. The validity and reliability tests were conducted. The relation rate between Turkish and English forms was high ($r = 0.77$ and $p < 0.01$). To measure the internal validity, the Cronbach's alpha value was calculated by applying the scale to 94 people (the Cronbach's alpha = 0.72).

Data analysis

In this study, SPSS25 software was used throughout the CHAID analysis to examine research questions. Within the SPSS25, decision tree diagrams were produced to indicate the results of the analysis. The CHAID analysis technique uses an algorithm to show the strongest ties between the variables (Brickham *et al.*, 2016) and it sets rules for those relations (Melchior *et al.*, 2000). In this study, three different CHAID analyses were accomplished. eHealth literacy was described as a dependent variable and then examined with patients' demographics, search strategies and health information sources. Thus, the correlates of independent variables and dependent variables are classified and understood categorically.

To analyze the variables categorically in CHAID analysis, it was necessary to break up variables into groups. However, it was just a categorical breaking up for the analysis. Some of the categorizations were applied according to other studies in the literature. For example, the variable "age" was categorized according to life circle group age categories. They are young adults, middle-aged and older adults. The first group consisted of patients whose age was between 18 and 45 years. The second group consisted of patients whose age was between 45 and 65 years. And the third group consisted of patients whose age was above 65. Additionally, in the social media tools, Facebook and Twitter were put into one group. Since Facebook and Twitter allow the patients to exchange and disseminate their health knowledge with short texts and instant messages, and those media allow the patients to collaborate as a social community (Tuarob *et al.*, 2014). The other social media tools, YouTube, Instagram and Pinterest, were not divided into groups, as each has singular characteristics. Before starting the CHAID analysis, researchers examined the data and categories of the variables (Table 1).

Results

RQ1. The effects of demographics on patients' eHealth literacy skills

The demographics of the population has been shown in Table 2. In addition, technologies such as patients use, Internet usage frequency and most used social media types have been presented in the table.

However, the eHealth literacy scores related to age, education level, gender and social media use were shown in Figure 1, and Figure 2. Accordingly, it was revealed that patients between 45 and 65 years old with different social media tools have higher eHealth literacy scores. Female patients with different social media tools have higher eHealth literacy scores.

However, the first CHAID analysis was deployed based on demographics which are age, gender, education level, Internet usage frequencies and social media types. According to the results, the only use of different social media tools, age and education level demographic data had correlates on eHealth literacy scores. The first tree model was shown in Figure 3, which shows the relations between different demographics. The tree model revealed three different branches which explain the relationship between the dependent variable eHealth literacy scores and the independent variables demographics. The first branch indicated that the social media type used for the online health information have higher correlates than other demographics on the eHealth literacy scores. According to the results, the most effective social media types on eHealth literacy scores were Facebook, Twitter and Pinterest. Patients who used those social media types had higher eHealth literacy scores ($M = 3.98$, SD 0.62; $n = 153$). In contrast, the patients who did not use any social media type or who used YouTube have lower eHealth literacy scores ($M = 3.05$, SD 1.10; $n = 397$) than the other patients who used the other social media types for the online health information.

However, it was found that there was a significant relation between the second group (I do not use, YouTube users), education level and age. The second branch of the first tree model has separated the eHealth literacy scores according to the education level. If the patients who

		n	Percentage (%)
Age			
	18–30	171	28.3
	30–45	168	27.8
	45–65	188	31.1
	>65	77	12.7
Gender			
	Female	335	55.4
	Male	269	44.5
Education level			
	Primary School	66	10.9
	Secondary School	22	3.6
	High School	131	21.7
	Vocational School	48	7.9
	Bachelor Degree	257	42.5
	Graduation Degree	80	13.2
Technologies that the patients mostly use			
	Tablet	48	7.9
	Desktop	41	6.8
	Smartphone	443	73.2
	Laptop	69	11.4
Internet usage frequency			
	Several times in a day	142	23.5
	Constantly during the day	378	62.5
	Once a week	58	9.6
	Several times in a week	26	4.3
Mostly used Social Media types			
	Facebook	132	21.6
	Instagram	54	8.9
	Twitter	8	1.3
	Pınterest	20	2.3
	YouTube	270	44.6
	I do not use	127	21

Table 1.
Characteristics of the participants ($n = 604$)

did not use any social media tool or who did use YouTube have bachelor or graduation degree as a graduation level, they had higher eHealth literacy scores ($M = 3.38$, SD 0.99; $n = 226$) than the patients with lower education levels ($M = 2.26$, SD 0.94; $n = 72$). In another word, even the patients who had lower eHealth literacy scores according to the use of different social media tools, when they had higher education levels, had higher eHealth literacy scores than other patients with lower education levels. Nevertheless, those patients who have only first and secondary school degrees had different eHealth scores according to their age. According to the results, patients who were older than 65 years old have highly lower eHealth literacy scores ($M = 1.78$; SD 0.59; $n = 35$). It means that even the patients had lower education level, if they were younger than 65 years old, they had potentially higher eHealth literacy scores.

Consequently, the first tree indicated that the first predictor of the e-health literacy scores of the patients in the demographic variables is social media type for the online health information and then education level comes after as a second predictor of the eHealth literacy scores. After that when the scores of different age groups were examined, it was seen that young adults and middle-aged patients have greater eHealth literacy scores than the older patients who were

	Independent variables	Content	Type	Depended variable
RQ1	Age	18–45, 45–65, >65	Categorical	eHealth
	Gender	Male, female	Categorical	Literacy
	Education level	Primary school, secondary school, high school, vocational school	Categorical	
		College		
		Graduation school		
	Social media types	Facebook, Instagram, Twitter	Categorical	
		Pinterest, YouTube		
		I do not use		
	Internet usage frequencies	Once a week	Categorical	
		Several times in a week		
		Once in a day		
		Several times in a day		
		Constantly during the day		
RQ2	Health information sources	Internet	Categorical	
		Radio or television		
		Newspaper, magazines or books		
		Pharmacist, nurse or physician		
		Family members or friends		
RQ3	Search strategies	Use a site that my physician recommended	Categorical	
		Follow links that appear on websites		
		Ask questions in forums		
		Use my favorites list		
		Use a site that a friend recommended		

Table 2.
The description of the variables in the study

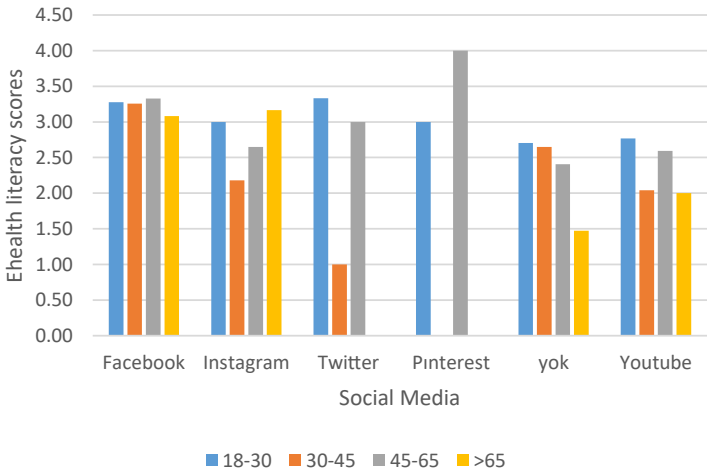

Figure 1.
eHealth literacy scores related to age and social media use

older than 65. According to the results of the first tree model, there were no significant correlates of the other demographics such as gender and Internet usage frequency.

RQ2. The effects of online health strategies on patients' eHealth literacy skills

The second tree model was deployed based on different search methods as independent variables in which patients apply for the health information. According to the use of different

search strategies, it was found that some sources have higher correlates of eHealth literacy scores. The second tree model has shown those relations in Figure 4.

The second tree model revealed three different nodes on search strategies. It was found that different search strategies had different correlates on eHealth literacy scores. It was understood from the nodes that following the links that appear on websites are the most effective strategy for getting health information online. The patients had higher eHealth literacy scores ($M = 3.79$, SD 0.9; $n = 209$) who followed the links that appear on the websites. From the second node, it was found that the second predictor variable was using the favorite lists for searching online health information. It referred to patients who had favorites websites links lists that had higher eHealth literacy scores ($M = 4.03$, SD 0.81; $n = 121$) than others. In another word, using the link that appears on websites was the most effective determinant between search strategies. And second, using the favorite lists was another determinant of eHealth literacy skills.

RQ3. The effects of health information sources on patients' eHealth literacy skills

The third tree model was deployed based on different health information sources as independent variables in which patients apply for the health information. According to the use of different health information sources, it was understood that some sources had higher correlates of eHealth literacy scores. The third tree model has shown those relations in Figure 5.

A third tree model revealed four different nodes which explained the relations. It indicated that the use of the Internet as a source of health information was the first effective tool for eHealth literacy scores. The patients who used the Internet very often as a source of health information had higher eHealth literacy scores ($M = 4.39$, SD 0.65; $n = 101$).

The tree model also indicated that there is a relation between the frequency of using the Internet and the frequency of using newspaper/magazines/books as a source of health information for eHealth literacy scores. The patients who used the Internet very often and use newspaper/magazines/books very often, often or sometimes had higher eHealth literacy scores ($M = 4.25$, SD 0.64; $n = 60$) than the patients who used newspaper/magazines/books rarely or never ($M = 3.9$, SD 0.57; $n = 31$). It was understood that newspapers/magazines/books are the efficient factors that influenced the eHealth scores for Internet users as well. If the frequency of the use of the Internet and newspaper/magazines/books together increased, eHealth literacy scores were also affected positively.

In the tree model, it was also presented that if the patients use the Internet rarely or sometimes, the frequencies of the use of the newspaper/magazines/books sources affected eHealth literacy scores differently. If the patients used newspaper/magazines/books often or very often, they had higher eHealth literacy scores ($M = 3.37$, SD 0.85; $n = 73$) than the

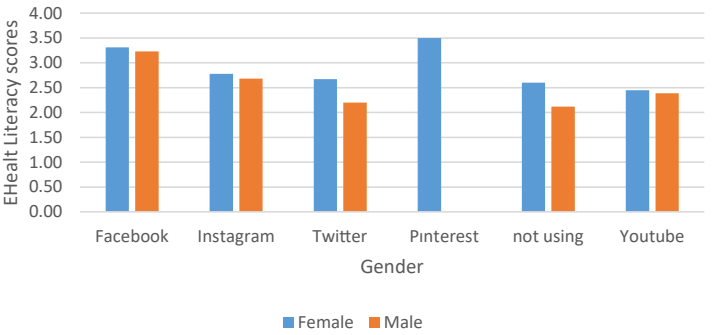

Figure 2.
eHealth literacy scores related to gender and social media use

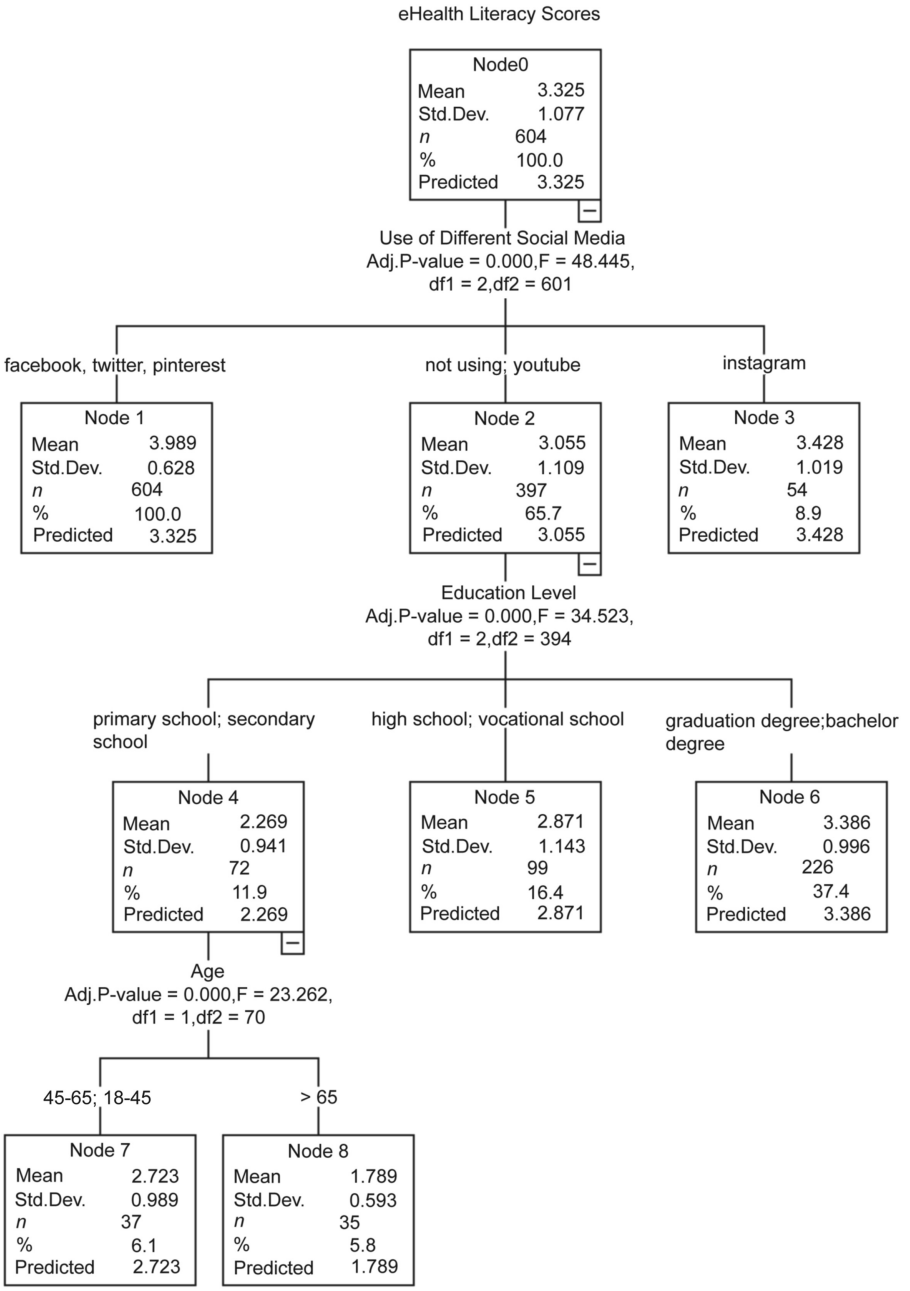

Figure 3.
The tree model of the CHAID analysis according to demographics: age, education level, use of social media

patients who used those never rarely or sometimes ($M = 2.9$, SD 0.95; $n = 156$). It showed that they even had lower eHealth literacy scores because of the lower Internet usage, and also increased eHealth literacy scores because of using the written sources. However, the results

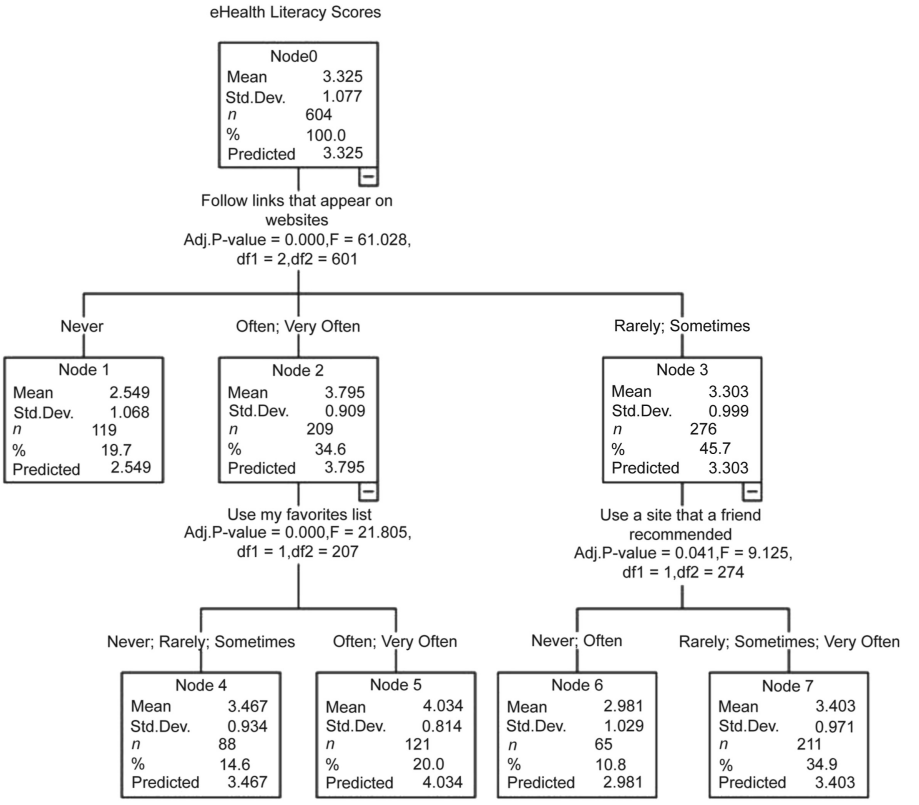

Figure 4.
The tree model of the CHAID analysis according to search strategies

revealed that radio and television were the tools with negative influence on the patients' eHealth literacy scores who used the Internet and newspaper/magazines/books sometimes or rarely as a source of health information. Between those patients who used the radio/television very often or often had highly lower eHealth literacy scores ($M = 2.33$, SD 0.83; $n = 28$). But if those patients used the radio/television sometimes, rarely or never, they had higher eHealth literacy scores ($M = 3.02$, SD 0.93; $n = 128$).

Consequently, the use of the Internet as a source of health information was the relatable attitude for patients' eHealth literacy scores. Additionally, newspapers/magazines/books strongly support the eHealth literacy scores of patients. If the patients more frequently benefitted from those tools nearby the Internet, their eHealth literacy scores were enhanced. In contrast, the use of television/radio had negative correlates on eHealth literacy scores. The patients who drew on the Internet and newspaper/magazines/books sometimes or rarely had lower eHealth literacy scores if they used more television/radio as a source of health information. Despitethe results indicated, there were no correlates of pharmacist/nurse/physician or family members/friends on eHealth literacy scores as a source of health information.

Discussions

The results consisted of this study have shown that there are different factors with different influences which affect the eHealth literacy skills for chronic patients in Izmir Turkey.

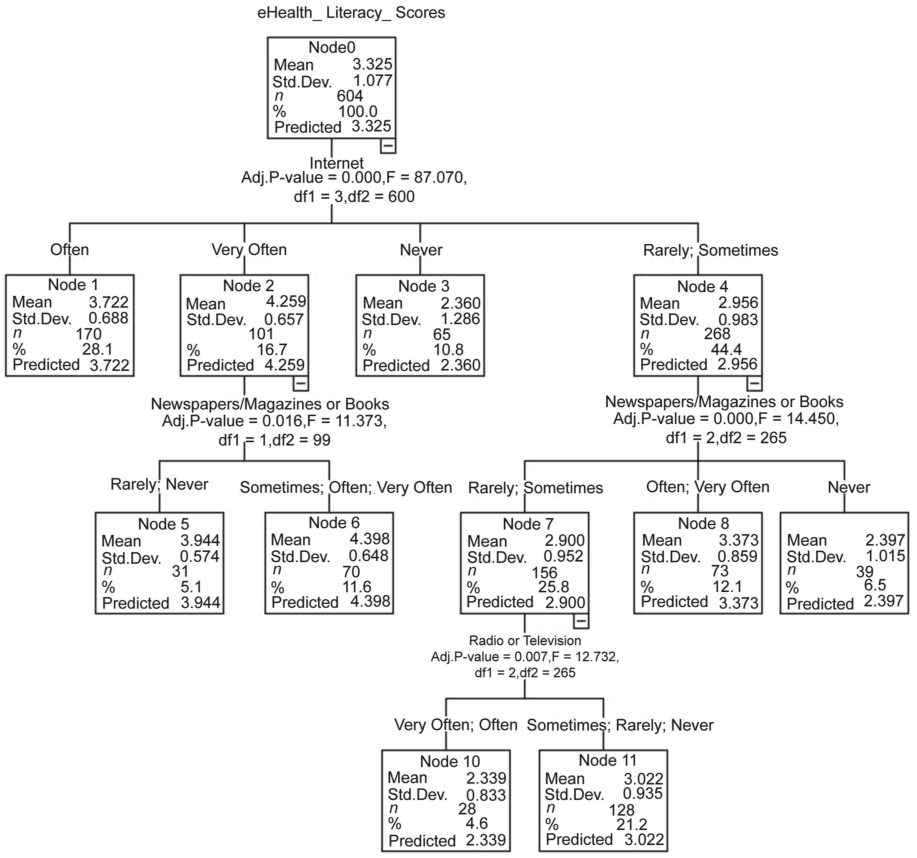

Figure 5.
The Tree model of the CHAID analysis according to the used health resources

Especially after a situation like COVID-19 pandemic, the use of the Internet for the health information seems to be an important tool for the patients for improving their health status.

Sociodemographic factors are important for the e-health behaviors during COVID-19 (Li and Lui, 2020). If the patients have much more chance to interact with the web-based health information with the help of technology use, this might help them to deal with the process. For example, the use of smartphones was found to be a relatable factor to eHealth literacy scores (Wong and Cheung, 2019). Therefore, finding financial sources for online health information users is one of the important requirements to develop eHealth literacy skills during COVID-19 (Xie *et al.*, 2020). The consumption of Internet and digital attributes more – using different Internet sites, benefitting from browser's features, interacting much more with different digital tools – conveyed better eHealth literacy scores (Rowley *et al.*, 2015). Moreover, eHealth literacy and digital literacy were highly correlated in the COVID-19 period (Bros *et al.*, 2020). Within this context, it has been revealed that the use of different digital attributes such as following different links on the Internet and using favorite lists is similar to the previous findings (Neter and Brainin, 2012). This could support the idea of this study that digital literacy skills should be supported to promote eHealth literacy and health behaviors, especially for chronic patients.

However, in this study, it was found that patients with middle age (45–65) were attentive to get better health knowledge online, in contrast to some studies which found that age was

inversely associated with eHealth scores (Guo *et al.*, 2021). This might also be about an increase in the healthy lifestyle behaviors between these ages (Bender and Habermalz, 2008). It is also important to have preventive behaviors, thanks to eHealth literacy during COVID-19 when it is considered that the pandemic is riskier for these age groups.

Some studies emphasized the general use of social media tools as a factor in eHealth literacy (Zhao *et al.*, 2020; Li and Liu, 2020), but they did not mention the name of social media tools. Accordingly, in this study, it was found that the use of Facebook and Twitter are more effective tools for eHealth literacy skills compared to YouTube or Instagram. Since Facebook supports the patients with its features to generate some social networks to share their health issues which promote the self-learning skills (van Uden-Kraan *et al.*, 2009), and the information in Facebook about COVID-19 can provide opportunities against misleading information during that period (Bruns *et al.*, 2020), this could be the effective tool for eHealth literacy. Twitter also allowed patients to collaborate as social groups (Scanfeld *et al.*, 2010). It could be especially an efficient tool for the patients in Turkey since Turkish people as members of a collectivist society are much more intended to behave socially while learning from online sources (Aydin, 2012). Although it was shown that in the researches, the trustworthiness of the health information is an important factor for getting online health information, the creditability for the online health information requires interaction with the online communities and adoption of the digital social environment (Chen *et al.*, 2014). Within this situation, this study stressed the importance of social behavior for eHealth literacy. Learning processes which were attached to gaining health information were highly based on the social contexts (Sbaffi and Rowley, 2017; Vega *et al.*, 2011). Therefore, Twitter can be a key tool to share experiences among COVID-19 (Hammer *et al.*, 2021). This could be the component that differentiates the results from previous studies for Turkey's situation.

However, interacting with the Internet often as a health information source support eHealth literacy skills (Lwin *et al.*, 2020), and media literacy is also important to navigate web searches for health information during COVID-19 (Dib *et al.*, 2021). Within this direction, it has come out in this study that written sources were also the important sources to promote eHealth literacy skills. It might be related to the trustworthiness of the health information. For example, there was unlimited contradictory, misleading health information on social media in the COVID-19 period (Zarocostas, 2020). On the contrary, as the written source could be perceived as more valid and reliable sources for the health information, it may help the patients for the online health information as well. Supporting online health information with written sources may also help to overcome the digital gap with the help of powerful written sources (Barnes *et al.*, 2003) in the COVID-19 period. This correlation may also be regarded for further studies about eHealth literacy.

It was also relatively revealed in this study that the conservation of the present online health sources by using favorite lists on the browser (which saves the sites to look at later again) contributed to the patients about their literacy skills. This could be about the help of the reconsideration of the knowledge for different times which can cause a metacognitive activity that develops learning skills (Ehret, 2014), which can be very helpful during COVID-19 to manage chronic diseases in terms of self-learning methods.

Finally, in contrast to the previous studies (Yan, 2010), this study indicated that the patients did not benefit from pharmacists/nurses/physicians' suggestions for seeking online health information in Turkey. This might be again about the situation in Turkey. Since the pharmacists/nurses/physicians in Turkey do not still have so much interest in online health information knowledge, and there is not any systematical tradition in the public services for online health information in Turkey, there is no tradition for patients to be led. This also showed the importance of systematic works for public health services for developing countries such as Turkey.

Implications and suggestions

In the light of the study results, some further suggestions have been presented below for the eHealth services, public health services and chronic patients in terms of using the Internet and digital technologies for health information:

(1) Education level and age of patients are important components for eHealth literacy skills of patients. Older adults tend to have lower eHealth literacy scores (Hoogland *et al.*, 2020). Therefore, this could be appropriate to organize some educations for these groups. For example, mobile health technologies may be appropriate for this kind of educations in terms of their applicability, capability and popularity (Davidson *et al.*, 2015). One method could be text message applications and educations for the development of eHealth literacy skills. According to a study done by Roberts suggest that text messaging interventions may be useful for older adults' eHealth literacy skills (Roberts, 2019). This may be a starting point for medical care developers or educators to develop some programs during and later COVID-19.

(2) As one of the subcomponents of demographics and eHealth literacy skills, digital literacy and use of technology skills are important other factors for patients' eHealth uses. It seems important that to increase the awareness of technology use and decrease the digital gap between individuals. For this reason, easily accessible online health information sources can be spread out much more by governments and educational and medical institutions for chronic patients. Technological infrastructure can be improved (Sumaedi *et al.*, 2021). Some encouraging activities and organizations by the public authorities may also be supplied to improve the facilities (Andersen *et al.*, 2019).

(3) Popular social media tools may be one of the main online health information sources that patients can benefit from and improve their eHealth literacy skills. However, these media tools can be harmful to patients with misleading information. In that context, this is important that the information in these sites should be subject to scientific and accurate information provided by medical professionals. For example, composing appropriate YouTube videos with accurate technics and content for deaf patients can be effective to improve their health information skills (Kushalnagar and Kushalnagar, 2018). These applications can also be designed for different disease groups and benefitted by patients during and later COVID-19.

(4) Trustworthiness of the health information is very critical for patients' eHealth literacy attitudes. When patients feel that online information involves redundant health information, they tend to avoid using online sources. Therefore, it is very important that medical professionals offer health information online. For example, the ICARE4EU project may be a good example for future works which aims to improve especially older peoples' eHealth usage with the help of professional opinions and applications (Melchiorre *et al.*, 2018).

(5) Social learning is a very essential learning style for every learning process. While patients are taking health information, the people around them influence them very much. In that context, especially social media tools may be used efficiently to guide the patients to create social interaction platforms and benefit from them appropriately. The platforms may either be created by using a common social media tool, such as Facebook or Twitter, or specifically designed web tools for specific problems. A social media model developed by Trpkovska and her colleagues for general diseases of children (2014) could be a good example to support patients' eHealth literacy skills for future studies.

Limitations

Based on our knowledge, this is the first study that investigates the chronic patients' eHealth literacy skills in Turkey. The study was conducted individually by two researchers and there was not any institutional or financial contribution. However, in the Covid-19 pandemic process, it was harder to reach the chronic patients to apply the study. Because of those reasons, although the study sample is representative of the number of patients who applied to identify hospitals, it can be expanded into a larger population for the whole country. In addition to this, the patients who volunteer to apply the study generally have higher education degrees. This also can cause the lack of representation of the patients with lower degrees.

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