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COVID-19 health misinformation: Using design-based research to develop a theoretical framework for intervention

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Design/methodology: Using design-based research methods, in this paper we develop a theoretical framework for addressing COVID-19 misinformation. Using a heuristic analysis of research on vaccine misinformation and hesitancy, we propose a framework for education interventions that use the narrative effect of transportation as a means to increase knowledge of the drivers of misinformation online.

Purpose: Because health misinformation pertaining to COVID-19 is a serious threat to public health, the purpose of this research was to develop a framework to guide an online intervention into some of the drivers of health misinformation online. This framework can be iterated upon through the use of design-based research in order to continue to develop further interventions as needed.

Findings: Our heuristic analysis determined that a key element of narrative transportation includes orientation towards particular audiences. Research indicates that mothers are the most significant household decision-makers with respect to vaccines and family health in general, we suggest narrative interventions should be tailored specifically to meet their interests and tastes, and that this may be different for mothers of different backgrounds and cultural communities.

Originality: While there is a significant body of literature on vaccine hesitancy and vaccine misinformation, more research is needed that helps people understand the ways in which misinformation works upon social media users. The framework developed in this research guided the development of an education intervention meant to facilitate this understanding.

Keywords: COVID-19 vaccine misinformation; narrative intervention; health misinformation; design-based research

Introduction

The spread of COVID-19 across the world has resulted in significant illness, death, and social and economic devastation. Alongside the circulation of the disease itself, researchers have observed a related

increase in unintentional and intentional online health misinformation (Lewandowski et al., 2020; Walter et al., 2020). This is what the World Health Organization (WHO) has called an "infodemic" (Zarocostas, 2020). With respect to COVID-19, misinformation can cause death and increase illness (Tasnim et al., 2020), and as the various COVID-19 vaccines are distributed around the world, potentially reduce vaccine uptake at a time when such vaccines are essential for protecting public health. The work of addressing the COVID-19 infodemic is complicated by it occurring alongside an already established health misinformation crisis. Indeed, the decades-long vaccine misinformation problem has now become an increasing threat given the life-saving impact of COVID-19 vaccines. There is scientific consensus that vaccines, while not a silver bullet, or even the only course of action (Chagla et al., 2020; Slaoui et al., 2020), are one global-scale solution to preventing great loss of life and a potential unknown future of chronic illness associated with COVID-19 infection and recovery (Kaur & Gupta, 2020). In this context, misinformation about vaccines prolongs the pandemic for many people.

Given the impacts of health misinformation on the spread of COVID-19, and therefore on people's lives and livelihoods, intervention into and mitigation of COVID-19 vaccine hesitancy is of utmost importance. As part of a broader research effort related to information flows and COVID-19 (Authors, 2021a), in this paper we describe one aspect of a design-based research (DBR) approach to mitigating the spread of COVID-19 vaccine misinformation online (Authors, 2021b; Authors, 2021c). For the purposes of this paper, COVID-19 vaccine misinformation refers to false information regarding vaccines and the attitudes impacted by such misinformation (Featherstone & Zhang, 2020). DBR is, as Wang and Hannifin (2005, p.6) describe, "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings." This iterative, interdisciplinary process, consists of examining real world problems, such as COVID-19 vaccine misinformation, to create, use, evaluate, and iterate theoretically-grounded interventions or solutions to those problems. These interventions take an heuristic approach, meaning the design uses principles drawn from the relevant literature to create a theoretical framework to determine design guidelines for the interventions. This type of analysis is common in DBR (Wang & Hannafin, 2005), and can also be thought of as a process to develop first principles for shaping the design, or as a kind of map of what we know to be true for what to include and avoid in the work (Merrill, 2002; Siarto, 2019), and therefore what will be most effective for the design intervention. In the context of education, these interventions often identify specific learning objectives or goals, which are then evaluated and assessed in real-world settings. From there, interventions are iterated upon to improve effectiveness. In this paper, we describe the theoretical framework for the design principles (Authors, 2021b), which informed the production and evaluation of our first design, which was a short comic tailored to an audience of mothers and intended to first educate

about emotions as drivers of misinformation, and second to provide a strategy for interrupting the spread emotionally-driven misinformation (Authors, 2021c).

The theoretical framework is a key component of DBR and design research endeavors more broadly, "not only because it uses theory to ground design, but also because the design and development work is undertaken to contribute to broader scientific understanding" (McKenney & Reeves, 2020, p.84). The theoretical framework is meant to help define the problem in an actionable way while providing an evidence-based approach to the creation of interventions. Therefore, what follows is an heuristic analysis of relevant literature necessary to define the problem and guide the creation of a strategic design to address that problem.

Context

For most internet users, the COVID-19 misinformation crisis has been made increasingly hazardous by specific pandemic-related factors such as increased reliance upon social media and online tools (Dib, Mayoud, Chauvin & Launay, 2021; Drouin et al., 2020). This intensified online engagement has coincided with a proliferation in health-related disinformation campaigns around the world (Patel et al., 2020; Weitz, 2020). What's more, because our scientific understanding of COVID-19 has been taking place in real-time in a public manner, higher rates of anxiety (Jungmann & Witthöft, 2020) and anger (Lwin et al., 2020) about what and who to trust can prevail, impacting how people negotiate misinformation (Han et al., 2020). Such factors combine to create a perfect storm in which people are vulnerable to health misinformation, and in particular COVID-19 vaccine misinformation at a critical time for vaccine uptake.

In many ways, this storm is further exacerbated for caregivers, especially mothers, because they are disproportionately the primary decision-makers when it comes to family health (Matoff-Stepp et al., 2014). While much research has focused on parental vaccine decision-making, mothers are reported to make up approximately eighty percent of household health decisions (Reich, 2016). This suggests that mothers are an ideal group to engage with when it comes to mitigating COVID-19 vaccine misinformation, as they are most likely to act on information related to their family's health, and this is why we chose to engage mothers for our intervention. To engage mothers effectively means understanding where their vulnerabilities to misinformation are in order to specifically address those vulnerabilities. Given that exposure to health misinformation and particularly exposure to vaccine misinformation, can have lasting negative consequences on health and health behaviours (Kata, 2012), consideration of sites of exposure is important. The internet is a prominent source of health information for people, including mothers (Kallen et al., 2019). Yet Suarez-Lledo and Alvarez-Galvez (2021) found that, depending on the topic, up to 87% of health-related information on social media is incorrect. As

regular users of social media (Van Cleaf, 2020), and often highly active online, mothers are likely to be exposed to vaccine and health misinformation. For instance, Regan and Brown (2019) point to the unregulated content and polarizing discourse of online "mom groups" as popular spaces where mothers and caregivers might encounter such misinformation. For example, one study has shown that only 47-54% of health advice found on two prominent parenting forums conformed to scientific evidence (Farrell, 2018).

Mothers may also be increasingly at risk of COVID-19 misinformation exposure specifically because of the increased demands that lockdowns and quarantines have placed on them. Unemployment and social isolation caused by lockdowns have strained many people around the world (Mahler, 2020; Topalidou et al., 2020), yet the higher burden of caregiving expected of mothers exacerbates the potential economic and mental stressors for mothers during the pandemic (Kingsley et al., 2020). Research also shows that mothers are experiencing significantly higher levels of COVID-19-related parental exhaustion than fathers (Marchetti et al., 2020). Not only has COVID-19 unequally burdened mothers, but it has further entrenched the neoliberal model of motherhood by normalizing the expectation that mothers can and should rise to the challenge of navigating a pandemic single-handedly (Güney-Frahm, 2020). O'Reilly (2020) particularly challenges mainstream narratives that honour and thank frontline and essential workers, and argues that these narratives silence and marginalize the frontline and essentialize labour performed by mothers around the world. In the context of this marginalization by mainstream media, O'Reilly observes mothers turning to online groups for support and advice, thereby potentially increasing exposure to misinformation.

The factors explained above for engaging mothers in an education intervention about COVID-19 health and vaccine misinformation are not experienced in isolation of each other, but are intersecting, and experienced differently across groups. The large structural issues in play that shape what mothers do and are expected to do, mean that addressing COVID-19 misinformation must come with sensitivity to these social pressures. The health decisions mothers make for their families come while negotiating obfuscatory information environments and at times contradictory messaging, often without the support necessary to make, or feel confident in, decisions based on scientific evidence and public health recommendations. Indeed, as Swire-Thompson and Lazer (2020) observe, the "vast amount of information that is possible to be retrieved makes it difficult to separate fact from fiction and interpret the findings, even for highly motivated individuals" (p. 436). This collision of factors impacts both exposure and vulnerability to health and vaccine misinformation. Given that health interventions that engage specific groups are shown to be more effective (Rivera, 2020), designing education interventions specifically for mothers is a theoretically sound, though quite complex, approach. Fortunately, there is much research on vaccine

misinformation and hesitancy that can guide development of this aspect of the theoretical framework for such education interventions.

Educating about vaccine misinformation

Vaccine misinformation and anti-vaccination attitudes have existed as long as vaccines have been understood to be effective (Poland & Jacobson, 2011; Wolfe & Sharp, 2002). The last fifteen years in particular have seen significant growth in this field of study (Habersaat & Jackson, 2020), with interest in vaccine misinformation on social media expanding (Ortiz, Smith, & Coyne-Beasley, 2019), especially in light of the pandemic (Limaye et al., 2021; Puri, Coomes, Haghbayan & Gunaratne, 2020). The study of health misinformation on social media is also extensive (e.g., Suarez-Lledo & Alvarez-Galvez, 2021; Wang, McKee, Torbica & Stuckler, 2019), and while beyond the scope of this research, could inform future iterations of related education design work.

The importance of the impact of health and vaccine misinformation circulating on social media on vaccine attitudes cannot be underestimated (Loomba et al., 2021), as made tragically clear by places with under-vaccinated populations and substantial fourth waves (Chiwaya, 2021). Through our heuristic analysis of what evidence indicates works and fails to work with respect to positively changing vaccine attitudes shaped by social media, it became evident that similar education and communication techniques could be strategically applied to teaching not just about vaccines specifically, but about the systems in which vaccine and health misinformation circulates. In other words, rather than design with persuasion about vaccines in mind, we designed an intervention meant to educate about how misinformation operates on individuals, a tactic Chou and Budenz (2021) also suggest is important in improving vaccine uptake. We did this by drawing on many of the same techniques used by vaccine and health communicators, as we outline next.

A key development in responding to vaccine hesitancy driven by misinformation is understanding the need to move beyond an information deficit model, in which communicators begin with the premise that people make less than ideal choices based on lack of good information, and which is a model shown to be largely ineffective for increasing vaccine acceptance (Nyhan & Reifler, 2015; Seethaler et al., 2019), even as such approaches dominate public health strategies (McKinnon & Orthia, 2017). The deficit model is appealing in its simplicity: to make people pro-vaccination, simply educate them about vaccination science under the assumption that they do not yet know enough about vaccines. However, as demonstrated by the National Academies of Sciences, Engineering, and Medicine et al. (2017), there are four major problems with this premise. First, scientific knowledge is uncertain and changes frequently so teaching scientific literacy is much more complicated than telling people what is correct science and what is not. Second, science communication is often mediated through third-party organizations and science

communicators compete with other voices, so that even if scientists succeed in disseminating "good science," there is no guarantee that it will be represented properly or listened to. Third, and perhaps most importantly, "people do not make decisions based solely on scientific information, but take values and other considerations into account. Thus it cannot be assumed that audiences that fail to act in accordance with the scientific evidence need more information" (National Academies of Sciences, Engineering, and Medicine et al., 2017). Fourth, a scientific message effective for one audience is not automatically effective for all audiences, so that science communication must take into account local context, beliefs, and needs.

Multiple studies identified a wide variety of factors that impact vaccine hesitancy, reinforcing the notion that providing information isn't enough to change behaviour. For example, Dubé et al., (2013) in their review of vaccine hesitancy literature, pointed to sensationalist coverage of vaccine controversies by traditional media and vocal anti-vaccination campaigns on social media, as a key contributor to vaccine hesitancy. Expanding this research, Dubé et al., (2018) examined the underlying factors of vaccine hesitancy in high income countries, and pointed to the importance of maintaining vaccination as a social norm by countering anti-vaccine misinformation. Yaqub and colleagues reviewed empirical research in multiple European nations, noting that reasons for vaccine hesitancy include a lack of trust in vaccine-related institutions and experts (Yaqub et al., 2014). More recently, Guzman-Holst et al., (2020) examined the barriers to vaccination in Latin America, identifying a range of factors, such as group influence and low socio-economic group membership. In a systematic review of existing literature, Ortiz-Sánchez et al., (2020) identified that such anti-vaccine movements on social networks such as Twitter, Facebook, and YouTube use multiple strategies to rapidly spread their message including bots and narratives of harm and profit. Considered together, these studies suggest that providing additional information on vaccine safety alone is unlikely to be enough to solve the vaccine hesitancy problem for a range of diverse audiences.

Instead of adopting an information deficit model, the research we have detailed above suggests the use of a sociological perspective for intervention, in which things such as identity and group affiliation, as well as technical knowledge, more heavily influence behaviour and beliefs (Lander & Ragusa, 2020). This approach enables us to develop an education intervention grounded in specificity, as with the case of engaging mothers, which research into vaccines hesitancy underscores the need for (Olson, Berry & Kumar, 2020). Rather than rely on a frame that suggests that people do not understand vaccine science and thus refuse vaccines, Lander and Ragusa (p. 2) argue that effective anti-vaccination messaging seems to first pass a verisimilitude threshold in which it is judged true by its audience because "it conforms to their individual and social experience" and it seems "lifelike." Notable here is that lack of information is not a primary factor in turning the tide from hesitancy to objection, but instead the focus on

how well the information conforms to lived experience influences vaccination decisions. In a related sociological approach, other researchers have recognized that anti-vaccine messages are often not supported by scientific evidence in the first place and are therefore unlikely to be dispelled through the information deficit model, researchers have turned to addressing the narrative models through which anti-vaccine messages and vaccine misinformation are rendered credible despite lack of scientific evidence. Kata (2012) outlines the tactics and the tropes (e.g., catchphrases, commonly used narratives, motifs etc.) the anti-vaccination movement deploys as starting points for thinking about how to increase vaccine uptake. She suggests the tactics used include skewing the science, shifting hypotheses about why vaccines are dangerous, censorship, and attacking the opposition, both personally and legally. Tropes, for example, include things such as calling vaccines toxic, that they should only be used if 100% safe, that they are unnatural, and importantly, that parents are experts in their own children (a claim Reich (2016) emphasizes as well). This approach has also been adopted by Bricker and Justice (2019), who argue that anti-vaccination messages utilize two main rhetorical tools — anecdotes of children harmed by vaccines, and suggestions of conspiracies within governments and pharmaceutical companies to suppress the truth about vaccines — to assert credibility despite a lack of scientific evidence.

What all of these methods share is an attention to the non-informational aspects of health messaging that best resonate with people, particularly through narrative cohesion or story. In this context, a story is defined as a form of communication consisting of structure with an event occurring, usually to one or more characters, which results in a change in the character(s). On one side of the debate about vaccine communication, researchers argue that scientific and health information presented in a narrative format is more accessible, relatable, and influential than the same information presented as stated facts or statistical data (Bakker et al., 2019; Fagerlin et al., 2005; Ratcliff & Sun, 2020). With respect to persuasion, ample empirical research has demonstrated the power of narrative (Appel & Mara, 2013; Green & Brock, 2000). On the other side of the debate, researchers argue that narrative formats present no benefits over non-narrative formats (Dunlop et al., 2010; Ecker et al., 2020; Reinhart, 2006; Zebregs et al., 2015), or even that non-narrative formats are more effective (Golke et al., 2019; Greene & Brinn, 2003; M. B. W. Wolfe & Woodwyk, 2010). In short, while narrative strategies have been shown to have mixed effects in pro-vaccine communication (Kim & Nan, 2019; Winterbottom, et al., 2008), what the literature makes clear is that the reasons for mixed effects are not yet clearly understood (Kim, 2020).

In spite of the inconsistent results with respect to narrative, recent research into COVID-19 vaccines and misinformation does suggest it remains an effective approach (Gesser-Edelsburg, 2021). A significant benefit of working with narrative is that it can engage people such that it approaches Ladner and Ragusa's verisimilitude threshold, as they observe as well (2020). Indeed, we propose that interventions into misinformation may be well served by narrative or storytelling, which the literature on

vaccine hesitancy also calls for (Shelby & Ernst, 2013). Importantly, narrative interventions need to be well attuned to their chosen audiences' lived experiences and concerns in order to increase their appeal and effectiveness. This means tailoring narrative interventions to particular groups in order to best achieve the desired impact.

Research demonstrates that positive impact can be achieved in messaging or education interventions through skillful application of narrative vis-a-vis the transportation effect and immersion. Immersion, as Moore and Green (2020) explain, "draw[s] more from automatic, experiential modes of thinking" (p.1), and possibly relies on the experiential thinking system, which is "more automatic and emotionally driven" (p.1), as opposed to more rational and analytic forms of thinking. Immersion can be facilitated by the effect of transportation, which as Sestir, Moore, and Green (2020) observe is the experience of "deep cognitive and affective absorption into the depicted story or world" (p. 1). This is the experience in which a story captures our attention fully, bringing us into the events and context of the story such that we are present with the information. In other words, transportation occurs in stories oriented towards Lander and Ragusa's (2020) verisimilitude threshold, and facilitates immersion in a story, or the feeling "of mental absorption individuals feel when reading a story, watching a movie, or playing a video game" (Moore & Green, 2020, p.1), and which may activate more emotional, experiential forms of mental processing.

Quality too is important. In order for a story (i.e., a narrative intervention) to be effective, it must also enable the suspension of disbelief through things like consistent character motivation, plausibility, and writing/media that does not break immersion. When a story fails to achieve these things, the audience is pulled from the transportational effects of the story and into an awareness that someone is trying to tell them a story, such as when one reads frequent spelling or grammar errors in a text, or disbelieves that a character would behave in a particular way (Green & Donahue, 2009; Schreiner et al., 2018). Although not fully understood, one effect of transportation is that it seems, at least in the moment, to reduce resistance to ideas being presented through the proposed process of "co-activation of attention, imagery, and emotion" (Green, 2004; Schreiner et al. 2018), suggesting an opening into what may be perceived as controversial information. Overall, there is extensive evidence which suggests that increased transportation, which itself is a testable experience, yields more persuasion (Green & Brock, 2002).

Another key factor in the effectiveness of transportation is familiarity. Research has shown that being familiar with characters, as well as similar to characters in a story, results in increased transportation effects (Green, 2004). Which is to say that when people see themselves in a story, there is evidence to believe that they will find the story more persuasive or influential. As such, it makes sense to tailor narrative interventions to targeted groups, which, beyond the outlined factors above (e.g., attention

to gender roles, race, and social pressures), is part of the reason in the context of this work for selecting mothers as a primary group to engage, as the comic we designed aims to do (Authors 2021c).

As noted above, however, interventions need to be contextual and attuned to differences across mothers, i.e., the category of "mother" is not homogenous or monolithic. What may elicit transportation and deep immersion for a white mother may not be effective or even culturally safe for a Black or Indigenous mother, and health communication strategies need to take this into account. Indeed, it's distinctly possible that a narrative intervention that relies upon a trusted medical authority as a character, such as a doctor, or even simply a white person, to deliver its message may in fact backfire for racialized mothers, given the racist and abusive medical histories experienced by such groups (Bunch, 2021; Quinn et al., 2016). The difference in attitudes towards the COVID-19 vaccines across racial groups demonstrates this, with studies in the US and the UK finding racial minorities are more than twice as likely to refuse or delay a COVID-19 vaccine (Hanson, 2021; Razai et al., 2021). Furthermore, understanding the differences between motivations to vaccinate or not across groups is also a central concern. Under-vaccination in some groups is not the same as refusing vaccination; each comes with different structural causes, which must be understood in order to effectively enable transportation for different audiences. For example, if a white mother is vaccine hesitant because of exposure to misinformation that has told her that an organic food diet is the preferred alternative to possible vaccine injury to her child, a narrative that speaks to community health may not shift her perspective. In contrast, a narrative that fails to alleviate concerns about transparency may not effectively respond to the hesitancy of racialized mothers.

In summary, as is the case of any educational intervention, it is important to be clear on who the audience is for an intervention, and to understand its needs and desires, as well as the external (e.g., social, technological) pressures that this group of people face (Dick, Carey, and Carey, 2005). Understanding these aspects can provide insight into the vulnerabilities faced by the group to be engaged, thereby connecting with its members in a supportive and non-judgmental way. In the context of this particular research, this means an intention to engage with mothers who are likely to be exposed to health misinformation, in a way that understands their unique and intersectional needs during the pandemic. It's also important to understand the means of persuasion that dominate anti-vaccine propaganda, and to effectively counter these (Bricker & Justice, 2019; Browne et al., 2015; Kata, 2012), which we suggest may be facilitated by using immersive narratives high in transportation effect to teach about the mechanisms typically used in the spread of misinformation.

The next step in this process is translating theory into practice. This means identifying particular learning objectives that the intervention is intended to address, designing the activities that the audience will engage with, identifying the delivery vehicles and environments in which the intervention will take

place, and aligning the learning objectives with assessments intended to evaluate the degree to which the intervention was effective. To date, we have identified learning objectives and designed one intervention tailored for mothers in the form of an illustrated narrative. We have evaluated this intervention (Authors, 2021c) and are currently creating an iteration of it for further implementation and evaluation. Significantly, this isn't a linear process: theory informs practice, and practice will inform theory and iterations of the intervention. Other examples of interventions that align with the design considerations outlined in this paper are anything from scripted Tiktok videos, targeted public health campaigns on Facebook, or Instagram posts or stories shared by popular mom influencers. This content can include stories that resonate with mothers as mothers, that address their concerns about vaccine safety, the ease and benefit of vaccines, and perhaps even the risks associated with failing to vaccinate. No matter what form a narrative intervention takes, it needs to be attuned to cultural differences, and be representative of mothers who face varying socio-economic barriers and who have different experiences of historical racism and privilege within the medical establishment.

Conclusion

In this paper, we outlined a theoretical framework developed through design-based research to create an education intervention into the topic of misinformation exposure online. Based on who makes the majority of health decisions for families, and is therefore likely to be influential on vaccine uptake, we selected mothers as ideal learners to engage with on the topic. Drawing on an heuristic analysis of vaccine misinformation and communication literature, we determined that the use of narrative-driven interventions designed specifically for mothers would be an effective approach. As our design-based research continues to unfold we will continue to evaluate further iterations strategy in a way that will have application across these differences and provide guidance for practitioners and policymakers as they negotiate the fraught terrain of vaccine misinformation throughout and beyond the COVID-19 pandemic.

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Pre-adolescent children's understanding of health and being healthy: A multidimensional perspective from the UK

Abstract

Purpose – We applied a multidimensional conceptual lens that incorporated physical, emotional, social, intellectual, and spiritual health dimensions to explore pre-adolescent children's understanding of health and being healthy.

Design/methodology/approach – Forty-six children aged 9-11 years old completed a short questionnaire about their understanding of health and what it means to be healthy. Data analysis was completed through a deductive analysis applying a multidimensional conceptual lens and an inductive thematic analysis of the content of children's responses to each question.

Findings – The analysis of children's understandings of health and being healthy both revealed five common themes: Being Well, Physically Active, Fit, and Healthy; Healthy Eating and Body Composition; Physical Activity Examples; Physical Activity Characteristics; and Unsure or Ambiguous. An additional theme of Social and Emotional emerged for children's understanding of what it means to be healthy. Across both questions the majority of responses reflected the physical dimension of health, with only a few references to the social and emotional dimensions. There was no evidence of the intellectual or spiritual dimensions of health in children's responses to either question.

Practical implications – Our data suggest that the plateau in adolescent UK children's trajectory of understandings originates earlier in childhood, with children aged 9-11 years showing a similarly limited understanding of health and being healthy as UK early and middle adolescents (12-15 years). Moreover, this focus on the physical dimension is narrower than previously considered as it is restricted to the movement category of this dimension only.

Originality/value – Our findings have implications for the timing and focus of health education interventions for children.

Keywords: health, children, school health promotion, health education, knowledge

Article Type: Research paper

Pre-adolescent children's understanding of health and being healthy: A multidimensional perspective from the UK

Introduction

Research into children's understanding of health has been motivated by a desire to help young people make informed decisions about their lifestyles and improve health education programmes. Yet, despite this aspiration, children's understanding appears to have changed little over the last 40 years. Worldwide evidence indicates that young people consistently report narrow and confused understandings throughout childhood which overemphasise the physical dimension of health (Burrows, Wright, & McCormack, 2009; Daigle, Herbert, & Humphries, 2007; Eiser, Patterson, & Eiser, 1983; Harris, Cale, Duncombe, & Musson, 2018; Lee & MacDonald, 2010; Myant & Williams, 2005; Natapoff, 1978; Schmidt & Frohling, 2000). Research from the UK, suggests that there may be a plateau in understanding during early and middle adolescence (12-15 years; Harris et al., 2018). However, we know little about what pre-adolescent (9-11 years) children in the UK understand about health, which is critical to assessing the trajectory of understanding. We need to ascertain whether the early and middle adolescence period is a plateau in understanding or part of a longer trajectory of limited and confused understanding. It is, perhaps, surprising given the widely accepted view of health as a multidimensional construct (see Hjelm, 2010) that such narrow views of health are reported by young people. In this paper we address several limitations in the research evidence by applying a multidimensional conceptual lens to explore pre-adolescent children's understanding of health in a UK sample. Identifying what children know about health prior to adolescence will help inform the timing and focus of health education interventions to support young people in developing their health literacy.

Health: A Multidimensional Concept

Health has been considered from a multidimensional perspective from as early as the 1940s when the World Health Organization's (WHO) landmark definition of health was published. This definition proposed a holistic view of health; it went beyond the focus on a person's physical body or the absence of disease and introduced the notions of social and mental well-being to health. It was an early step towards an integration of a biopsychosocial view of health with the traditional medical model and to linking health with well-being. Since this time, the holistic view of health has been developed further, with other multidimensional views of health being acknowledged within the literature (Donatelle, 2006; Edlin & Golanty, 2007; Hales, 2009, Hjelm, 2010; Insel & Roth, 2004). These views of health have commonly included at least five interacting and overlapping dimensions: physical, social, emotional, intellectual, and spiritual. While some authors have also included environmental health (Donatelle, 2006, Hales, 2009; Insel & Roth, 2004) and occupational health (Edlin & Golanty, 2007) as additional dimensions, Hjelm (2010) argues that they overlap to such an extent with the other dimensions that they are not distinctive enough as separate dimensions. He contends that environmental health is akin to social and spiritual health and occupational health to social, intellectual and emotional health; and thus presents five dimensions in his conceptual model.

In outlining his conceptual model, Hjelm (2010) provides a broad understanding of how each dimension has been defined, described, and represented within the literature before presenting his models for each dimension of health. His first dimension is physical health, which is represented by three aspects; movement, thought, and procreation. A physically healthy person is able to move themselves and manipulate objects, they are able to engage in effective thought so that they can move their body and control bodily functions, and are able to reproduce. The next dimension is social health and is represented by four aspects; context, dialogue, empathy, and intimacy. Interdependence is an important part of social health. A socially healthy individual has supportive relationships with those around them and shows a

concern for others, is able to adapt to changes within relationships and communicate effectively, and experiences intimate and trusting relationships. The third dimension presented by Hjelm (2010) is emotional health which is represented by four aspects; mindfulness of emotions, experiencing the spectrum of emotions, regulation and self-control of emotions, and utilisation of emotions. An emotionally healthy person is able to recognise their emotions when they are felt, can experience a range of emotions, realises that their emotions have consequences, and seeks to use them in ways that facilitate rather than hinder their life, relationships, and personal goals. These three dimensions represent those from WHOs landmark definition of health, however, Hjelm (2010) also includes intellectual and spiritual dimensions in his model of health.

Intellectual health is represented by the acquisition, comprehension, and application of knowledge (Hjelm, 2010). An intellectually healthy person is able to think and learn, they can accumulate discrete facts but also form concepts and principles, can understand and provide a context to the information acquired, and then apply this information to analyse situations and make connections and consider consequences and alternatives. Lastly, Hjelm (2010) incorporates the dimension of spiritual health, which consists of three components; character and virtue, meaning and purpose, and connectedness. A spiritually healthy individual recognises a purpose in life and that there is something greater than themselves which gives meaning to their life, they care about and feel a sense of belonging and connectedness to the world around them, and their concerns promote a need to behave appropriately and honestly.

The conceptual model proposed by Hjelm (2010) views each dimension of health as important for the individual and suggests that when all dimensions are functioning well, they contribute to the individual experiencing their highest level of health. However, the fluidity of health is also recognised in that at any one time, one or more dimensions can be impaired and affect the health of the individual. Equally, changes in one dimension can impact on other

dimensions. We believe that this dynamic, multidimensional view of health is important for enabling young people to be able to engage in self-care and make informed choices about, and for, their health both now and in the future. Yet despite the longstanding interest in children's understanding of health and the established history of a multidimensional conceptualisation of health, research has typically failed to go beyond a trichotomous conceptual lens.

Children's Understanding of Health

At school in the UK, children aged 9-11 years learn about a broad range of health-related issues and topics, which cover many of the dimensions of health (Council for the Curriculum, Examinations and Assessment [CCEA], 2007; Department for Education [DfE], 2013; Education Scotland [ES], 2021; Welsh Assembly Government [WAG], 2008). A wide variety of school subjects are involved with the teaching of health (e.g., Science, Physical Education, Design and Technology, and Personal, Social, Health and Economic Education [PSHE]) and while most of the topics at this age are centred on the physical dimension of health (e.g., body functions, exercise and physical activity, diet and food, and hygiene), there are many topics and issues that relate to the other dimensions of health. Examples of such topics include the following: empathy and relationships (social health); moral and spiritual development (spiritual health); mental health and well-being (emotional health); and making healthy choices (intellectual health) (CCEA, 2007; DfE, 2013; ES, 2021; WAG, 2008).

However, a critical mass of literature on children's understanding of health suggests that children have a limited, reductive view of health that is dominated by the physical dimension and characterised by inaccuracies and inconsistencies (see Burrows & Wright, 2010; Harris et al., 2018). Interestingly though, much of this research has been situated within the global crisis about obesity and inactivity in children and within the context of sport and physical education (Brusseau, Kulinna, & Cothran, 2011; Burrows et al., 2009; Daigle et al., 2007; Powell & Fitzpatrick, 2015; Wright & Burrows, 2004), which themselves lend a corporeal lens

to the context of understanding health. Consequently, researchers in this literature have been interested in a range of physical concepts in their attempt to understand what children know about health. In addition to direct questions about what does health mean and what does it mean to be healthy, researchers have also explored children's understanding of terms such as fitness (Placek et al., 2001; Harris, 1993, 1994; Harris et al., 2018), physical activity, exercise, or being active (Brusseau et al., 2011; Harris et al., 2018; MacDougall, Schiller & Darbyshire, 2004; Sleap & Wormold, 2001; Trost et al., 2000), as well as their health-related fitness knowledge (Hoppel & Graham, 1995; Keating, Harrison, Dauenhauer, Chen, & Guan, 2009; Kulinna, 2004) and knowledge of physical activity guidelines (Roth & Stamatakis, 2010). These concepts are undoubtedly located within the physical dimension of health but from Hjelm's (2010) perspective these concepts are associated with only the movement element of this dimension. Moreover, any reference to the multidimensionality of health within this research has been associated with the WHOs definition of health rather than broader models of health (Donatelle, 2006; Edlin & Golanty, 2007; Hales, 2009, Hjelm, 2010; Insel & Roth, 2004). It would, therefore, appear from this literature that not only is children's understanding of health limited and dominated by the physical dimension but also the context and focus of a significant amount of research that purports to explore children's understanding of health.

Nevertheless, within this literature, evidence focusing on exploring the concept of health specifically shows that across the world children have consistently demonstrated a preoccupation with diet and exercise as a means to being healthy and have confused aspects of fitness, appearance, the body, and weight with being healthy at all stages of childhood (e.g., Burrows, 2010; Harris et al., 2018; Rail, 2009; Wright & Macdonald, 2010). Researchers in the UK (Harris, 1993; 1994; Harris et al., 2018), Canada (Rail, 2009), the US (Brusseau et al., 2011; Placek et al., 2001), New Zealand (Burrows et al., 2009) and Australia (Lee & MacDonald, 2010; Wright, MacDonald, & Groom, 2003) have all reported that the corporeal

focus and dominance of the physical dimension as well as inconsistencies and conceptual confusion are evident at both early and late adolescence. Interestingly, evidence from the UK suggests that there may be a plateau in early and middle adolescents' understandings of health as children aged 12 to 15 years reported similarly narrow views, misunderstandings, and misconceptions of health (Harris et al., 2018). This is notable as the developmental literature suggests that understandings of health should increase in sophistication and accuracy with age (Backett & Davidson, 1992; Myant & Williams, 2005). Yet such development appears to be missing and if we are to intervene to improve young people's understanding of health we need to know when this *apparent* plateau in understanding begins. We currently have little, if any, data to know when this phenomenon occurs as there is no evidence, within this physically contextualised literature, on UK children's understanding of health prior to adolescence.

Worldwide literature (Burrows, 2010; Burrows, Wright, & Jungersen-Smith, 2002; Burrows, Wright, & McCormack, 2009), however, has shown similarly limited understandings of health in younger children, with a dominance of the physical dimension, diet, and exercise. In New Zealand, expected developmental changes in understanding were observed, with children aged 11-12 years providing more holistic and detailed understandings, including more references to social and emotional health and the consequences of behaviours, compared to children aged 8-9 years (Burrows, 2010; Burrows et al., 2009). This is an intriguing perspective on the use of the term 'holistic', as the authors reported a dominance of responses in the physical dimension, with most about diet and exercise (70%) and less than 5% of responses being associated with social and emotional aspects (Burrows et al., 2009). Although, comparably their view is more holistic than those aged 8-9 years old, 11-12 year olds still reported a narrow view of health in relation to both the landmark definition of WHO and with regards to authors who have proposed five or more dimensions of health (Donatelle, 2006; Edlin & Golanty, 2007; Hjelm, 2010; Insel & Roth, 2004).

Beyond this physically contextualised literature, the developmental psychology literature has focused more explicitly on younger and older children's (i.e., early and middle childhood; 4-12 years) understanding of health in both UK and international samples (Eiser et al., 1983; Knighting, Rowa-Dewar, Malcolm, Kearney, & Gibson, 2010; Myant & Williams, 2005; Natapoff, 1978; Piko & Bak, 2006; Schmidt & Frohling, 2000). Even though similar findings regarding the dominance of diet and exercise as a means to being healthy are also evident (Eiser et al., 1983, Knighting et al., 2010; Natapoff, 1978; Piko & Bak, 2006; Schmidt & Frohling, 2000) and that the, albeit few references to psychological aspects of health disappeared from age 7 through to 12 (Myant & Williams, 2005), this literature appears to take a more optimistic view of children's understanding of health. It focuses on what children know, how their understanding increases in sophistication and accuracy with age (Backett & Davidson, 1992; Myant & Williams, 2005; Schmidt & Frohling, 2000) and rarely, if ever, describes it as limited or reductive. As with the previous literature, very few studies in this area situate their research within a definition or model of health even though they are seeking to explore children's understanding of health. One exception to this is the study by Piko and Bak (2006) who, akin to the physically contextualised literature, used WHOs definition of health to conclude that 8-11 year old Hungarian children reported a multidimensional perspective on health. This was despite similar findings being evident with an obvious dominance of the physical dimension and limited references to social and emotional health. Nevertheless, regardless of this overall more optimistic view, there is little, if any, research that has embraced a multidimensional conceptual lens that goes beyond the trichotomous dimensions to analysing children's understanding of health.

The Present Study

The aim of the present study was to explore what pre-adolescent children knew about health and being healthy and apply a broad multidimensional conceptual lens to this understanding.

Focusing on UK children aged 9-11 years we were interested in the content of their responses to questions about what the term health meant and what it meant to be healthy. We used a two phase approach to our study, firstly, using an inductive approach, we sought to discover what understandings of health emerged in children's responses. We then used a deductive approach to apply Hjelm's (2010) conceptual model of health to explore the multidimensionality of pre-adolescent children's understandings of health. In light of the UK evidence (Harris et al., 2018) which shows that misunderstandings and a dominance of the physical dimension of health exists in adolescent samples, we did not expect pre-adolescent children to demonstrate a multidimensional understanding of health. It was likely that their understandings would also be dominated by the physical domain and a focus on diet and exercise. However, as understanding is argued to develop in accuracy and sophistication with age (Backett & Davidson, 1992; Myant & Williams, 2005; Schmidt & Frohling, 2000) it is important to explore what understanding is evident at pre-adolescence so that we can ascertain whether this appears to develop or stagnate during the adolescent years. This data is critical to informing the content and timing of health education programmes for young people and ensure their transition to being health literate adults.

Method

Sample and Procedures

Forty-six students (males $n = 25$; females $n = 21$) from two classes in a state primary school located in East England, United Kingdom participated in the study. Students were recruited from school years five ($n = 21$) and six ($n = 25$) and were aged nine to eleven years old ($M = 10.1$ years, $SD = 0.73$ years). Although ethnicity data was not formally recorded, the majority were White British. Participants were being taught in mixed ability, mixed sex classes at the time of data collection (March) and had been taught by the teacher since the start of the school year (September).

Procedures followed the guidelines of the British Psychological Society and were approved by the ethical advisory committee of the lead authors' institution. Consent for the school and class to participate in the study was sought from the head teacher and class teachers. Following which a trained research assistant visited the school to speak with the class teachers and students about the research project and answer any questions. Parental information sheets and consent forms were distributed by the class teachers. Parents were given a two-week period to return the consent form to the teacher if they wished for their child to participate in the study. For those students whose parents agreed they could participate in the study an informed assent process was completed on the day of data collection to allow individual students to opt-in or out of participating in the study, irrespective of parental consent being given.

Data was collected during a normal classroom lesson. Topics or subjects that may have involved content about health and a focus on the body such as science or physical education were avoided to remove any potential bias towards the physical dimension of health. The research assistant introduced the students to the purpose of the study and highlighted that: 1) participation in the study was voluntary; 2) they could withdraw at any time before submission of the anonymous questionnaire; 3) they could stop at any time; and 4) choose not to answer a question if they did not want to. Students were reminded there were no right or wrong answers and that all answers would be anonymous and remain confidential. Any questions the students had were answered by the research assistant who was also available to help students with reading the questions. The questionnaires were given out by the research assistant and children were given as much time as they wanted to answer the questions with most children completing the questionnaire within 15 minutes. Students who had not been given parental consent to participate in the project or who had not given informed assent completed a normal classroom activity with the teacher while the data was being collected.

Measures

A short questionnaire was created for children to record their responses to two questions about health. Students provided demographic information such as their age, year group, and gender and completed two open-ended questions: 1) Write down what you think the term 'health' means; and 2) Write down what you think it means to be healthy. Students were told that answers could be presented as words, sentences, or with images to accompany them if they wished. All students chose to provide their responses as words or sentences.

Data Analysis

Responses for each participant were collated into a raw data sheet for each question by the third author with separate sheets created for the overall sample, by gender, and by year group. The first part of the data analysis involved an inductive approach and followed the six thematic analysis principles of Braun and Clarke (2006). Each question was analysed separately at the overall, gender, and year group levels. Responses were read and re-read to create familiarisation with the data and to identify the patterns of responses that were emerging. Based on these pattern of responses, preliminary codes were assigned to the data that described the content of the children's responses to the question. Following which these preliminary codes were grouped together into candidate themes which depicted significant characteristics of the data and represented higher-order patterns in the data (Braun, Clarke, & Weate, 2016). The themes were named and reviewed in relation to the extracts that would exemplify them. To ensure trustworthiness of the data, the second author completed a review of the data analysis by reading the raw data, checking the assigned code, and the higher-order thematic grouping. Discussions between the two authors resulted in either consensus regarding the coding and thematic content or changes until consensus was reached. The first author provided a review of the final codes and themes.

The second phase of the data analysis took a deductive approach using Hjelm's (2010) conceptual model to explore pre-adolescent children's understanding of health. The third

author coded the responses of the children according to the sub-categories and dimensions of health outlined in the model. As with phase 1, the second author provided a review of the analysis and the first author a final review of codes and themes to ensure the trustworthiness of the data. The meaning units used to illustrate the themes and sub-themes in our analysis were selected across different participants.

Results

Understandings of Health: A Multidimensional Perspective

In the deductive phase of analysis, of the 69 statements generated by children in response to what the term 'health' meant, 56 could be coded for their content in relation to Hjelm's (2010) multidimensional model of health. The 13 statements made by children that did not relate to health could, therefore, not be scrutinised using Hjelm's multidimensional model of health and were removed from the deductive phase of the analysis. All 56 statements that could be analysed were coded as belonging to the physical dimension of health and were specifically considered to be part of the movement sub-category of this dimension.

Exploring Understandings of Physical Health

In the inductive phase of the analysis, a total of 69 statements for the question about what the term health meant were coded for their content. These statements resulted in 13 lower-order codes being generated that represented five higher-order themes: 1) Being well, physically active, fit, and healthy; 2) Healthy eating and body composition; 3) Physical activity examples; 4) Physical activity characteristics and; 5) Unsure or ambiguous. There were some observable differences (>5%) in the responses of males and females and in children in Year 5 and Year 6 to this question, these are detailed where appropriate in our analysis [1].

Theme: Being Well, Physically Active, Fit, and Healthy

The majority (42%) of statements coded referred to this thematic category with 79.8% of children's responses in this theme including ideas that were related only to this theme. Nearly

half (48.7%) of all Year 6 children's statements were related to this theme compared to a third (33.3%) of Year 5 children's.

The most popular reference was to *physical health* (14.5%), of these responses 80% were provided by Year 6 children with these showing a greater focus on the body than Year 5 children. Example responses included, 'if your body is ok or not', '…what's inside you', 'to look after you and your body', 'be good to your body' and '…how your body is coping'. The Year 5 responses were to some extent different to these, being quite superficial referring to 'it means like physical health', while another made a specific, but not elaborate, reference to hygiene in their response.

Being well, an absence of illness or disease accounted for 8.7% of responses in this thematic category, of which two thirds (66.7%) of responses were made by Year 6 children. They referred to being 'fit and well', 'your medical and body health', 'to be medically well', and 'health is basically just what helps you to live because if your [*sic*] not healthy it increases your chance to get disease'. Year 5 children referred to 'not being ill' and 'being in good health and well'.

Within this theme children also referred to *being physically fit* (7.2%) and being *active* (7.2%) with 60% of responses in each code being generated by Year 6 children. Children referred to terms such as 'staying fit…', 'to keep your body fit…', and 'getting fit and healthy' and phrasing such as 'staying active' or 'keep yourself active' to help explain what they understood by the term health.

Other references included to the general idea of *well-being* (2.9%), 'it means that you are well-being and eating a balance of sugar and fruit and veg' and 'health means how your well-being and body is doing so if you have a healthy body you might not have a healthy well-being'. A specific *physical attribute* (1.4%) was mentioned by one Year 5 child, 'I think it means how much strength you have'.

Theme: Healthy Eating and Body Composition

This was the second most popular theme (30.4%) for children's responses to what they understood by the term health, with 65% of children's responses in this theme also including ideas that were related to other themes too. Year 5 children (40%) were more likely than Year 6 children (21.3%) to refer to this theme to help them explain what they understood by the term health.

Most of the statements in this theme referred to *healthy eating and a balanced diet* (29%), with 60% of these being generated by Year 5 children. There were limited differences in the phrasing or content of the statements with both year groups having both general and specific statements about diet and food. For example, general references included to 'eat good food', 'eating salad', 'eating the right things', and 'eat healthy' or 'don't eat junk food' while more specific references referred to 'eat good foods like vegetables', 'eat healthy food and not bad food like crisps and chocolate', 'it's when you don't eat lots of sweets but more veg than usual', and 'eating a balance of sugar and fruit and veg'.

Year 6 children's responses referred to the amount of food that should be eaten, for example 'eating the right amount of fruit and vegetables', and 'eat the right foods like fruit and vegetables often.' One Year 5 child alluded to water in their answer, alongside reference to the nutrients of food but could not articulate it clearly 'health means what your food is high in health or low in health same with water…'.

The other category in this theme that emerged was *body weight and composition* (1.4%). This was only mentioned by one Year 6 student who described the term health as 'having a good weight and not being fat'.

Theme: Physical Activity Examples

The third theme that emerged reflected 8.7% of the content of children's responses to what they understood by the term health. Females (11.8%) generated more physical activity

examples than males (5.7%) in their responses to help explain what they understood by the term health. Common responses included generic references to 'exercise' or 'sport' with only one specific example of 'running' provided.

Theme: Physical Activity Characteristics

A fourth theme that represented more specific characteristics of physical activity also emerged (5.8%). There were references to the *frequency and time element* (4.3%) of physical activity in relation to their understanding of health. However, these were non-specific references such as '…and do a fair time of exercise to keep your body in a healthy state', 'how much exercise or physical activity you do to keep healthy', and 'where you do lots of sport so your (sic) healthy…' The idea of *being outdoors* (Also within this theme was the idea of *being outdoors* (1.4%) also featured in this theme, although this was a generic comment about health being about 'going outside and doing stuff'.

Theme: Unsure or Ambiguous

The final theme contained 13% of children's responses, with 4.3% of responses stating that they explicitly did not know what health meant and 8.7% providing ambiguous responses. Year 6 and male children were more likely to say that they were unsure what the term health meant, while Year 5 and male children were more likely to provide an ambiguous answer. These latter responses included those that could be considered tautological, for example 'it means being healthy and not unhealthy' or used the term healthy without further elaboration, for example 'I think it means to stay healthy', '…what's inside you and your life and being healthy' or 'health is being healthy or however you would describe it'. They also included responses in which the coders could not clearly discern a category or focus such as, 'it means you don't treat yourself badly' or 'living well'.

Understanding Being Healthy: A Multidimensional Perspective

In this deductive phase of analysis, of the 85 statements generated by children in response to what it means to be healthy 71 could be coded for their content in relation to Hjelm's (2010) multidimensional model of health. The physical dimension dominated with 97.2% of responses, while the emotional and social dimensions reflected 1.4% each. All of the statements coded as the physical dimension of health were specifically considered to be part of the movement sub-category of this dimension.

Exploring Physical, Social, and Emotional Understandings of Being Healthy

In the inductive phase of the analysis, a total of 85 statements were coded for the content of children's responses to the question about what it meant to be healthy. These statements resulted in 13 lower-order codes being generated that represented six higher-order themes: 1) Healthy eating and body composition; 2) Physical activity examples; 3) Being well, physically active, fit, and healthy; 4) Physical activity characteristics; 5) Unsure or ambiguous and; 6) Social and emotional. There were some observable differences (>5%) in the responses of males and females and in children in Year 5 and Year 6 to this question, these are detailed where appropriate in our analysis.

Theme: Healthy Eating and Body Composition

This was the most popular theme (45.9%) for children's responses to what it means to be healthy, with 68.6% of these responses also containing reference to ideas associated with other themes with half of these (51.4%) being about doing exercise or being active. Over half (55.8%) of the responses from males to this question contained ideas relating to this theme compared to approximately a third (35.7%) of females.

Most of the statements in this theme referred to *healthy eating and a balanced diet* (41.2%), with males generating 60% of all responses. The statements contained both general and specific statements about diet and food. A common general response was to 'eat good foods' or to have a good diet or eat healthy foods. Children also provided examples of food to

help illustrate what they understood about what it means to be healthy. Fruit, vegetables, and salad were commonly mentioned, but also other specific foods or descriptions of food such as '…having your 5 a day', 'to not have lots of fat in your food', '…if you are not eating a lot of sugar and to eat vegetables and healthy food', 'don't eat junk food', or 'to eat healthy food such as vegetable, rice, curry, and more'. One child phrased it as to 'eat disgusting food'.

Some references were made to the amount or balance of food through statements such as '…to have a balanced diet', 'eating the correct amount of each food groups' or '…the right nutrients and vitamins that you need'. One child mentioned protein and minerals, '…if you are unhealthy this means you are not eating enough protein…. Protein is very good for health and minerals is good for your bones and keeps your body healthy.' While another child was able to articulate the need for balance in the diet through the description, 'You need to eat carrots and you can still eat other treats like chocolate and hot-dogs. But stay healthy (not all the time)'.

Other statements in this theme focused on *body weight and composition* (4.7%), with males providing 75% of these responses. They referred to 'having a good body', 'having a good weight and not being fat', and 'it's good to be healthy because you won't be fat'.

Theme: Physical Activity Examples

The second theme that emerged reflected 20% of the content of children's responses to what it means to be healthy. Year 5 children (23.7%) generated slightly more responses in this theme than Year 6 children (17%). Both year groups mostly referred to 'doing exercise', one child provided an example such as '…going to the gym'.

Theme: Being Well, Physically Active, Fit, and Healthy

This was the third most popular theme (14.2%). Year 6 children (19.1%) were more likely than Year 5 children (7.9%) to generate responses in this theme, as were females (21.4%) when compared to males (7%). Responses in this theme referred to *being active* (4.7%) through use

of generic phrase such as 'to be active' and *being physically fit* (4.7%), for example 'keeping fit', '…and your body is fit', and '…stay very fit'.

Other references in this theme were to *being well, an absence of illness or disease* (3.5%), with statements such as 'to be medically well', and 'not being ill' and to *physical health* (1.2%), for example 'to be healthy means your body is fine, your health is high and your heart is normal'.

Theme: Physical Activity Characteristics

A fourth theme that represented more specific characteristics of physical activity also emerged (11.8%). References in this category reflected a focus on the *frequency and time element* (8.2%) such as '…and do a fair time.', '…doing enough exercise' or '…doing lots of exercise' or *being outdoors* (3.5%), 'to go outside'.

Theme: Unsure or Ambiguous

The fifth theme contained 5.9% of children's responses, with 1.2% of responses stating that they explicitly did not know what health meant and 4.7% providing ambiguous responses. These latter responses included things such as 'to do healthy things' or '…doing good things for your body'. Females provided all of the unsure responses to the question and 75% (n = 3) of the ambiguous responses.

Theme: Social and Emotional

The final theme that emerged contained 2.4% of the responses to what it means to be healthy. Two children included this theme in their response with one referring to 'making friends…' and the other 'it means you are happy…'.

Discussion

The current study explored UK pre-adolescent children's understandings about health and being healthy and situated these within a quintuple multidimensional conceptual lens. We established that a plateau in children's understanding about health may begin as early as pre-

adolescence. Children aged 9-11 years old demonstrated a limited understanding of health and what it means to be healthy that was consistent with understandings seen in early and middle adolescents in the UK (Harris et al., 2018) and younger samples worldwide (Burrows, 2010; Burrows et al., 2009; Piko & Bak, 2006). Moreover, we established that pre-adolescent children exhibited narrow views about health and being healthy in relation to established multidimensional conceptual models. We, therefore, develop the current literature on children's understanding of health by: (1) establishing that pre-adolescents' multidimensional understanding of health is limited not only to the physical domain but specifically to the movement category of this dimension of health; and 2) identifying the first evidence in a UK sample that the *apparent* plateau of understanding seen in adolescence extends to pre-adolescence.

Applying Hjelm's Multidimensional Model of Health

The application of Hjelm's (2010) multidimensional model of health demonstrates that the concerns around young people's limited understanding of health is a more substantial issue than previously considered. Our data shows that children's views about physical health are even narrower as they were confined to a focus on the movement category within this dimension. Although emotional and social dimensions of health did appear in the pre-adolescent's responses about being healthy, we contend that this did not constitute enough to conclude that our pre-adolescents demonstrated a multidimensional or holistic understanding of what it means to be healthy.

Our findings are consistent with previous research (Burrows et al., 2009; Harris et al., 2018; Pika & Bak, 2006) which interestingly do use descriptions of 'more holistic' or 'multidimensional' understandings to describe similar findings. Future research in the area should be cautious about using such descriptions when evidence of multidimensionality is limited, and it should move beyond WHOs definition of health to consider children's

understanding of health. We suggest that a broad and wide-ranging understanding of health can only be beneficial to young people and their future health and lifestyle choices. An understanding of health that goes beyond the physical and incorporates more than just behaviours such as diet and exercise that are used to manipulate weight is needed. We want children's understanding of health to reflect more than the currently prevalent healthism discourse (Clark, 2018; Crawford, 1980; Gray, MacIsaac, & Jess, 2015). To achieve this, health education curriculums and health promotion campaigns need to broaden and strengthen their messages across the dimensions of health to overcome this prevalent healthism discourse. Moreover, social agents involved in developing children's understanding of health need to consider a multidimensional perspective of health when supporting children to understand about health, what it means to be healthy, and the lifestyle choices they make.

Children's Understanding of Health: Trajectories and Plateau

Our data suggests that the *apparent* plateau in understanding observed in adolescent samples (Harris et al., 2018) is a more worrying issue than previously identified. The descriptions and ideas about health and being healthy of the children in our study show a similarity with those of early, middle, and late adolescents (12-18 years) in the extant literature (Burrows et al., 2009; Harris et al., 2018; Lee & McDonald, 2010). From a developmental perspective one would expect to see young people's understandings of health increase in sophistication and accuracy across the pre-adolescent to adolescent years (Backett & Davidson, 1992; Myant & Williams, 2005; Schmidt & Frohling, 2000). However, this difference was not evident when comparing our data to previous literature. Future longitudinal studies are needed to corroborate and explore this finding by examining the trajectories of children's understandings of health across childhood.

Additionally, it appears that Year 6 may be a critical time for our young people in their understandings of health. Year 6 children (aged 10-11 years) were more likely to make an

explicit reference to 'the body' when describing their understanding of health but such references were not explicit in Year 5 children's descriptions about health. This parallels the findings from previous research in this area where this emphasis is also evident (Burrows & Wright, 2004; Harris et al., 2018). Years 5 and 6 (aged 9-11 years) may, therefore, be an important stage at which to intervene to counteract the start of this explicit emphasis on the body and its association with health. One such intervention could be through what is taught in schools as current UK curricula may be contributing to such a focus on the body. For example, the National Curriculum in England Science Programme of Study (POS) for Year 6 children uses phrasing that emphasises a focus on the body in relation to health through learning about how things (diet, exercise, drugs, and lifestyle) affect how their body functions and what they can do to keep their body healthy (Department for Education, 2013). While we appreciate that this is an important area of learning about health it may be contributing to the corporeal focus of health demonstrated in these pre-adolescent children. Schools may want to consider introducing additional learning in relation to topics which focus on some of the other dimensions of health (i.e., emotional, social, spiritual, and intellectual health) to redress the balance; thereby, emphasising a holistic approach to health education.

Interestingly, the same POS also identifies drugs and lifestyle alongside diet and exercise as key areas of learning, yet pre-adolescent children identified only diet and exercise as the main behaviours that were associated with health and being healthy. This parallels the data on adolescent children (Harris et al., 2018) and further emphasises the limited development in young people's understandings of health and the extension of a plateau in understanding to an earlier point in childhood. It is perhaps not surprising that diet and exercise feature in children's understanding so strongly as they are the prominent aspects of the Change4Life (Chalkley & Milton, 2021) social marketing campaign to tackle obesity. While it is important that children understand the importance of diet and exercise for their health, this

seems to be at the expense of other areas of health. Even if other aspects of health are being taught as part of the POS they are not at the forefront of young people's thinking about health and being healthy. Moreover, this focus on diet and exercise in relation to health may have a detrimental effect as a preoccupation with diet and exercise is known to be a characteristic of individuals with eating disorders (Larson, 1989; Worobey & Schoenfeld, 1999), which have a peak period of onset during the adolescent years (Stice, Marti, & Rohde, 2013).

Furthermore, even though diet and exercise were a dominant feature of children's understanding about health, our data suggests that what pre-adolescents' know about diet and exercise could be considered superficial and potentially problematic. For example, some children were able to identify the need to eat a balanced diet, yet they did this by using descriptions which indicated that food has a moral value (Jutel, 2005). These descriptions reflected their understanding of healthy versus unhealthy foods such as eating the right foods or good foods and avoiding bad foods. While it is argued that labels such as these are designed to help individuals make appropriate choices when it comes to their diet, the application of the labels to foods enables the individual to choose their food based on the individual food rather than the larger context of their diet and lifestyle. For example, considering aspects such as what have I eaten today, how active have I been, and what is the nutritional value of this food in my total nutritional intake for today. Moreover, the labelling of foods in this way may also lead to future problems and long-term issues with dieting and weight (Julia et al., 2021; Jutel, 2005). It can promote a negative relationship with food, in that food becomes something that helps the individual to feel good or bad about themselves by whether they have eaten 'good or bad foods' or encourages them to crave foods that are often restricted as they have been labelled as 'bad' (Julia et al., 2021; Jutel, 2005). We need to consider how the curriculum can support what we want our children to learn about their health, being healthy and how they make choices about their diet and other health behaviours.

Our data shows that pre-adolescent children were able to recognise the need to be active as part of health and being healthy, but they were unable to provide specific examples of how much activity they should do. Where the frequency or time element was identified it was often in relation to 'lots' with no specific details of either frequency or time. This is perhaps not surprising since previous research on children's understanding of the physical activity recommendations in England found that only 11% of 11-15 year olds knew how much physical activity they should do (Roth & Stamatakis, 2010). Yet it indicates that key messages from campaigns such as Change4Life may not be at the forefront of young people's minds. In light of the continued concerns over the decline in adolescents' physical activity levels and the associated consequences (WHO, 2020), it would seem important for pre-adolescents to know they should be active for an average of at least 60 minutes per day across the week and to be able to articulate this in relation to their health and being healthy (Department of Health and Social Care [DHSC], 2019). This is particularly so for girls who in previous research demonstrated a positive relationship between knowledge of the guidelines and meeting the guidelines (Roth & Stamatakis, 2010). Interestingly, despite the increased focus on the effects of sedentary behaviour on health in recent years and their inclusion in the physical activity guidelines for children of this age (DHSC, 2019), no references to the need to avoid sitting for prolonged periods were made by the pre-adolescent children in the study. This guidance on physical activity and sedentary behaviour is important for young people to know as they approach adolescence so that they can make informed choices about their lifestyle.

Conclusion, Limitations and Future Research

This study makes an important and unique contribution to the health education literature by providing an insight into pre-adolescent children's understanding of health and being healthy. However, further research is needed to corroborate and extend these findings. Future research may also wish to address the limitations of the current study which include its cross-sectional

design and focus on a single point in childhood. Although, our findings suggest that the *apparent* plateau in children's understanding of health extends into pre-adolescence (9-11 years) further work is needed in establishing children's understanding of health and what it means to be healthy in early childhood (4-8 years). We would recommend that future research efforts using a multidimensional conceptual lens explores children's understanding of health in this age range using appropriate research methods for collecting this data (e.g., visual, audio, and kinaesthetic techniques). Moreover, longitudinal research is needed to explore changes in individuals understanding across childhood and the factors associated with both positive and negative changes in children's understandings. These will seek to ascertain whether the *apparent* plateau in children's understanding of health begins to develop during this earlier age range (i.e., 8 years and below). Present findings also suggest that children's understanding of health is limited to the movement category of the physical dimension of health. These empirical findings require verification in larger samples, so that the content and timing of effective health education programmes can be developed. There is also a need for research to go beyond WEIRD (Western, educated, industrialised, rich, and democratic) populations (Rad, Martingano, & Ginges, 2018). Such endeavours will collectively assist in supporting children across the world to develop a holistic multidimensional perspective of health and enable their transition to health literate adults.

Endnote

[1] We highlight observable differences in the percentages for males and females or Year 5 and Year 6 children when the difference between the percentages for the categories was greater than 5%.

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Development of a *Men's Health* Course for First-Year Undergraduates Using Culturally Responsive Teaching Strategies

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ABSTRACT

Purpose

A novel first-year experience course was developed using culturally responsive teaching strategies at an undergraduate liberal arts college in the southeastern USA to promote health advocacy and to provide students with an overview of male health. The course focuses on the biological, socio-cultural, economic, and gender influences that shape men's health beliefs and practices. It also emphasizes health disparities in the USA among Black/African American men compared to other racial groups and intervention strategies to improve health outcomes.

Design/methodology/approach

The lecture and laboratory components of the course were designed as a blended learning environment with a modified flipped class model. Culturally relevant strategies guided the course design with three focus domains: academic success, cultural competence, and sociopolitical consciousness. A community engagement model and service-learning activities were also incorporated in the design. We used course grades to gauge learning and implemented a survey to assess students' perception of the knowledge gained in three realms: men's health, health sciences, and physical sciences.

Findings

This report describes the course design, highlights the value of using culturally responsive teaching strategies, and service-learning projects to encourage students' active learning. Course activity examples are discussed with student responses. We found that students'

perception of their knowledge in men's health, health sciences, and physical sciences increased and the students performed well in the course.

Originality/value

This is one of few biology courses in the nation that intentionally focuses on the unique health challenges of Black men, while empowering college students to develop culturally competent strategies to improve their health outcomes. Our findings suggest that the students learned the material and that their perceived knowledge on men's health increased. We urge other academic institutions and healthcare providers to consider implementation of similar courses in an effort to enhance male health equity.

Background and Rationale

Women and men experience health differently and show distinct rates of mortality and disease incidence across nearly all age groups, with further heightening of these disparities among racial groups. Men and boys in every age group have higher death rates than women and girls for each of the 15 leading causes of death except Alzheimer's disease, but the largest gap is between college-aged men and women (Courtenay, 1998; Davies et al., 2000). Further, in the USA alone, men live five fewer years than women and about seven years worldwide, with elderly men being outnumbered by older women by several million (Pinkhasov et al., 2010). The health disparities among Black/African American men are striking: they are 30% more likely to die from heart disease and 60% more likely to die from stroke than are non-Hispanic White men (CDC, 2021). Additionally, HIV is one of the top 10 killers of Black/African American men, and Latino men also have higher HIV-related death rates compared to White men (Rhodes et al., 2006; Sanchez et al., 2006; Villarosa, 2019; Whitehead, 1997). Although it is well known that lung and prostate cancers are responsible for most cancer deaths in men, the rates of prostate cancer and related deaths in Black/African American men are among the highest in the world (Chu et al., 2003; Woods et al., 2004).

Exactly why men suffer higher rates of morbidity and mortality is not entirely clear. Research suggests that a leading reason for the "longevity gender gap" between men and women is that men do not take care of themselves as well as women do, and that men generally lead less healthy lifestyles (Aviv, 2007; Pinkhasov et al., 2010). For example, minority men are less likely to seek preventive care and to have access to quality health care when they fall sick (Blendon et al., 1989; Cheatham et al., 2008;

Council on Ethical and Judicial Affairs, 1990; Ginzberg, 1991). It is also important to note that racism and historical oppression have created barriers of mistrust for many people of color of the healthcare system, further challenging the maintenance of good health (Cheatham et al., 2008; Kennedy et al., 2007; Woods et al., 2004). Although systemic racism and mistrust are not easily addressed, raising awareness about men's health and racial disparities as well as educating men on lifestyle changes that significantly lower risk of death from many of the leading causes of morbidity and mortality are attainable and needed to change health outcomes for men.

Biological differences between men and women contribute to many sex-specific illnesses and disorders (Ngun et al., 2011; Pardue and Wizemann, 2001). 'Men's health' are the distinct health concerns that stem from biological sex differences, such as reproductive system and sexuality (Ngun et al., 2011; Pardue and Wizemann, 2001). More broadly, men's health is defined as the holistic management of health conditions and risks that are most common or specific to men in order to promote optimal physical, emotional and social health.

While male health education is not new, courses and workshops targeted at male students are rare. Previous work aimed at identifying content and strategies for developing health advocacy skills has focused on elementary, middle, and senior high school students, but not on males specifically (e.g., Herlitz et al. 2020). Other research explored non-conventional options, such as barbershops, which show a promising avenue for male health education (Randolph et al 2017; Sutton et al. 2021). Although higher education institutions provide an excellent opportunity to reach young men, none to our knowledge, offer a course that focuses on male health issues from scientific and

sociopolitical perspectives. Here we outline the development of a general education college health course titled: *Men's Health*, **the only one in the nation that focuses intentionally on gaining a deeper understanding of the unique health challenges of Black/African American men, and that seeks to inform and empower college male students to develop culturally competent strategies and solutions to improve their own health outcomes and those of their community by engaging in active and service learning.**

Educational Setting

Morehouse College (Morehouse) is a private historically Black men's liberal arts college. Like most colleges and universities, Morehouse requires students to complete general education courses in fields outside of their area of study making up one-quarter to one-third of a student's academic program. As such, general education science courses are populated by students with a diversity of attitudes and experiences with science and health. There is the potential then for collegiate general education science courses, both at Morehouse and elsewhere, to serve as avenues to broadly improve scientific literacy and health advocacy. The *Men's Health* course was also intentionally designed as a general education First Year Experience (FYE) course targeting students in their first two years of college, and transfer students. FYE courses have been shown to have an overall positive impact on the academic performance, persistence, and graduation rates of students (Lang, 2007). It is important to note that this biology course is not intended to replace qualified medical and professional consultation. We emphasize this point at the beginning of the semester and provide the students with information to

the college health center as well as Disclaimer and Disclosure statements (see Supplementary Material).

Course Design and Content

Instructional material in this biology course introduces students to the concepts of male health beyond a traditional focus on the reproductive and urinary system, to a biological sex and gender-focused view of the unique health needs facing boys and men. The course emphasizes a holistic view of the physical, mental, emotional, social, and spiritual life experiences and health needs of men throughout their lifespan. As students gain knowledge and understanding, the course presents opportunities for students to apply their value systems to decisions concerning their own health. The course is designed with no pre-requisites as a one-semester lecture and lab, with lab as a required co-requisite.

We designed the course using “backwards design” and Bloom’s Taxonomy to develop the intended course learning outcomes (Table I), associated class activities, and assessments (Huitt 2011; Wiggins and McTighe 2005; Reynolds and Kearns 2017). Course development was initiated by Dr. Ethell Vereen and all authors contributed to designing activities and assessments. Based on student feedback and evaluations at the end of each semester, we adjusted course materials accordingly. This led to the overarching course goal: as a result of successfully completing this course, students should develop the knowledge and skills they need to make healthy decisions, gain enhanced appreciation for the scientific process, and develop communication skills that allow them to demonstrate healthy choices with respect for self, family, and others.

The lecture and laboratory component of the course were designed as a blended learning environment that specifically utilized a modified flipped class model (Bergmann and Sams 2012; Sohrabi and Iraj 2016; Akcayir and Akcayir 2018). Flipping the classroom, or 'inverted teaching' is a response to the idea that class time can be used to engage students in learning through active learning techniques, rather than through delivering lectures alone (Bergmann and Sams 2012). Flipping the classroom is the process of replacing traditional lectures with more student-centered learning strategies, such as active learning, discussions, problem-based learning, and other forms of group work and peer instruction (Bergmann and Sams 2012). Content delivery is moved outside of the classroom through videos, case studies, or pre-class readings and students are responsible for completing assigned material prior to class meeting (Bergmann and Sams 2012). The interactive and inquiry-based teaching techniques are the basis of the flipped classroom model and have been shown to enhance learning (Galindo-Dominguez, 2021; Crouch and Mazur, 2001; Deslauriers et al., 2011). Additionally, students report that they prefer courses that have a blend of online and face-to-face components (Dahlstrom and Bichsel, 2014).

Culturally Responsive Teaching

We intentionally included culturally responsive teaching throughout the course. While no single teaching strategy consistently engages all learners, culturally responsive teaching places students' cultures at the core of the learning process and utilizes the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students in all aspects of learning (Gay, 2018, 2014; Ladson-Billings,

2014, 1995). Culturally relevant strategies have guided the design of this course and continue to be refined to engage diverse students. The three major domains of focus are: academic success, cultural competence, and sociopolitical consciousness (Ladson-Billings, 2014, 1995). Briefly as defined by Ladson-Billings, these domains can be described as (1) *academic success*, or the intellectual growth that students experience as a result of classroom instruction and learning experiences; (2) *cultural competence*, or the ability to help students appreciate and celebrate their cultures of origin while gaining knowledge of and fluency in at least one other culture; and (3) *sociopolitical consciousness*, the ability to take learning beyond the confines of the classroom using school knowledge and skills to identify, analyze and solve real-world problems.

The *Men's Health* course includes a broad series of lectures and lab activities that offer a variety of modalities for student engagement, content retention, and assessment towards achieving academic success. Formative and summative assessments are used to allow both instructors and students to monitor progress towards achieving learning outcome and to identify misconceptions and learning gaps. As an example, each unit contains a series of lessons that include introduction of content, scholarly activity for demonstration of content, and a quiz. Formative assessments such as these have been shown to bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply only to final grades (Trumbull and Lash, 2013). The course includes end of unit exams, a group course project, and a final exam. For examples of assessment used in the course see Supplementary Materials.

Because guest lecturing programs have been shown to improve students' applied learning and engagement (Li and Guo, 2015; Rowland and Algie, 2007), the *Men's Health* course design intentionally includes the participation of professionals and subject matter experts. These guests were invited to share their professional insights with students through a series of guest lecturers during class sessions, and outside classroom learning experiences, including departmental seminars. Invited professionals and subject matter experts have ranged from urologists, family physicians, mental health counselors, chefs and nutritionists, and health and wellness trainers or coaches.

Student group project

Cultural competence and sociopolitical consciousness are integrated throughout the course. They are further demonstrated in the culmination of this course, using the design thinking model, whereby students complete a group course project (3 or 4 students per group). Specifically, students conduct background research on a health issue of their choosing that is of particular concern to Black/African American men or other relevant groups (e.g., prostate cancer). Next, students identify and use publicly available datasets for federal, state, and local level to quantify measures of the disease or health issue, such as prevalence over time. Students use the data to describe the health issue occurrence in the population at the national level – USA, state level – Georgia, and local level – Fulton County, GA. Additionally, students include county level data for their own hometown. **International students are encouraged to use World Health Organization and international reports.* The group project intends to provide a deeper understanding of a

198 particular health issue and a practice of data visualization and communication skills via
199 infographic, Public Service Announcement (PSA) and a final presentation.
200 As part of the group project, students are also introduced to the Morehouse College
201 **"**Makerspace Exploration Center" (MakerSpace), a cooperative laboratory workspace
202 where students and faculty can design novel products, conduct research, and collaborate.
203 The center includes 3D printers, computers, equipment, and supplies to facilitate student
204 work. As part of the *Men's Health* course, students had the option to use the MakerSpace
205 to address a disease or a health problem. While some students created 3D print models
206 of human anatomical structures, others designed and created inventions, or improved
207 existing prototypes.
208 The service-learning component of this course invites students to go beyond
209 creating an infographic, PSA, or prototype, and to use their project and knowledge gained
210 for peer education and community engagement (for examples of student products see
211 Supplementary Materials). We use the barbershop model for community engagement.
212 Unlike other community settings, the barbershop, by its very nature, invites men of varied
213 backgrounds to engage in open, frank communication. Further, barbershops are now
214 recognized as valuable locations for community outreach targeting Black men to promote
215 health awareness and research (Ferdinand et al., 2020; Moore et al., 2016; Releford et
216 al., 2010). Therefore, the group project involves sharing the infographic, PSA, or
217 prototype with patrons in local barbershops. Students are also encouraged to share their
218 findings and make postings on social media (e.g., Instagram). Students may also choose
219 to work with health advocacy groups and community organizations on men's health
220 related topics. For example, in the past students have partnered with Wecycle Atlanta

(www.wecycleatlanta.org), a bike shop and bike advocacy organization, which serves the Historic Westside Community of Atlanta to promote cycling.

Student responses and outcomes

A total of 189 undergraduate students have enrolled in this course in the five semesters that the course has been offered. Student responses, and interest in this course have been overwhelmingly positive. As a result, a separate section of the *Men's Health* course has been expanded to the Chemistry program. Students are encouraged to complete the end of course evaluation provided by the institution, as well as a course reflection and evaluation assignment (see Supplementary Material for details and examples of student responses). A student response to the course project and a website URL link to one of the student group created PSAs as a general example of student responses is below.

"In the makerspace, I learned how to turn my 3D online prototypes into a physical material item that I can actually use as a miniature model. One main thing I do appreciate about the makerspace is that it is not just confined to the use of engineering and other stem majors, but to all Morehouse students. Overall, I had an excellent makerspace experience and I will definitely be using it in the future for my endeavors." Student response example

Morehouse College Men's Health Course Student Group Public Service Announcement – Prostate Cancer Link:
https://www.youtube.com/watch?v=_SF3p7zB0C0

Students have also demonstrated proficiency and competency in meeting course learning outcomes as determined using final grade distribution as one assessment tool (Table II). The majority of students, 79% (149 out of 189), earned a C or better in this course. On Monday, March 23, 2020 Morehouse implemented its decision to put into place remote working arrangements for all staff, students and faculty in response to the coronavirus (COVID-19) pandemic. For the Spring 2020 and Fall 2020 semesters, students were provided an option to choose the letter grade, or to choose a Pass/Fail option, where the minimum grade earned to receive a Pass was a 'C'. The course was delivered online due to the pandemic and previous work indicated the methods used were effective in supporting student engagement and learning (Majewska, Ania A. and Ethell Vereen, 2021).

Assessment of perceived knowledge

To better understand whether our course was effective in increasing students' perceived knowledge on men's health, health sciences, and physical sciences, we employed a survey. The survey was conducted during Fall 2020 semester and consisted of answering pre- and post- lab activity questionnaires (IRB protocol # 570002057). Student participation in the survey was anonymous and voluntary. During the lab portion of the course students were asked to answer initial survey questions aimed at gauging their knowledge on one of the three topics. Completion of the survey took approximately 10 minutes. Following the lab activities, students completed a second survey to gauge knowledge gained. We averaged the scores and compared pre and post perceived

knowledge scores of three main topics and found that post lab scores tended be higher across topics (Table III, Figure 1).

Conclusion

Recognizing the pressing need for innovative health promotion and education targeting men led to the development of the *Men's Health* course. This course was designed to raise awareness of the unique health challenges of men, emphasizing health disparities faced by Black/African American men and men of color in the USA, while not diminishing the health challenges of women and other groups. We used culturally relevant teaching strategies and activities because they empower college students, especially students from diverse backgrounds, to be engaged learners and producers of knowledge, not mere receivers or consumers of information. The barbershop community engagement model and service-learning activities using student created infographics and PSA's are an innovative means to foster health promotion and education beyond the classroom. The incorporation of guest lecturers and subject matter experts in the course reinforce preventative health strategies and provide additional insight that students may use to improve their own health outcomes, and those of their family, friends, and community. We urge faculty at other academic institutions to use the framework and design described here to implement similar health and wellness courses at their institutions. We expect that, wherever offered, the delivery of this course will increase awareness of the dramatic disparities in male morbidity and mortality worldwide.

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Supplementary Materials

To accompany "Development of a Men's Health Course for First-Year Undergraduates Using Culturally Responsive Teaching Strategies"

Examples of materials used in the design of the Men's Health course at Morehouse College.

I. Disclaimer and Disclosure (provided at the beginning of the semester)

DISCLAIMER: This course is a general education course on Men's Health. This course is not intended to replace qualified medical and professional consultation. The information provided in this course is intended for your general knowledge only and is not intended to be a substitute for professional medical advice, diagnosis or treatment. You should not use this information to diagnose or treat a health problem or disease without consulting with a qualified healthcare provider. If you have a personal health concern, we recommend consultation with a health care provider. Always seek the advice of your physician or other qualified healthcare provider with any questions about your medical condition. Health care providers are available to you for free at the Morehouse College Student Health Center.

James B. Ellison, Sr. Student Health Center
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Atlanta, GA 30314-3773

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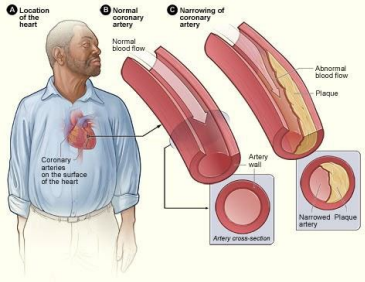
DISCLOSURE: I am not a medical doctor, and as such cannot diagnose or treat any medical issues. Students are strongly encouraged and advised to do their own research and make decisions in partnership with their healthcare provider. Please consult your healthcare provider with any questions or concerns you may have regarding a medical condition.

II. Images

Majewska, Ania A. and Ethell Vereen, 2021 supplemental material

a)



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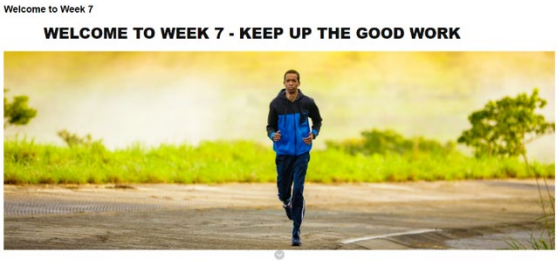

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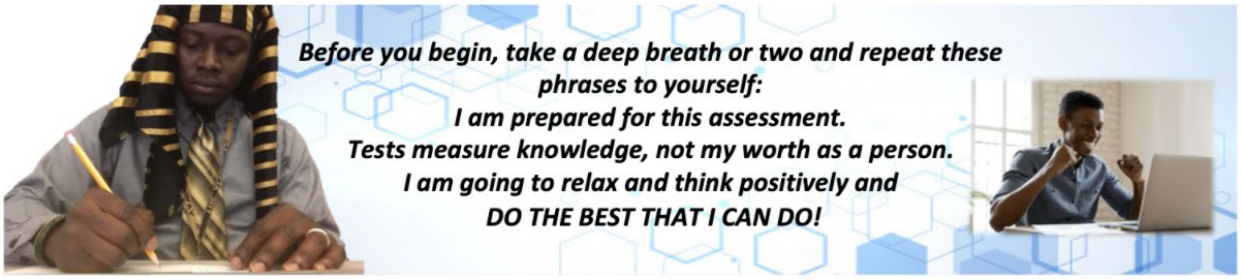


Figure S1. Examples of images used in the course: a) Diagram used for a mini-lecture on cardiovascular disease. b) Learning Management System (LMS) post for week 7 announcements. c) LMS post accompanying unit assessments.

III. Reading

Majewska, Ania A. and Ethell Vereen, 2021 supplemental material

<u>Required course textbook:</u>

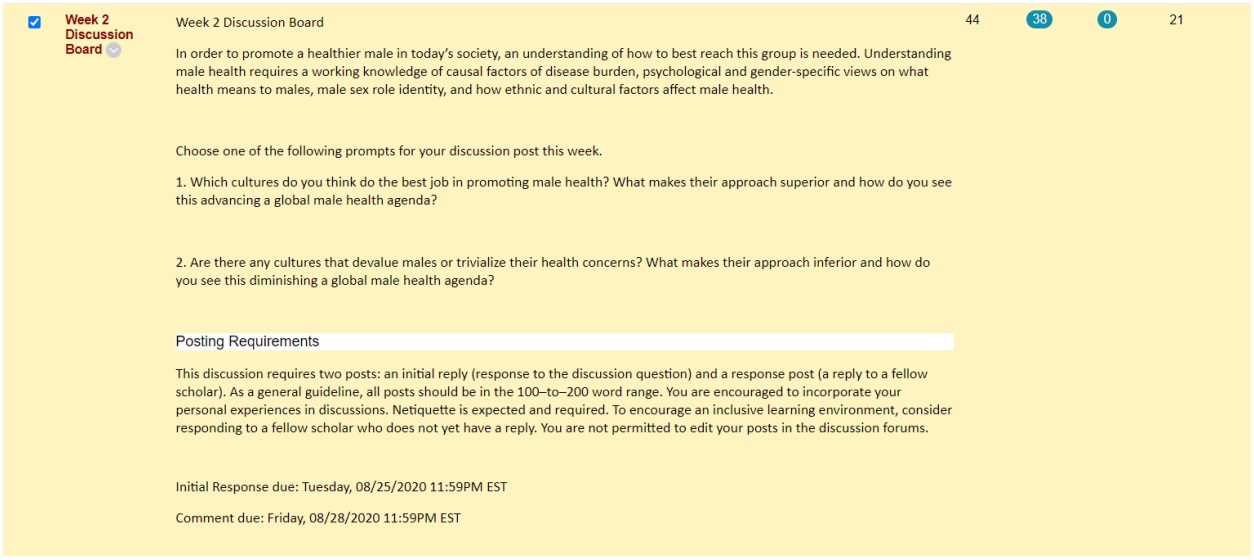
Reed, James W. and Neil Shulman. 2011. The Black Man's Guide to Good Health: Essential Advice for African-American Men and Their Families. Hilton Publishing; Revised edition (August 1, 2011).

Leone, James E. 2012. Concepts in Male Health Perspectives across the Lifespan (Public Health/AAHE). San Francisco, CA: Wiley and Sons; Revised edition (January 27, 2012)

IV. Assignments

Majewska, Ania A. and Ethell Vereen, 2021 supplemental material

Discussion Board



Week 2 Discussion Board

Week 2 Discussion Board

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In order to promote a healthier male in today's society, an understanding of how to best reach this group is needed. Understanding male health requires a working knowledge of causal factors of disease burden, psychological and gender-specific views on what health means to males, male sex role identity, and how ethnic and cultural factors affect male health.

Choose one of the following prompts for your discussion post this week.

1. Which cultures do you think do the best job in promoting male health? What makes their approach superior and how do you see this advancing a global male health agenda?

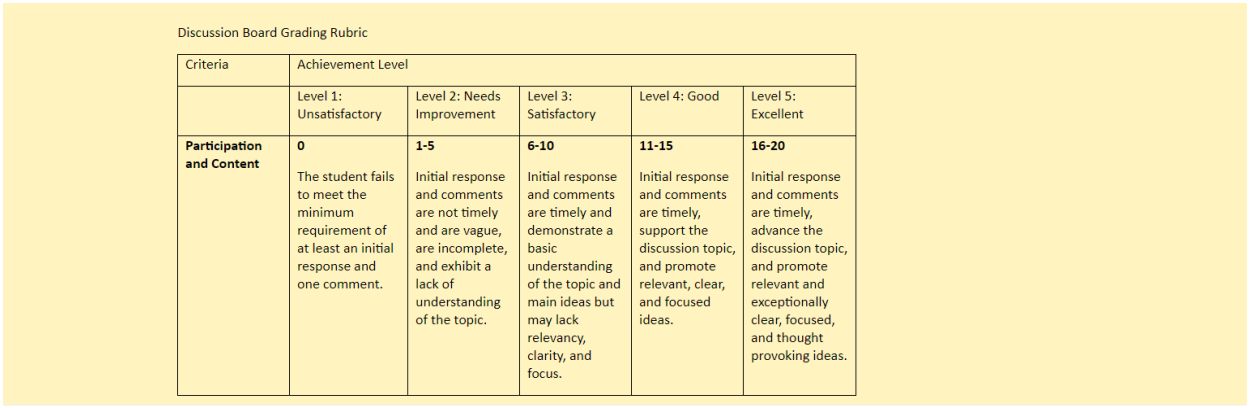
2. Are there any cultures that devalue males or trivialize their health concerns? What makes their approach inferior and how do you see this diminishing a global male health agenda?

Posting Requirements

This discussion requires two posts: an initial reply (response to the discussion question) and a response post (a reply to a fellow scholar). As a general guideline, all posts should be in the 100–to–200 word range. You are encouraged to incorporate your personal experiences in discussions. Netiquette is expected and required. To encourage an inclusive learning environment, consider responding to a fellow scholar who does not yet have a reply. You are not permitted to edit your posts in the discussion forums.

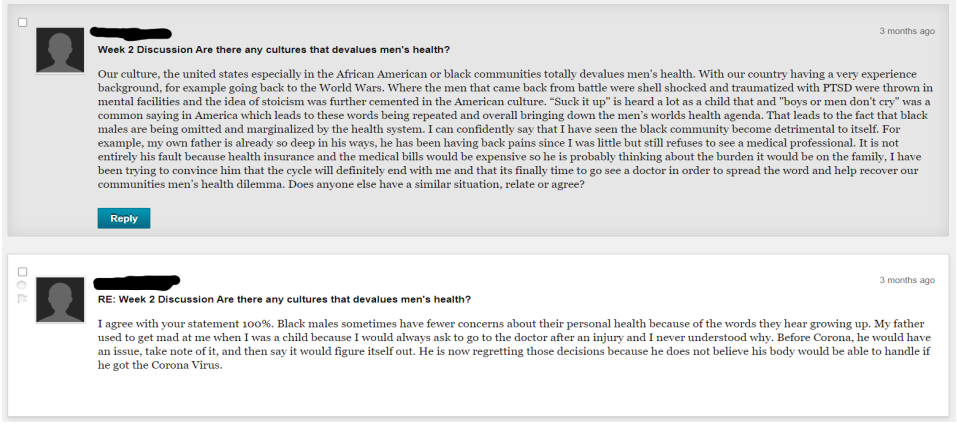
Initial Response due: Tuesday, 08/25/2020 11:59PM EST

Comment due: Friday, 08/28/2020 11:59PM EST



Discussion Board Grading Rubric

Criteria	Achievement Level				
	Level 1: Unsatisfactory	Level 2: Needs Improvement	Level 3: Satisfactory	Level 4: Good	Level 5: Excellent
Participation and Content	**0** The student fails to meet the minimum requirement of at least an initial response and one comment.	**1-5** Initial response and comments are not timely and are vague, are incomplete, and exhibit a lack of understanding of the topic.	**6-10** Initial response and comments are timely and demonstrate a basic understanding of the topic and main ideas but may lack relevancy, clarity, and focus.	**11-15** Initial response and comments are timely, support the discussion topic, and promote relevant, clear, and focused ideas.	**16-20** Initial response and comments are timely, advance the discussion topic, and promote relevant and exceptionally clear, focused, and thought provoking ideas.



[redacted]

3 months ago

Week 2 Discussion Are there any cultures that devalues men's health?

Our culture, the united states especially in the African American or black communities totally devalues men's health. With our country having a very experience background, for example going back to the World Wars. Where the men that came back from battle were shell shocked and traumatized with PTSD were thrown in mental facilities and the idea of stoicism was further cemented in the American culture. "Suck it up" is heard a lot as a child that and "boys or men don't cry" was a common saying in America which leads to these words being repeated and overall bringing down the men's worlds health agenda. That leads to the fact that black males are being omitted and marginalized by the health system. I can confidently say that I have seen the black community become detrimental to itself. For example, my own father is already so deep in his ways, he has been having back pains since I was little but still refuses to see a medical professional. It is not entirely his fault because health insurance and the medical bills would be expensive so he is probably thinking about the burden it would be on the family. I have been trying to convince him that the cycle will definitely end with me and that its finally time to go see a doctor in order to spread the word and help recover our communities men's health dilemma. Does anyone else have a similar situation, relate or agree?

Reply

[redacted]

3 months ago

RE: Week 2 Discussion Are there any cultures that devalues men's health?

I agree with your statement 100%. Black males sometimes have fewer concerns about their personal health because of the words they hear growing up. My father used to get mad at me when I was a child because I would always ask to go to the doctor after an injury and I never understood why. Before Corona, he would have an issue, take note of it, and then say it would figure itself out. He is now regretting those decisions because he does not believe his body would be able to handle if he got the Corona Virus.

Unit I Assessment – Section II Essay

Availability: Item is hidden from students. It was last available on Sep 11, 2020 11:59 PM.

Unit I Assessment – Section II Essay

Unit I Online Assessment Section II Essay

As you have learned in this first unit, understanding male health requires a working knowledge of causal factors of disease burden, historical, psychological and gender-specific views on what health means to males, male sex role identity, and how ethnic and cultural factors affect male health. Read the scenarios provided below, and choose one to write about for your essay. **MUST BE SUBMITTED BY FRIDAY, SEPTEMBER 11, 2020 11:59PM.**

Option 1:

Beliefs about masculinity and manhood that are deeply rooted in culture and supported by social institutions play a role in shaping the behavioral patterns of men in ways that have consequences for health. Considering Black life, history and culture how has masculinity changed or remained the same since the 1600s in the Western world, and its relation to male health? Explain how culture can enhance or reduce health, especially in Black males in the case of occupational choices. Provide multiple examples to illustrate and justify your point. Include at least 2 references; only one can be textbook or other assigned reading.

Option 2:

Most research in sex, gender and mental health supports two findings: (a) men and women have approximately equal rates of disorder overall (at least among the disorders that have been assessed; Rieker, Bird, & Lang, 2010; Rosenfield & Smith, 2009) and (b) men and women tend to experience different kinds of psychiatric illnesses (Rosenfield & Mouzon, 2013; Rosenfield & Smith, 2009; Rosenfield, Vertefuille, & Mcalpine, 2000). Discuss sex and gender similarities in relation to mental health, and the impact of masculinities on men's mental health and the direction for future research in this area.

Option 3:

Sexual health is fundamental to the overall health and well-being of individuals, couples and families, and to the social and economic development of communities and countries. Sexual health, when viewed affirmatively, requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. Sexual health-related issues are wide-ranging, and encompass sexual orientation and gender identity, sexual expression, relationships, and pleasure. Discuss two male sexual health-related issues, and challenges and opportunities to inform the sexual health of college males especially.

Formatting Guideline

Your response should be a minimum of one (1) page in length, not including your title page and reference page. Any outside sources you choose to use should be scholarly sources. All sources used, including textbooks, must be referenced; paraphrased and quoted material must have accompanying APA citations. Set your margins to 1 inch on the top, bottom, and both sides of the page. Before you start typing, set the spacing of the paper to 1.5 space. Set your font to Arial, size 12.

V. Group project assignment intended learning outcomes

A. Summarizing data findings, trends, and comparisons and list the principal gaps in knowledge about the distribution of the disease or health problem.
B. Summarizing any current hypotheses that have been proposed to explain the observed health disparity, and intervention strategies that are available for this disease or health problem. Students are also encouraged to generate hypotheses of their own.
C. Designing and creating an infographic, or a 30-second to two-minute PSA to raise awareness about the health disparity or topic that was investigated, or promote an intervention strategy to address the disease or health problem.

VI. Reflect and Evaluate Writing Assignment and Rubric

What have I learned from this class discussion and reflective writing

"Excellence is going far and beyond the call of duty, and doing more than others expect. It comes from striving, maintaining the highest standards and looking after the smallest detail. Excellence means doing your very best. In everything. In every way." -Anonymous

Assignment Overview: We are going to reflect on what we've learned in this course and evaluate how well it went. At the end of this course we want you to be able to:

- Explain through discussion and writing what you have learned in the course and any changes that you see in yourself or would like to see in yourself.
- Explain through discussion and writing why what you have learned is important.
- Predict how you will use it.

Not everything that you learn is going to be easy and fun. We try to make it as fun as possible but sometimes learning can be challenging. Learning may not be occurring if something is too easy. Learning something new is challenging, but if we can make it interesting it will not only make more sense but it will also affect us as a person.

We have discussed a lot of things this semester. Now I would like you to **"Reflect and Evaluate"** independently, and through a conversation with a family member or friend. I want you to share in a conversation something that you have learned in this course. I want you to write about what you have personally learned, and reflect on the conversation with your family member or friend. What did you share in the conversation and why? I also want you to write more about some changes that you might be seeing in yourself or would like to see in yourself. Finally, I want you also to include how you have used or will use what you have learned in this course in your everyday life and goals.

Reflective writing is:

- your response to experiences, opinions, events or new information
- your response to thoughts and feelings
- a way of thinking to explore your learning
- an opportunity to gain self-knowledge
- a way to achieve clarity and better understanding of what you are learning
- a chance to develop and reinforce writing skills
- a way of making meaning out of what you study

Reflective writing is not:

- just conveying information, instruction or argument
- pure description, though there may be descriptive elements
- straightforward decision or judgement (e.g. about whether something is right or wrong, good or bad)
- simple problem-solving
- a summary of course notes
- a standard university essay

See rubric for additional grading criteria. Assignment Point Value: 100 points

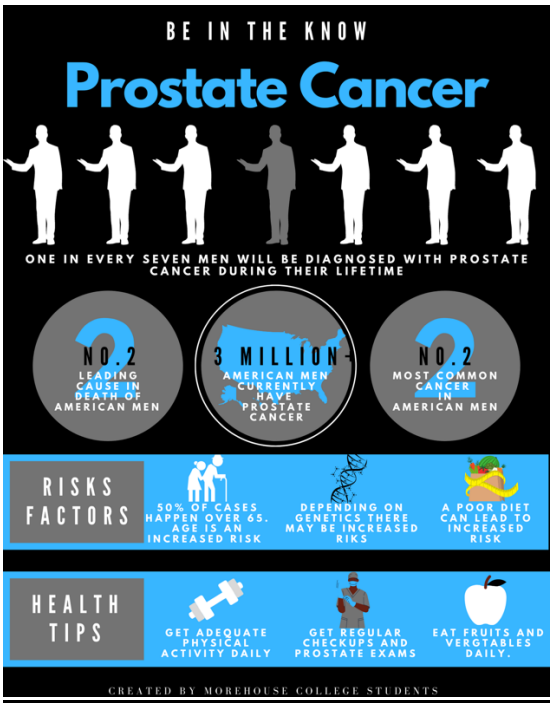
"Reflect and Evaluate" Rubric

Criteria	Unsatisfactory-Beginning	Developing	Accomplished	Exemplary	Total
Content Reflection	**0-34 points**	**35-39 points**	**40-44 points**	**45-50 points**	/50
	Reflection lacks critical thinking. Superficial connections are made with key course concepts and course materials, activities, and/or assignments	Reflection demonstrates limited critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions, activities, and/or assignments Minimal connections made through explanations, inferences, and/or examples.	Reflection demonstrates some degree of critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions activities, and/or assignments. Connections made through explanations, inferences, and/or examples.	Reflection demonstrates a high degree of critical thinking in applying, analyzing, and evaluating key course concepts and theories from readings, lectures, media, discussions activities, and/or assignments. Insightful and relevant connections made through contextual explanations, inferences, and examples. This reflection can be used as an example for other students.	
Personal Growth	**0-13 points**	**14-15 points**	**16-17 points**	**18-20 points**	/30
	Conveys inadequate evidence of reflection on own work in response to the self-assessment questions posed. Personal growth and awareness are not evident and/or demonstrates a neutral experience with negligible personal impact. Lacks enough inferences, examples, personal insights and challenges, and/or future implications are overlooked.	Conveys limited evidence of reflection on own work in response to the self-assessment questions posed. Demonstrates less than adequate personal growth and awareness through few or simplistic inferences made, examples, insights, and/or challenges that are not well developed. Minimal thought of the future implications of current experience.	Conveys evidence of reflection on own work with a personal response to the self-assessment questions posed. Demonstrates satisfactory personal growth and awareness through some inferences made, examples, insights, and challenges. Some thought of the future implications of current experience.	Conveys strong evidence of reflection on own work with a personal response to the self-assessment questions posed. Demonstrates significant personal growth and awareness of deeper meaning through inferences made, examples, well developed insights, and substantial depth in perceptions and challenges. Synthesizes current experience into future implications.	
Writing Quality	**0-13 points**	**14-15 points**	**16-17 points**	**18-20 points**	/20
	Poor writing style lacking in standard English, clarity, language used, and/or frequent errors in grammar, punctuation, usage, and spelling. Needs work.	Average and/or casual writing style that is sometimes unclear and/or with some errors in grammar, punctuation, usage, and spelling.	Above average writing style and logically organized using standard English with minor errors in grammar, punctuation, usage, and spelling.	Well written and clearly organized using standard English, characterized by elements of a strong writing style and basically free from grammar, punctuation, usage, and spelling errors.	
Timeliness	**Deduct 11 points-overall failing**	**Deduct 6-10 points**	**Deduct 1-5 points**	**0 points deducted**	/—
	Reflection is submitted 2-3 days (49-72 hours) after the deadline.	Reflection is submitted 1-2 days (25-48 hours) after the deadline.	Reflection is submitted within 1 day (24 hours) after the deadline.	Reflection is submitted on or before deadline.	
				TOTAL POINTS (sum of 4 Criteria)	/100

Example of student response to above reflect and evaluate activity

Over the Thanksgiving break, I was fortunate enough to talk to my dad about the things I learned from the Men's Health course. We talked about the list of the highest ranked health disparities for males. He commented on suicide being number eight on the list, saying "that doesn't sound like Black people." I referred him to the list of the highest ranked health disparities for African-American males. He said that he could understand why homicide and diabetes would be on that list. The fact that he was not surprised at the information shows that Black men of all ages understand that we have a problem when it comes to violence in our community and our eating habits as a demographic. To give my dad a takeaway, I informed him [of] the importance of getting your prostate checked for any abnormalities. He was squeamish when it came to the topic, but he understood after I let him know that he could be affected right at that very moment and he would not know. He, then, had a change of heart and said he was more willing to get a prostate exam when he went in for a check-up.

VII. Example of student created infographics



Supplemental Material References

Majewska, Ania A. and Ethell Vereen, 2021. Supplemental Material. Fostering student-student interactions in a first-year experience course taught online during the COVID-19 pandemic. Journal of Microbiology & Biology Education.

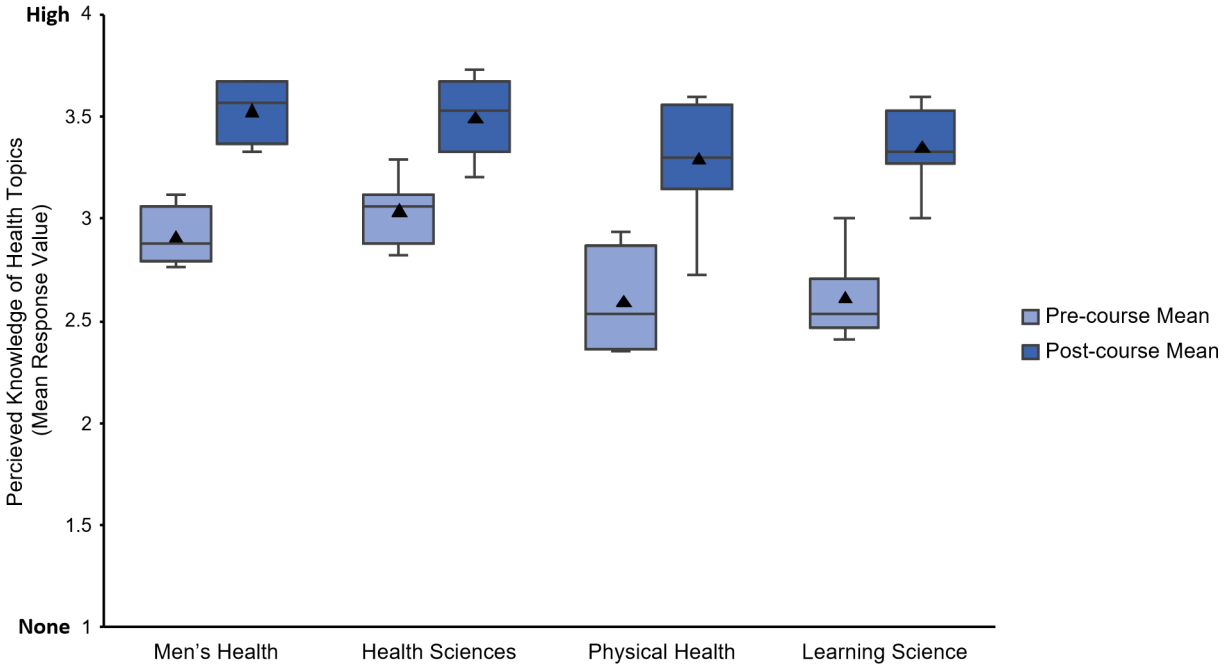


Figure I. Increased perception of knowledge about topics in health sciences after taking *Men's Health* course. On the first day of class (n=15), and prior to final exams (n=17), students were asked, "What do you feel is your current level of knowledge pertaining to the subjects of Health Sciences?". Answer option responses ranged from 1=None to 4=High. The box represents quartile range. The inner horizontal line indicates the median of whole data set. The triangles indicate the mean. The maximum and minimum values in the data set are represented as whiskers.

Table I. *Men's Health* course intended learning outcomes

1. Understand male health in historical, cultural, and global contexts
2. Interpret epidemiological and statistical evidence as it relates to male health
3. Explain how culture can enhance or reduce health in males in the case of health-related disparities.
4. Identify biological and sociocultural underpinnings, factors, and risks in male health.
5. List the primary signs and symptoms of sexually transmitted infections, rates, trends and modes of transmission, and preventative strategies.
6. Identify and understand the various physical, social, and emotional variables, and health challenges that men face in young and middle adulthood, and strategies to prevent and address challenges to their physical, social and emotional health.
7. Discuss factors relating to hypertension (high blood pressure), heart disease, stroke, diabetes, cancer (emphasis on prostate cancer), and sickle cell disease, as well as preventative strategies.
8. Identify advocacy groups and organizations, and common advocacy topics about male health, including challenges facing a male health agenda in the United States.
9. Apply strategies by which to close gaps in health disparities in males, particularly in racial, ethnic, and other minority groups.

Table II. *Men's Health* final course grades for students earned from Fall 2018 to Fall 2020[A]

	Fall 2018			Spring 2019		Fall 2019		Spring 2020	Fall 2020	
	10AM	11AM	1PM	10AM	11AM	10AM	11AM	10AM	10AM	11AM
A	6	9	7	13	10	8	8	4	4	5
B	6	6	8	5	6	7	5	3	1	6
C	4	3	1	2	2	1	4	1	3	1
D	1	0	0	0	0	2	1	0	0	2
F	1	1	1	0	0	2	1	1	5	6
Pass								12	3	1
Total Students	18	19	17	20	18	20	19	21	16	21

[A]Spring 2020 and Fall 2020 students were given an option to choose Pass/Fail for grading or earned letter grade in response to the COVID-19 pandemic

Table III. Students perceived knowledge of health topics before and after the *Men's Health* course.

Topic	Perceived Knowledge of Topic		
	Pre-course (n = 17) Mean (SD)	Post-course (n = 15) Mean (SD)	Total Response Mean[a] Pre-Course Mean (SD) Post-Course Mean (SD)
Men's Health			
Health issues faced by men (all races)	2.88 (0.47)	3.47 (0.50)	2.91 (0.15) 3.535 (0.17)
Health issues faced by Black men	3.12 (0.68)	3.67 (0.47)	
Sociocultural implications of being male	2.88 (0.83)	3.67 (0.47)	
Contributions of Black men to science and health	2.76 (0.81)	3.33 (0.60)	
Health Sciences			
Overall traditional view of health	3.12 (0.47)	3.67 (0.47)	3.04 (0.16) 3.49 (0.18)
Physical Health	3.29 (0.46)	3.73 (0.44)	
Environmental Health	2.82 (0.62)	3.33 (0.60)	
Mental Health	2.88 (0.68)	3.53 (0.50)	
Spiritual Health	3.12 (0.68)	3.20 (0.75)	
Social Health	3.00 (0.59)	3.53 (0.50)	
Health Equality and Health Equity	3.06 (0.64)	3.47 (0.62)	
Physical Health			
Nutrition and diet	2.94 (0.64)	3.20 (0.75)	2.60 (0.25) 3.30 (0.29)
Male anatomy	2.88 (0.58)	3.33 (0.60)	
Reproductive system	2.82 (0.38)	3.57 (0.62)	
Female anatomy	2.65 (0.59)	3.53 (0.62)	
Respiratory system	2.41 (0.49)	3.27 (0.77)	
Cardiovascular system	2.41 (0.60)	3.60 (0.61)	
Digestive system	2.35 (0.48)	3.13 (0.72)	
Organ systems	2.35 (0.59)	2.73 (1.12)	
Learning Science			
Understanding the scientific method	2.71 (0.67)	3.27 (0.44)	2.61 (0.20) 3.35 (0.19)
Understanding the concept of science	2.47 (0.61)	3.60 (0.49)	
How scientist solve everyday problems	2.53 (0.78)	3.53 (0.50)	
Genetics and Heredity	2.65 (0.68)	3.40 (0.61)	
Evolution and Natural Selection	2.53 (0.70)	3.33 (0.60)	
Distinguishing between Facts and Myths	3.00 (0.59)	3.33 (0.87)	
Cell division: Mitosis and Meiosis	2.41 (0.60)	3.00 (0.73)	

The survey questions asked students to indicate "what do you feel is your current level of knowledge pertaining to" the respective topics.

[a]Total response mean was calculated using the means of student responses for each topic.

2022

Designing and evaluating falls prevention education with residents and staff in aged care homes: A feasibility study

Jacqueline Francis-Coad

Tessa Watts

Caroline Bulsara

Anne-Marie Hill

This article was originally published as:
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Original article available here:
10.1108/HE-08-2021-0113

Francis-Coad, J., Watts, T., Bulsara, C., & Hill, A. (2022) Designing and evaluating falls prevention education with residents and staff in aged care homes: A feasibility study. *Health Education, 122*(5), 546-563, https://doi.org/10.1108/HE-08-2021-0113

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Designing and evaluating falls prevention education with residents and staff in aged care homes: a feasibility study

Dr Jacqueline Francis-Coad, Dr Tessa Watts, Professor Caroline Bulsara, Professor Anne-Marie Hill

Abstract

Purpose

The purpose of this study was to co-design a falls prevention education programme with aged care home residents and staff and evaluate its feasibility. The intention of providing the education programme was to assist residents to stay safe and mobile whilst reducing their risk of falling.

Design/methodology/approach

A two-phase mixed methods participatory design using a resident (n=6) and care staff (n=5) consumer engagement panel, pre and post programme resident (n=35) survey and semi-structured care staff interviews (n=8) was undertaken in two countries.

Findings

A poster, brochure, video and staff education guide featuring 12 safety messages depicting fall prevention behaviours were co-designed**.** Residents, supported by staff, perceived the falls prevention education programme as enjoyable and informative but there were no significant differences in capability, opportunity or motivation. However, several residents were observed enacting fall prevention behaviours such as, “If I feel unwell, I’ll ring the bell” and waiting for staff assistance. Challenges to programme demand, acceptability and implementation which may have impacted

residents' exposure and engagement with the programme were identified, along with recommendations to improve feasibility**.**

Originality

The use of bespoke resources, novel rhymes, positive messages emphasising safety and co-designing with residents themselves were welcomed points of programme difference.

Practical implications

When developing falls prevention education programmes partnering with residents and staff, providing choices to meet personal and aesthetic preferences along with frequent, shorter duration learning opportunities are important for translating education messages into actions.

Introduction

Internationally falls are a leading adverse event for older people (Morley *et al*., 2012; Oliver *et al.,* 2007), particularly those in aged care homes (ACH) who are three times more likely to fall compared with those residing in their own homes (Cooper, 2017). This cohort of older frailer people, described as "residents", are at greater risk of falling due to the high prevalence of disability (81.3%) and cognitive impairment (68.0%) that cause functional limitations, making daily living tasks a challenge (Burland *et al.,* 2013; Oliver *et al.,* 2007; Onder *et al.,* 2012). More than 50% of ACH admissions fall annually (Burland *et al.,* 2013; Francis-Coad *et al.,* 2018b) and concerningly between 25-30% of these falls result in physical injury, including hip fracture, head injuries and major lacerations (National Institute of Health Research, 2018, Morley *et al*., 2012; Oliver *et al.,* 2007). The consequences of a fall can be devastating for the older person with many experiencing physical and psychological trauma. This can result in functional decline, disability, fear of falling, depression and anxiety that lead to loss of independence and in some cases death (Oliver *et al.,* 2007; Onder *et al.,* 2012). Additionally, the estimated cost of falls per annum in Western Australia alone is $181 million dollars, whilst in the more population dense UK the cost is more than £2.3 billion pounds. This places a substantial economic burden on the healthcare systems (National Institute for Health and Care Excellence, 2018; Hendrie *et al*., 2004), hence preventing falls is an international priority from a humanitarian and economic perspective.

Previous research has identified that residents have low levels of knowledge and self-perceived risk regarding falls, falls risk factors and how to prevent falls, which may contribute to their limited uptake of falls prevention strategies (Francis-Coad *et al.,*

2018c; Mwanri and Fuller, 2003). Health education is a successful intervention in preventative care and disease self-management and is important in facilitating health behaviour change, including in falls prevention and in care homes (Ghisi *et al.,* 2014; Heng *et al.,* 2020; Hill *et al.,* 2015; Michie *et al*., 2014; Schoberer *et al.,* 2016). Education is recommended internationally as a component of a best practice multifactorial approach to falls prevention for older people (Australian Comission on Safety and Quality in Healthcare, 2009; My Home Life Cymru, 2018; NHS Care Directorate Scotland, 2016). Providing falls prevention education to residents is therefore an important strategy in targeting the problem of falls by changing falls prevention behaviours. However limited research has investigated residents' views regarding preferences and acceptability of falls prevention education in ACH settings. A recent systematic review reported that while residents are infrequently included in research, those without cognitive impairment had successfully undertaken advisory and collaborative roles in some qualitative designed studies (Backhouse *et al.,* 2016). Clinical trials of falls education for older people in hospital settings, that included community dwelling older adults and residents from ACH, demonstrated it was effective in reducing falls rates by 40% (Hill *et al.,* 2015), supporting the need for older people to receive high quality health education regarding falls prevention. Furthermore, without resident input it remains challenging for aged care providers to develop and improve acceptability and adherence to falls prevention programmes. One research study aimed to be inclusive by partnering with residents in ACH to determine their educational needs and preferences regarding fall prevention (Francis-Coad *et al.,* 2018c). Gaps in residents' knowledge of intrinsic falls prevention risk factors were identified along with preferences for personal fall prevention strategy reminder resources and education delivery in small discussion groups with a focus on

staying safe and functionally mobile. Some residents also felt care staff required education regarding how to best assist them to reduce their risk of falls (Francis-Coad *et al.,* 2018c). Studies in ACH settings have reported gaps in fall prevention education for care staff with requests for reminder resources and more opportunities to assist residents with falls prevention strategies, within the demands of their workload (Clancy and Mahler, 2016; Francis-Coad *et al.,* 2019). These findings identify several gaps that require addressing in the design and delivery of falls prevention education programmes in the ACH setting, confirming the need for more research in partnership with residents and care staff. Therefore, the purpose of this study was to co-design a falls prevention education programme with residents and care staff and evaluate its feasibility in the ACH setting. The intention of providing the education programme was to assist residents to stay safe and reduce their risk of falling whilst maintaining their mobility.

Methods

Study design

A mixed methods participatory design was conducted in two phases between April 2019 and February 2020, as shown in Figure 1 (Creswell and Plano Clark, 2011). Participatory research broadly describes 'all partnered research' that includes co-design approaches involving researchers and community stakeholders (Goodyear-Smith *et al*., 2015; Salsberg *et al*., 2015). The participatory design was selected to ensure the research was responsive to the community stakeholders (ACH residents and staff) it intended to serve and thereby facilitate uptake of the findings (Goodyear-

Smith *et al*., 2015). The participatory principles of the 'Look-Think-Act' framework (Stringer and Genat, 2004) were applied. In this context 'Look' gathered collaborative information by empowering residents and staff to tailor the education programme utilising consumer engagement panels, 'Think' analysed and interpreted information gathered to co-produce programme resources and 'Act' implemented and evaluated the programme with stakeholders using pre and post programme resident surveys and semi-structured staff interviews.

Participants and setting

Five ACH, three in Australia and two in Wales, UK participated in the study. The co-nation design was intended to offer an international perspective representative of similarities and differences in countries that provided residential aged care services. The ACH ranged in size from 31-100 beds with a total capacity of 278 beds led by a care home manager. All sites provided similar 24-hour general care in a home-like environment for residents with low to high dependency care needs. Low care needs describe residents who are independent with or without equipment for some, but not all, functional mobility and self-care tasks. Conversely, high care needs describe residents' dependent on one or two members of staff and equipment, such as mechanical hoists, for functional mobility and self-care tasks. The three Australian ACH were operated by a single not-for-profit organisation and the two Welsh ACH were privately operated by independent companies. Professional staffing differed between countries with Australian ACH employing allied health staff, including nurses, physiotherapists and occupational therapists either full-time or mostly part-time (Australian Institute of Health and Welfare, 2012), whereas Welsh ACH had

limited access to allied health services on a 'needs only' basis via external agencies (Cook *et al*., 2017).

A purposive sample of residents and care staff participated. Inclusion criteria for residents were resided at the ACH for a minimum of three months, aged over 65years or above, English language skills and cognitive capacity (Abbreviated Mental Test Score >7/10) (Hodkinson, 1972) to respond to survey questions and give written informed consent. Inclusion criteria for care staff were employed at the ACH in a care role with direct resident contact for a minimum of three months and English language skills to respond to survey questions. All residents and care staff meeting the inclusion criteria were verbally invited to participate by the ACH liaison staff member at site resident and staff meetings.

Phase 1

Education programme and resource design

The preliminary education resources were designed by the lead researcher (JFC) based on prior falls prevention research evidence and resident falls education preferences in ACH settings (Cameron *et al.,* 2018; Francis-Coad *et al.,* 2018a; Francis-Coad *et al.,* 2018c). Behavioural change theory has been successfully used in patient falls prevention education programmes in hospital settings that were effective in reducing falls (Hill et al., 2015; Hill et al., 2016). The theory underpinning the intent of the education programme was the 'COM-B model' conceptualised by Michie, Atkins & West (2014). This model postulates that changing the behaviour of an individual or group involves determining their capability (C), opportunity (O) and

motivation (M) to engage in the new behaviour (B), such as undertaking a behaviour to prevent a fall. Residents' capability, opportunity and motivation to undertake falls prevention behaviours was assessed using closed responses to COM statements constructed in the questionnaires and measured using a 5-point Likert scale (Hartley, 2014). Open responses examined residents' awareness about falls and falls prevention knowledge (capability). In the post-programme questionnaire residents were also asked to share their thoughts and opinions regarding the programme delivery and acceptability of the poster, brochure and video resources (see Appendix 1). The questionnaire had been tested in a published study with residents in ACH settings in Australia and Wales (Francis-Coad *et al*., 2018). The education programme comprised of ACH falls epidemiology, falls risk factors for the ACH population and 12 novel safety messages (see Table 1) constructed to reduce the risk of falls. The safety messages with supporting graphics incorporated rhymes, as these have been shown to assist in effective processing and re-call of information across the lifespan (Nelson and Brooks, 1974; Vasse *et al.,* 2010). A 5-minute video, poster, brochure and staff education guide (file) were produced to provide alternative delivery choices.

Table 1. *Safety messages*

	Message and Explanation
1	**"If I feel unwell, I'll ring the bell"** • If you feel unwell, dizzy or a bit unsteady tell your care staff immediately • Getting checked early may prevent an illness developing or a fall from happening
2	**"My walking aid is near and my route is clear"**

- Check your walking aid is within your reach at all times
- Ask the staff to show you the best way to walk or use your walking aid
- Have a look around in the direction you are planning to walk so your pathway is clear

3 **"I need to hear and see so it's safer for me"**

- Make sure you always wear your glasses when you are moving around
- Clean your glasses regularly
- Have your eyes checked 6-12 months
- Wear your hearing aids when you are moving around and switch them on

4 **"If it's not nice and bright I'll put on the light"**

- Put the light on if you are moving around when it's night time or light levels are low

5 **"I'll choose with care the clothes I wear"**

- Checking the fit of clothing so that hemlines aren't dragging on the ground will help avoid tripping or slipping
- Comfortable clothing will enable you to move freely

6 **"My supportive shoes are the ones I'll use"**

- Choosing a shoe with good supports, like laces or straps and thinner soles, will help you feel the ground beneath you
- Never walk around in stockings or socks only
- Have regular foot checks, talk to your Chiropodist or Doctor

7 **"When changing position I'll make safety my mission"**

- Pause when you move from one position to another, like standing up from sitting
- This allows our blood pressure time to adjust, if you feel wobbly or dizzy sit back down and call for assistance

8 **"Being steadier and stronger helps me stay well longer"**

- Having better balance and stronger muscles help us to stay steady and move around well
- Ask the Physio about exercises that might help you to feel steady and stronger

9 **"Having enough Vitamin D is helpful for me"**

- Our levels of Vitamin D may be lower as we get older. We need vitamin D to help our muscles and bones stay strong
- Taking a vitamin D supplement can be helpful so ask your Nurse or Doctor

10 **"Knowing my medications can avoid complications"**

- Some medications can have side effects that may make you feel drowsy and unsteady on your feet
- Tell your care staff or Doctor if you notice any changes when taking your medications

11 **"I'm thirsty I think I'll be sure to have a drink"**

- Have regular drinks throughout the day
- Water is best
- Keep a jug or water bottle close by

12 **"I have a toileting plan to go safely when I can"**

- Try not to leave it too long to walk to the toilet so you don't need to hurry
- If you need to go to the toilet at night make sure you have a lit pathway
- Talk to your care staff about planning a visit to the toilet

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Data collection and procedure

Consumer engagement panels

The preliminary education programme resources were presented to consumer engagement panels of both residents and ACH staff volunteers. The panels were undertaken in a private meeting room at one ACH in Australia and one in Wales. Each panel member was provided with a paper copy of the education resources for review and the video was screened on a smart television. Panels ran for approximately 30-45 mins, commencing with refreshments followed by a brief overview of the study, and were facilitated and documented by the lead researcher using a discussion guide. The guide contained a list of open-ended questions and prompts based on criteria outlined in the suitability assessment of materials for evaluation of health-related information for adults (Doak *et al*., 1996). This included asking participants to comment on each educational resource's content, literacy, graphics, layout, learning stimulation and cultural appropriateness.

Phase 2

Phase one informed co-production of the education programme resources by the research team. All research assistants (RA) were trained by the lead researcher (JFC).

Pre-programme survey

Participating residents were administered the pre-programme questionnaire in a private room at their ACH one-to-one by the RA reading out the questions and recording their responses verbatim. The RA then read back the resident's responses for checking and confirmation.

Education programme delivery

On completion of the pre-programme questionnaires residents were invited in small groups (n=5-6) to attend the education programme one-hour interactive discussion led by the lead researcher. Firstly, basic falls epidemiology and falls risk factors for the ACH population were discussed. Secondly the 12 safety messages, addressing falls risk factors such as vitamin D deficiency and poor balance, were discussed using the poster, brochure and video. The programme concluded with demonstrations of how residents could perform the fall prevention behaviours suggested in the safety messages. Care staff were invited to an education and training session at a time of lower activity during their shift. The training comprised of basic falls epidemiology, falls risk factors for the ACH population and how they could assist residents to perform the fall prevention behaviours using the safety messages, as described in the staff education guide. The participating residents were all given a copy of the poster

and brochure and were asked to review them daily in their own time over a 3-4 week period. The care staff were asked to assist residents to display the poster in their room and prompt daily engagement with the poster and brochure when attending to residents. A copy of the video (USB) was provided to the ACH manager to screen on their lounge room smart television, for example when residents gathered there to watch the daily news bulletin. Copies of the poster, brochure and staff education guide were provided for each of the communal staff rooms at participating sites.

Post-programme survey and staff interviews

Research assistants returned to each ACH 3-4 weeks after the education and resources were delivered and conducted the post-programme survey with residents as described previously. Care staff that attended the education at each site were invited to participate in a short semi-structured interview (see guide in Appendix 1) to discuss their thoughts on the education resources and their impact on residents. Interviews were digitally audio-recorded and conducted face to face by the RA. Copies of transcripts were provided to participants for member checking.

Data analysis

Phase 1

Qualitative responses from the consumer engagement panels were analysed using a deductive approach (Elo and Kyngäs, 2008). This type of approach was selected as previous knowledge around the research topic of falls prevention education aiming to

change behaviours was known (Hill *et al.* 2015, Hill *et al.* 2016) but the theory was being tested in a different population and context (ACH). A category matrix that mapped the panel's suggested resource modifications against known criteria based on the suitability assessment of materials for evaluation of health-related information for adults was constructed (Doak *et al*., 1996). Content was specifically mapped to the COM-B model based on the education programme potentially increasing resident capability (through knowledge about falls prevention) together with raising motivation and opportunity (making it clear how and when safety messages could be enacted) (Michie *et al*., 2014).

Phase 2

Quantitative survey responses describing residents' levels of knowledge and awareness of falls risks capability, opportunity and motivation to enact fall prevention strategies were entered into SPSS version 22 (IBM SPSS Inc., Chicago IL, USA) and summarised using descriptive statistics. Differences between residents' pre and post questionnaire responses were examined using a Wilcoxon signed rank test (Portney and Watkins, 2009).

Qualitative open responses from the resident survey items and staff interviews were transcribed verbatim and managed using NVivo version 12 (QSR International Pty Ltd, 2018). Two independent researchers (JFC, CB) read the transcripts multiple times for data familiarisation. A third researcher (AMH) was available to arbitrate any disagreement and facilitate consensus. Data were analysed using deductive content analysis (Elo and Kyngäs, 2008). Feasibility studies address the overarching questions can it work? does it work? and will it work? (Bowen *et al.,* 2009). A category matrix

was constructed to examine feasibility using the appropriate 'areas of focus' identified by Bowen *et al.* (2009). These authors provide reasons for conducting feasibility studies, including that previous interventions had positive outcomes but in different settings than the one of interest. This applies in our study where falls prevention education that was successful in hospital settings (Hill *et al.* 2015, Hill *et al.* 2016) was being transferred to ACH settings. Areas of focus when examining feasibility are described as: Acceptability, Demand, Implementation, Practicality, Adaptation, Integration and, where required, Expansion (Bowen *et al.*, 2009). Data describing residents' and staffs' positive or negative responses regarding the falls prevention education programme were mapped against the areas of focus described (Bowen *et al.*, 2009). The consolidated criteria for reporting qualitative research (COREQ) guidelines were followed when designing, conducting and reporting the study findings (Tong *et al*., 2007) see Appendix 2.

Ethical considerations

This research was approved by the participating Universities' Human Research Ethics Committees (019034F and REC649) and the governance boards of the participating ACH. All participants provided written informed consent.

Results

Phase 1

Six residents and five staff participated in the consumer engagement panels (Australia n=7, Wales n=4) providing feedback that informed the final co-production. Overall, both residents and staff agreed the education programme content facilitated capability, opportunity and motivation to engage with the safety messages and enact fall prevention behaviours. The modifications made to the education programme resources are detailed in Appendix 3a, changes served to improve visual clarity of the poster and brochure, comprehension of written text together with auditory clarity of the video. In the final iteration, changes were approved by participants viewing paper copies of the modified resources that had been emailed to the ACH managers.

Phase 2

Participant characteristics

Thirty-five residents participated in the pre-programme survey with 33(94.3%) completing the post-programme survey (n=2 deceased) and eight staff members completed post-programme interviews. The mean age of residents was 85.8 years (SD 8.1 years), 28 (80.0%) used a walking aid and 21 (60.0%) had experienced one or more falls since their admission to the ACH, characteristics of residents and staff are reported in Table 2.

Table 2. *Resident and staff characteristics*

Resident Characteristics	Australia n=25 (100%)	Wales n=10 (100%)	Combined n=35 (100%)
Gender, Female n (%)	20 (80.0)	8 (80.0)	28 (80.0)
Age (years)			
Mean (SD)	86.1 (SD 8.9)	85.0 (SD 5.6)	85.8 (SD 8.1)
Range	65 - 99	79 - 94	65 - 99
Length of stay at ACH (months)			
Mean (SD)	31.6 (SD 40.8)	17.2 (SD 9.3)	27.5 (SD 35.2)
Range	3 - 188	3 - 30	3 - 188
Ambulant n (%)	25 (100.0)	10 (100.0)	35 (100.0)
Uses walking aid n (%)	19 (76.0)	9 (90.0)	28 (80.0)
Single-point stick	2 (8.0)	0	2 (5.7)
Quadruped stick	1 (4.0)	2 (20.0)	3 (8.6)
2 Wheeled walker	1 (4.0)	6 (60.0)	7 (20.0)
3 Wheeled walker	2 (8.0)	0	2 (5.7)
4 Wheeled walker	13 (52.0)	1 (10.0)	14 (40.0)
Fallers since admission n (%)	16 (64.0)	5 (50.0)	21 (60.0)
Number of falls n (%)			
1 fall	7 (28.0)	0	7 (20.0)
2 – 10 falls	8 (32.0)	4 (40.0)	12 (34.3)
More than 10	1 (4.0)	1 (10.0)	2 (5.7)
Staff Characteristics	Australia n=6 (100%)	Wales n=2 (100%)	Combined n=8 (100%)
Gender, Female n (%)	6 (100)	2 (100)	8 (100)
Age (years)			
Mean (SD)	39.8 (SD 14.9)	62.5 (SD 2.1)	45.5 (SD 16.4)
Range	24 - 62	61- 64	24-64
Length of employment at ACH (months)			
Mean (SD)	63.00 (SD 38.1)	91.0 (SD 41.0)	70.0 (SD 38.0)
Range	18 - 120	62 - 120	18 - 120
Designation	6 (100.0)	2 (100.0)	8 (100.0)

Occupational Therapist	1 (16.7)	0	1 (12.5)
Enrolled Nurse	2 (33.3)	0	2 (25.0)
Nursing Care Assistant	1 (16.7)	2 (100.0)	3 (37.5)
Therapy Assistant	2 (33.3)	0	2 (25.0)

Notes: ACH – Aged Care Home(s), SD – Standard Deviation

Residents' level of capability, opportunity and motivation to enact falls prevention behaviours pre and post education programme

The quantitative findings provided limited support for intervention feasibility. Comparative analysis of residents' responses to the survey (Likert scale responses) regarding their falls risk awareness along with confidence, opportunity and motivation to reduce their risk of falling pre and post programme showed no significant differences (see Appendix 3b). A small positive trend was noted regarding residents feeling increasingly confident in their ability to take the necessary actions to remain safe (pre 68.6% versus post 81.8%) following the programme but only moderate agreement that they had a clear plan of what they would do to stay safe. Qualitative findings were predominantly supportive of the intervention producing behaviour change. Residents demonstrated some baseline knowledge and awareness (capability) of intrinsic falls risk factors such as muscular weakness, poor vision and balance. However, when asked what they currently do to stay safe/prevent falls addressing extrinsic risk factors predominated, such as wearing appropriate footwear, de-cluttering their environment, using their walking aid and other safety equipment such as handrails. After the education there was some perceived improvement in capability with one Australian resident commenting, 'I'm more aware of what I do, it [the education] has probably made me think more [about my safety]'. A fifth (N=7,

20.0%) of the residents recalled programme safety messages addressing intrinsic falls risk factors such as drinking regularly to avoid dehydration, considering continence issues and slowing position changes for postural hypotension, with one 77-year-old Australian male physically demonstrating his capability and motivation to the RA, 'I don't suddenly get up…I steady myself when I stand.' However, most residents reported the same extrinsic strategies for staying safe/preventing falls as at baseline with a few commenting on messages they had newly adopted over the past weeks. One motivated 92-year-old Australian female resident had taken the opportunity to make sure areas were well lit explaining, 'You must have sufficient light' and another 94-year-old Welsh female talked about improved awareness (capability) in checking her environment stating, 'I'm careful to make sure the path in front of me is clear'.

Acceptability of the falls prevention education programme

Overall resident and staff reactions to the falls prevention education programme were positive as the learning experience was perceived as enjoyable and informative. All staff reported they had some prior experience of falls prevention education; however, they felt the use of bespoke resources, positive messages emphasising safety and co-designing with the residents themselves were welcomed points of difference enabling engagement. One Australian staff member (S2) recalled, 'Yes, I like the…different way of looking at it. The education I've done has been a little bit just text book and repetitive, whereas this with the sayings [rhyming safety messages], you remember them…it sticks in your head a bit more', another Australian staff member (S3) commented, 'I think it was delivered [interactive discussion] in a way that everyone could understand…I didn't go to sleep! [laughs]'. Staff embraced the participatory

research design as they felt it valued theirs, and the residents' opinions commenting, 'Trying to get the residents more involved as well was the great thing, that was really different, having the residents be a part of it was fantastic' (Welsh staff, S2).

The education resource design aesthetics were appreciated by most residents (n=21, 60.0%) as enabling engagement with learning one commented, 'Liked it, good, very well done, the colour [yellow] is nice and bright…easy to see' (80-year-old female, Wales) and another added, 'I think that it's very clever [the safety rhymes]…I've read it through several times' (91-year-old male, Wales). The pictorial design elements were also perceived as an enabler, an 83-year-old Australian female commented 'The little pictures help because you can put yourself in that position. A picture tells a story…It's heightened my awareness'. Conversely 7(29.0%) residents expressed dislike for the colour or design which acted as a barrier for engagement with learning one commented, 'It's a boring old people's picture, I don't like the yellow, needs something more modern' (83-year-old female, Australia). Two residents with eye disease (from Australia and Wales) felt the brochure was hard to read, as the font and pictures were smaller than on the poster. Many residents found the questionnaires' 5-point Likert scale responses too complicated, expressing preferences to simply answer 'yes or no' rather than select a level of agreement. The staff education guide was perceived by the eight interviewees to have been well designed for engaging in learning the safety messages for themselves and to assist residents, with positive feedback on clarity, uniqueness and imagery. A Welsh staff member (S8) commented, 'We can see what we have to do to help prevent the falls, but it's like…in a positive way [emphasising safety]'.

Demand for falls prevention education

Staff and residents in both countries expressed demand for falls prevention education as they had experienced a fall or attended residents' who had fallen in the past month witnessing the trauma first-hand. One Australian staff member (S1) stated, 'I think it's a really good thing for everyone…to keep on pushing it [falls prevention education] definitely keep on pushing it out there' and a Welsh resident concluded, 'It's helping us to be safer…I think it's a very good thing'. Only a limited proportion of residents (approximately 15-20%) met the inclusion criteria for participation due to high levels of cognitive impairment in the ACH population (Australian Institute of Health and Welfare, 2020). Two contrary views were expressed that negated the need for falls prevention education where residents believed, 'It's just common sense' (80-year-old female, Australia) and another pointed out, 'We don't need this information as the staff are always here…they do everything' (88-year-old female, Wales).

Implementation of the programme in the ACH setting

Barriers and enablers in executing the education programme were identified. The education resources being added to the ACH environment resulted in observed enactment of the safety messages by both residents and staff. Staff at one Welsh site stated that having the programme as a daily handover agenda item served as a useful reminder. Eighteen (71%) residents provided positive feedback regarding learning some safety messages from the poster, one resident reflected, 'It's good [the poster], I don't mind having it in my room, it makes you keep it in mind that you can ring the bell and get in touch with them if there's anything wrong' (85-year-old female, Australia). Four staff members reported they had observed a few residents translating

some safety messages into practice after the posters were displayed on the residents' walls. For example, 'I think you can see a lot more people calling [using bell] if they feel a bit unsafe or they say oh I'm feeling a bit dizzy…they won't get up they'll ring the bell' (Australian staff member, S6). Five staff members felt seeing the posters displayed on the residents' walls had made them aware that some of their daily tasks with resident contact were opportunities to help learn safety messages. This was enacted by a Welsh staff member (S7), 'I sit there I talk to them [residents] and I say if it's not nice and bright I'll put on the light' and an Australian staff member (S6), who had begun checking bedside jugs were accessible and filled with water during her shifts stating, '…and she [researcher] said about the water, having a drink, hydration'. Eight (24.2%) residents felt the brochure enabled learning as it was compact and easily shared, one 99-year-old Australian male resident demonstrated this, 'I passed it on to a new lady, I understand she's had a fall. I'm encouraging her to use her wheels [wheeled walking frame] at all times'. The video was perceived as unanimously positive for engaging learning due to its visual appeal. Two residents explained, 'We all watch TV…I think showing a video [to everyone here] would be a good idea…to show why older people fall, they said glasses [bi-focal] could cause it [a fall]' (85-year-old male, Australia) and 'If you like movies…the video sticks in your mind more than anything' (82-year-old female, Australia).

We encountered some barriers with programme implementation that may have compromised residents' exposure to and engagement with the falls prevention education resources. Seventeen (51.5%) residents stated they had not received any reminders from the staff to engage with the resources and safety messages during the study period. At one site the poster was not displayed in residents' rooms as staff perceived displaying a poster was not conducive with their interpretation of their

ACH policy of ‘providing a home-like environment’. The RAs also reported that on their post-programme visit with some residents, posters had not been displayed in a place where they could easily view. Twenty-four (72.7%) residents reported using a brochure (a loose sheet of folded card) to deliver the safety messages was a barrier as staff or family members frequently tidied them away or residents misplaced them, hence the brochure had fewer reviews. The opportunity for residents to autonomously view the video following the education session was very limited as none had the personal technology to take away their own copy for review. Only five residents (15.2%) from one Australian site, where the video was screened three times by the care manager on a communal TV, were able to provide feedback.

Practicality of delivering the education programme

We identified some practical recruitment barriers at three levels namely, organisation, site and resident. At organisational level we encountered withdrawal of an aged care provider due to the need to attend to other issues (i.e., meeting accreditation requirements) and at individual site level withdrawal due to an infectious disease outbreak. Staff also reported that their colleagues who had not attended the staff education session were mostly ‘too busy’ to fully engage with the education guide during their shifts, despite copies being readily available in the staff meeting areas. Access to residents and staff for post-programme data collection posed some difficulties due to competing priorities at sites. These included, for example, residents having spontaneous family visits.

Adaptation and Integration of the education programme

All participants (residents and staff) provided valuable feedback on the falls prevention education programme that led to adaptations to make it more acceptable for implementation and hence more likely to be integrated into clinical practice. For example, one Australian staff member (S5) suggested for future programme roll out, 'frequency... instead of having everything all at once [12 safety messages]…focus on one thing at a time, it allows that person to focus on that one thing, throughout the week they are thinking about it and the next week they learn another one'. Detailed recommendations are shown in Table 3 mapped to the relevant feasibility areas of focus (Bowen *et al*., 2009).

Table 3. *Recommendations for improving falls prevention education programme feasibility*

Feasibility criteria	**Recommended adaptations**
Improve intervention acceptability	• Provide residents with the opportunity to personalise their chosen resource (either poster or brochure via electronic copy) to meet their aesthetic preferences • Re-design the brochure with larger font and more spacing between messages • Modify questionnaire responses to simpler format (Yes/No/Unsure) and pilot for better understanding and reliability

Increase intervention demand for future expansion	• Co-design programme adaptations with residents living with cognitive impairment, their family and staff to meet their specific needs (aiding recruitment)
Improve ability to implement the intervention and integrate into practice	• Researchers to embrace participatory designs and increase opportunities for participants to contribute to all aspects of the research (design, delivery, evaluation and dissemination) to improve integration of the programme into practice • Break down the program into more manageable learning components e.g. having a weekly focus on a single safety message for a 12 week cycle (covering 12 messages) to facilitate learning • ACH management to provide frequent opportunities for residents to watch video e.g. play before screened movies or evening news on communal large screen increasing access • ACH management to provide learning opportunities for all staff enabling them to assist residents with programme engagement • ACH management to provide opportunity (through workload re-structure?) for staff to assist residents to enact safety messages on a daily basis

	• ACH management to establish accountability measures for staff assisting residents with safety message enactment e.g. using audit and feedback
Improve practicality for delivering the intervention	• ACH management to provide opportunity (through workload re-structure?) for staff to assist residents to enact safety messages on a daily basis • Researchers to identify and network with a number of ACH organisations as potential participants (preferably those with prior experience of research participation) to combat withdrawal

Notes: ACH - Aged Care Home(s)

Discussion

This feasibility study provides new insights regarding how to design and deliver effective falls prevention education with residents and care staff in the ACH setting. Having residents participate in the programme design was perceived as refreshingly different and worthwhile by both staff and residents in Australia and Wales, with diverse views expressed. This was similar to studies of community dwelling older people that showed participants are more likely to adopt fall prevention messages when they are involved in the design, where their needs and preferences can be incorporated (Bulsara *et al.,* 2016; de Jong *et al.,* 2019; Hill *et al.,* 2016; Mwanri and Fuller, 2003).

There was some evidence suggesting that safety messages had been learnt and new behaviours adopted in both countries. Residents were observed enacting safety

strategies, such as ensuring an area was well lit or steadying themselves after they stood up, supported by staff, in their daily activities. These observed behaviour changes could be attributed to providing residents with a range of well-designed education resources that could be read, heard or viewed accommodating their preferred learning style (Dreeben, 2010; Heng *et al.*, 2020).

For some residents our colour choice was not aesthetically pleasing and thus probably less acceptable for resource engagement. Utilising the yellow end of the colour spectrum is a strategy used to combat age-related changes to the eye, which include decreased function of the blue cone mechanism (Dittmar, 2001). Our findings showed that for some residents their personal aesthetic preference maybe more important than evidence-based colour selection. Hence customising printed resources for resident preferences could enable a more person-centred approach for improved engagement, in line with ACH cultural change recommendations that aim to empower residents in decision-making (Zimmerman *et al*., 2014).

We encountered several paradoxes similar to those reported by older people in hospital and community settings (de Jong *et al.,* 2019; Hill *et al.,* 2016), that challenged programme demand. The demand for resident falls prevention education was either trivialised as 'just common sense' or deemed irrelevant where the presence of staff or family 'to do everything for me' negated the need to learn about keeping themselves safe (de Jong *et al.,* 2019; Hill *et al.,* 2016; Lee *et al.,* 2013). This suggests that more effort is required in changing the ACH culture of institutionalised task-based care to de-institutionalised models that foster a more person-centred approach facilitating independence (Zimmerman *et al*., 2014).

Implementation success was not observed to be nation dependent, rather it was associated with supportive site leadership by the ACH care manager. This was exemplified in Australia at one site where the care manager took responsibility for screening the video for residents to watch and in Wales one site care manager had the research project as a daily handover agenda item. This supportive leadership prompted staff to engage more with the educational resources and assist residents. Similarly, a realist evaluation of implementing falls prevention strategies in ACH reported that sites where care managers had invested in and prioritised falls prevention interventions was an important mechanism for implementation success (Francis-Coad *et al.*, 2018). Our study identified some non-adherence related to resident engagement with the education resources. Non-adherence in health care has been classified into three types, we encountered Type II in which participants want to comply with the intervention, but the environment or conditions are not conducive with adherence (Dreeben, 2010). Firstly, staff not understanding the importance of putting up the poster or placing it where residents were able to easily view it in their rooms contributed to non-adherence in both countries. Consequently, these actions may have prevented motivated residents in engaging with the safety messages and possibly compromised resident safety. A study evaluating care staff fall prevention knowledge and awareness in ACH reported low levels of falls risk awareness in residents they cared for and similarly identified gaps in care staff knowledge that were detrimental to resident safety. This suggests that care staff are unlikely to identify and assist residents at risk of falling if falls prevention education is not mandatory and ongoing (Francis-Coad *et al.,* 2019). Secondly, staff reported they were too busy to engage with the education resources and consequently more than half the residents reported staff had not reminded them to engage with the safety messages. Staff having

limited time to engage in research project activity and workplace learning have been reported as barriers to enabling research in other ACH studies (Francis-Coad *et al.,* 2018a; National Institute of Health Research, 2018). In addition, workload time pressure has been identified as a barrier to care staff having the opportunity to assist residents with falls prevention. This may be attributed to additional duties being added to the care staff role, such as cleaning and laundry, which requires addressing at the management level (Francis-Coad *et al.,* 2019).

A key difference in context between the two countries was the staffing mix. The absence of professional staff in Wales, such as physiotherapists who often have a responsibility for falls prevention, appeared to have minimal impact on residents' levels of knowledge. This may partly be explained by the low direct contact time physiotherapists in ACH settings have to spend with residents, which on average is only 2.3% of an eight hour shift combined with responsibilities across other areas of chronic and acute care management (Leemrijse *et al*., 2007).

Our findings highlighted a translation gap remains, in that many residents, despite having some knowledge and awareness of falls risks, were still unclear on how to translate safety education into action. A systematic review of educational interventions to empower ACH residents reported that individually tailored education programmes using structured educational strategies were successful in empowering residents to improve health care behaviour (Schoberer *et al.,* 2016). This suggests that adapting future falls prevention education programmes for residents to utilise a tailored approach may be beneficial in improving translation.

Strengths and limitations

We partnered with residents and staff as co-designers of the falls prevention education programme enabling an informed and authentic perspective. This acknowledged the recommendation for adopting a more ethical approach to research design by conducting research in partnership 'with' a community rather than doing research 'on' a community (Blumenthal *et al.,* 2013; National Institute of Health Research, 2016). However, co-designing in this setting was challenging as participation across all phases of the research was seen as an additional burden by many residents with complex comorbidities and frailty, resulting in limited numbers wanting to volunteer. This was a feasibility study with a small sample therefore findings may not be generalizable to other ACH settings. Nonetheless, it was conducted in five ACH in two countries where similar resident and staff views were expressed, which adds credibility to the findings. Residents in this study found responding to a 5-point Likert scale too complicated, which may have jeopardised the reliability of the quantitative findings, despite the questionnaire having been tested previously in ACH and approved by the consumer panel. However, the mixed methods design provided rich qualitative data that strongly contributed to the credibility of recommended programme adaptations. We confirmed a need for expanding the intervention as residents with cognitive impairment, who make up more than half of the ACH population (Australian Institute of Health and Welfare, 2020; Onder *et al.,* 2012), were not included in this study as the education programme was primarily designed for those residents with better levels of cognition. Previous work, including in falls education, shows that older people with limited cognition have differing learning needs compared to those with intact cognition (Montero-Odasso and Speechley, 2018; Vasse *et al.,* 2010). For example, loss of the ability to comprehend text would require adapting message delivery to alternative more understandable formats, such as using

gestural cues that are easier for residents living with cognitive impairment to interpret (Vasse *et al.,* 2010). In addition, involving family members of residents living with cognitive impairment alongside them through the co-design phases could facilitate proxy participation in developing meaningful programme adaptations (Peach *et al*., 2017). Therefore, we plan to work similarly with residents who have limited cognition, their family and staff in co-designing programme a that best meet their needs.

Conclusion

Designing a fall prevention education programme with residents and care staff supported positive behaviour change. Findings also identified barriers and subsequent recommendations to improve the feasibility of delivering the programme to residents in ACH settings. Residents confirmed a 'one size fits all' approach is not acceptable and suitable choices must be provided in both programme resource format and aesthetics if they are to engage with and enact safety messages. Care staff also need to be knowledgeable regarding fall prevention and be afforded the opportunity to assist residents in translating safety messages into action as part of everyday care. Further research is required to trial the effectiveness of falls prevention education for residents incorporating the programme adaptations identified.

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Appendix 1

Resident Survey (questions only)

	Questions
1	I think that older people who are admitted to care homes (like this one) are at risk of falling over.
2	I think that I will fall over at some time whilst living here (in a care home)
3	I think that if an older person who lives in a care home falls over they are likely to get a serious injury (such as a sprain, broken bone or bumped head)
4	I think that if I were to fall over I would be likely to get a serious injury
5	I am aware of the things I need to do to stay safe and reduce my risk of falling
6	I am confident in my ability to do the things I need to do to stay safe and reduce my risk of falling
7	Why do you think older people fall over?
8	I feel positive about staying safe and reducing my overall risk of falling
9	I am provided with every opportunity to do the things I need to do to stay safe and reduce my risk of falling
10	In the next month, I intend to do the things I need to do to stay safe and reduce my risk of falling
11	I have a clear plan of how I will do the things I need to do to stay safe and reduce my risk of falling
12	Tell me what you currently do to stay safe and reduce your risk of falling
13	Is there anything that might make it difficult for you to do the things you need to do to stay safe and reduce your risk of falling?
14	**Pre**: Is there anything the staff could do to help you stay safe and reduce your risk of falling?

	Post: Did the staff remind you about the messages on the poster and brochure to help you stay safe and reduce your risk of falling?
15	**Pre:** Have you received any education (information) on how to stay safe and reduce your risk of falling? Would you mind telling us about it? **Post**: Can you tell me what you thought of the poster? Can you tell me what you thought of the brochure? Can you tell me what you thought of the video?
16	Any other comments?

Notes. COM-B application: Questions 1-5, 7, 12 & 13 relate to 'Capability', questions 9, 11 & 13 relate to 'Opportunity' and questions 6, 8 & 10 relate to 'Motivation'

Staff interview guide

Questions and prompts
Was this the first time you've undertaken falls prevention training? (If not) Was this experience different to previous occasions?
Regarding the training, what did you think worked well?
Did you learn anything new? Can you remember any of the safety messages (rhymes)?
What interested you most? Why? (prompt if needed: video, poster, training guide)
Were there any disappointments regarding the training or resources?
Did anything frustrate you?
Do you think there are any changes that should be made to the training guide? (Can you describe?)
Do you think there are any changes that should be made to the video? (Can you describe?)
Was there anything unexpected in the training? What questions were raised in your mind?
Who can you share the new information with?
Who can you problem solve with if needed?
Have you observed any (behaviour) changes in the residents who received the education program? (Prompt: undertaking measures to stay safe and reduce their falls risk)
Do you want to share any other thoughts on the safety/fall prevention training or resources?

Appendix 3

eTable a. *Education programme modifications*

	Modifications
Poster & Brochure	• Image and text order flipped so images preceded text when reading from left to right • Text bubbles were connected to images • Borders were added to all images for visual clarity • Two replacement photographs were added with a clearer background for the exercise demonstration and close-up of the call bell
Video	• Voiceover by the lead researcher for clarity and accuracy of information • Copied onto USB drives in mp4 format for all participating sites to view on either a smart TV, computer screen or tablet
Staff Education Guide	• Additional text explanations of the care staff role in assisting residents to reduce their risk of falling using the resources were added to improve readability and understanding
Print format	• Poster single side A3 matt paper 300 dpi Times New Roman (bold) font 60 • Brochure double sided A4 (folded) matt paper 300 dpi • Staff education guide double sided A4 (flip format binded) matt paper 300 dpi Calibri (body) font 16-22

eTable b. *Comparison of residents' capability, opportunity and motivation to prevent falls*

Item	SA *Pre / Post	A *Pre / Post	U *Pre / Post	D *Pre / Post	SD *Pre / Post	p value
I think that older people who are admitted to care homes (like this one) are at risk of falling over	7/4	12/18	5/4	11/6	0/1	0.258
I think that I will fall over at some time whilst living here in a care home	5/4	18/16	4/5	7/7	1/1	0.703

Item	SA *Pre / Post	A *Pre / Post	U *Pre / Post	D *Pre / Post	SD *Pre / Post	p value
I think that if an older person who lives in a care home falls over they are likely to get a serious injury (such as a sprain, broken bone or bumped head)	5/6	19/20	6/5	5/2	0/0	0.315
I think that if I were to fall over I would be likely to get a serious injury	3/4	16/12	9/8	7/9	0/0	0.325
I am aware of the things I need to do to stay safe and reduce my risk of falling	9/11	22/21	3/1	1/0	0/0	0.317

Item	SA *Pre / Post	A *Pre / Post	U *Pre / Post	D *Pre / Post	SD *Pre / Post	p value
I am confident in my ability to do the things I need to do to stay safe and reduce my risk of falling	3/6	21/21	4/1	7/4	0/1	0.224
I feel positive about staying safe and reducing my overall risk of falling	5/3	24/24	2/1	4/5	0/0	0.711
I am provided with every opportunity to do the things I need to do to stay safe and reduce my risk of falling	10/5	23/26	2/1	0/1	0/0	0.134

Item	SA *Pre / Post	A *Pre / Post	U *Pre / Post	D *Pre / Post	SD *Pre / Post	p value
In the next month, I intend to do the things I need to do to stay safe and reduce my risk of falling	5/8	26/22	3/2	1/1	0/0	0.475
I have a clear plan of how I will do the things I need to do to stay safe and reduce my risk of falling	3/6	17/14	7/1	8/12	0/0	0.933

Notes: SA Strongly Agree, A Agree, U undecided, D Disagree, SD Strongly Disagree
*Pre-intervention / Post-intervention
Missing data n=2 (Post-intervention)

This is the peer reviewed version of the following article:
Martínez-García, A. (2022), "Contributions of universal school-based mental health promotion to the wellbeing of adolescents and preadolescents: a systematic review of educational interventions", *Health Education*, Vol. 122 No. 5, pp. 564-583. https://doi.org/10.1108/HE-07-2021-0106

Article abstract:

Purpose – To determine the contributions of universal school-based educational programs to the current and future worldwide youth mental health condition.
Design/methodology/approach – A systematic search was conducted in accordance with the PRISMA 2020 guidelines. Academic education and health databases including ERIC, Education Database, APA PsycInfo, APA PsycArticles, Psychology Database, and PubMed were used. Characteristics and outcomes of educational interventions developed in school settings and education potential for mental health promotion were examined.
Findings – Universal school-based mental health educational programs positively affect preadolescents and adolescents. The study review provided further insight into educational programs' characteristics and identified two primary curricula foci: mental health education and development of resiliency traits and skills.
Originality/value – Research on mental health promotion using a pedagogical approach is rare as most studies focus on mental health symptomatology and psychotherapy techniques training.

Contributions of universal school-based mental health promotion to the wellbeing of adolescents and preadolescents: A systematic review of educational interventions

Journal:	*Health Education*
Manuscript ID	HE-07-2021-0106.R2
Manuscript Type:	Original Article
Keywords:	Mental health promotion, resilience, school mental health, Adolescents, mental health and young people, Education

Contributions of universal school-based mental health promotion to the wellbeing of adolescents and preadolescents: A systematic review of educational interventions

Abstract

Purpose: To determine the contributions of universal school-based educational programs to the current and future worldwide youth mental health condition.

Design/methodology/approach*:* A systematic search was conducted in accordance with the PRISMA 2020 guidelines. Academic education and health databases including ERIC, Education Database, APA PsycInfo, APA PsycArticles, Psychology Database, and PubMed were used. Characteristics and outcomes of educational interventions developed in school settings and education potential for mental health promotion were examined.

Findings*:* Universal school-based mental health educational programs positively affect preadolescents and adolescents. The study review provided further insight into educational programs' characteristics and identified two primary curricula foci: mental health education and development of resiliency traits and skills.

Originality/value*:* Research on mental health promotion using a pedagogical approach is rare as most studies focus on mental health symptomatology and psychotherapy techniques training.

Keywords: Mental health promotion, educational intervention, resilience, emotional wellbeing, adolescents, preadolescents.

Paper type: Literature review.

Introduction

Adolescent mental health issues have become a major concern worldwide; one in every six people aged 10–19 suffers from a mental health disorder (WHO, 2020). Mental health disorders are conditions characterized by altered emotions, thinking and/or behavior that are associated with distress or difficulties in social, occupational, academic and familial environmental functions (APA, 2018).

However, COVID-19 has caused the imposition of social isolation measures that have changed the lifestyles of young people. Future mental health concerns may increase as peer interaction—a vital aspect of this age group's development—has been restricted (Orben *et al.*, 2020). The effects of social deprivation on the development of adolescents and their mental health are expected, as social isolation is associated with an increase in depressive symptoms, low self-esteem, and self-harm (Hall-Lande *et al.*, 2007).

Moreover, adolescence has been identified as a critical period in identity development and a determining factor for the onset of psychopathologies (Sharp and Wall, 2018). Approximately 50% of adult mental disorders begin before the age of 14, and 75% before the age of 24, though the majority remain untreated (Kessler *et al.*, 2005). Adolescents experience constant physical, cognitive, and social changes that act

as stressors (Voltas and Canals, 2018) and are possible triggers of mental health problems.

As this stage in life is critical for the emergence of mental health problems, promoting universal mental health interventions must focus on the wellbeing of both adolescents and preadolescents. Additionally, preadolescence onsets (9–11 years of age) predict later mental health concerns (Keenan *et al.*, 2008), while an early onset increases the risk of persistence and comorbidity for mental health disorders (Caspi *et al.*, 2020).

To access this population, schools are being tasked with the responsibility of reaching out to this population. Schools are environments in which most adolescents spend majority of their time, and they provide an ideal setting for this population (WHO, 2001). Educational stages that include adolescents and preadolescents are mostly secondary schools and middle schools or primary schools, depending on the country's educational system. These schools are frequently used to implement preventive and therapeutic interventions through psychotherapy, as well as skill training, as reviewed by Das *et al.* (2016).

Nowadays, universal mental health/wellbeing school-based promotion programs are a combination of a variety of interventions, as reviewed by O'Connor *et al.* (2018). Nevertheless, numerous programs focus on promotion by reducing risk factors based on therapeutic techniques' application (e.g. cognitive behavioral techniques and mindfulness). Therefore, schools are being studied as convenient environments for intervention, though educational contributions in the development of mental health remain less explored (O'Toole, 2017).

Promoting mental health

Mental health is defined as a state of wellbeing, not just the absence of mental illnesses. This state enables people to recognize their abilities, deal with stress in life, work productively, and contribute to their community (WHO, 2018). Thus, mental health is considered to be found on the mental health continuum, which includes multiple degrees of wellbeing different from complete health and diagnosable diseases (Keyes, 2002). In this continuum, there is room for promoting the mental health of every student who aspires to flourish. Mental health promotion focuses on developing competencies, resources, and strengths, whereas mental disorder prevention is concerned with specific illnesses and attempts to minimize their incidence, prevalence, or severity (Barry, 2001). Additionally, health promotion aims to support social and personal development by providing health-related information and education and enhancing life skills (WHO, 1986). Mental health promotion programs frame mental health in a positive light and focus on strengths, abilities, and self-efficacy (Weissberg *et al.*, 1991).

In mental health promotion, the concept of resilience allows for understanding the relationship between protective and risk factors. Resilience is defined as a lifelong process of learning that develops the ability to maintain or regain mental health despite

experiencing adversity (Wald *et al.*, 2006) and that involves facing risk situations by putting capacities and resources at stake (Muñoz and de Pedro, 2005). Protective factors for resilient adolescents are peer acceptance, family connectedness, school connectedness, and personal attributes such as high self-esteem (Costello *et al.*, 2008), high perceived self-efficacy (Sagone *et al.*, 2020), optimism, and life satisfaction (Piko *et al.*, 2009).

Because of resilience's critical role in student mental health, educational mental health promotion interventions also target resilience-related skills. These skills can be labeled as self-efficacy, self-esteem, and problem-solving, coping, life, communication, and healthy relationships skills. As students spend the majority of their developmental years in a formal educational setting, schools play a significant role in teaching resilience through the acquisition of social and emotional skills (Ciarrochi *et al.*, 2019). Social and Emotional Learning (SEL) programs are educational interventions that target wellbeing through social and emotional skills. CASEL (2020) describes SEL as an integral part of education that comprises knowledge, skills, and attitude acquisition. SEL programs promote wellbeing by working on aspects such as self-awareness, self-management, social awareness, relationship skills and responsible decision-making. These interventions have proved efficacy in improving emotional adjustment, behavioral adjustment, and internalizing symptoms, as reviewed by Goldberg *et al.* (2019). SEL programs often are multicomponent interventions with a whole-school approach and comprise coordinated learning curricula and actions concerning the school environment, family-school partnerships, and community-school partnerships (CASEL, 2020).

When promoting resilience, other protective factors included in the promotion of wellbeing are goals definition, hope, optimism, and life satisfaction. Optimism (Sánchez and Méndez, 2009) and life satisfaction (Proctor *et al.*, 2009) are related to depressive symptomatology prevention as resources for coping with hopelessness. Hope and optimism promotion interventions have demonstrated efficacy in suicide (Horwitz *et al.*, 2017) and depression prevention (Shatté *et al.*, 2000). Nevertheless, these programs are based on the training of psychology techniques, and educational interventions on learning hope are focused on skill development.

Moreover, educational wellbeing promotion programs can target mental health literacy, anti-stigma education, and help-seeking behavior. Mental health literacy is defined as the competencies and knowledge that people need for understanding mental disorders, obtaining and maintaining mental health, enhancing help-seeking, and decreasing stigma (Kutcher *et al.*, 2016). The purpose of mental health literacy programs is to inform and educate participants about mental health concerns, early detection of psychological problems, and appropriate help-seeking mechanisms (Kelly *et al.*, 2007). Nevertheless, help-seeking behavior faces the mental health stigma barrier (Clement *et al.*, 2015; Wynaden *et al.*, 2014). Anti-stigma education aims to change public perceptions of mental health problems to reduce stigma and discrimination (Pejović-

Milovancević *et al.*, 2009). These interventions can consist of a learning curriculum or combine it with intergroup contact practices and people who also suffer from mental conditions to potentiate the understanding of mental illnesses and experiences of people with mental health conditions and combat the stigmatization of attitudes and behaviors (Yamaguchi *et al.*, 2011).

The present study

The primary purpose of this review is to determine the contributions of universal school-based educational programs to the current and future worldwide youth mental health condition. To accomplish this, the research question for this review was formulated by following a PICO strategy (Schardt *et al.*, 2007):

What are the contributions of universal school-based mental health educational promoting interventions in the wellbeing of preadolescents and adolescents?

To address this question, it is necessary to examine the characteristics and outcomes of educational interventions developed in the school setting and identify where the goals and potential utility of pedagogical responses for mental health promotion. Therefore, studies published in the last decade were reviewed to conduct a study on the latest trends in educational mental health promotion programs, such as resilience, mental health literacy or SEL.

Educational programs are sets of educational activities designed to achieve predetermined objectives. Achieving this goal frequently involves a sequence of structured learning experiences (UNESCO, 1997). This study intends to better understand the educational focuses of school-based mental health promotion programs that are integrated into the school's teaching curricula and other educational initiatives. Additonally, the review considered other possible didactic characteristics that may influence outcomes such as intervention flexibility. The educational program content can be sequenced and organized into specific implementation manuals, or the program's implementation and sequencing can be flexible. Flexible intervention allows for a better intervention adjustment to both context and student learning needs, while manualized interventions are expected to have similar effects on every implementation setting as they follow specific didactic guidelines (Durlak *et al.*, 2011).

As adolescence (12–18 years of age) and preadolescence (9–11 years of age) are critical mental health intervention stages, this review particularly focused on interventions including middle school students (and its equivalent grades in primary schools) and secondary school. Therefore, the resulting sample age range considered was 8 to 21 years of age. The sample included 8-year-old students because these are also included in the academic year of 9-year-old. Moreover, students up to the age of 21 were included because other studies included high school students of this age.

Method

A systematic search was conducted in March 2021 in accordance with the PRISMA 2020 guidelines (Page *et al.*, 2021). Academic and healthcare databases including ERIC, Education Database, APA PsycInfo, APA PsycArticles, Psychology Database, and PubMed were used. Search terms included: educational program, educational intervention, young people, adolescent, school-based, mental health promotion, emotional wellbeing, resilience, social-emotional learning, and effect.

Inclusion criteria

To be eligible for inclusion in the final sample, reports needed to have (a) been published between 2011 and February 28th, 2021, (b) evaluated educational school-based universal mental health promotion programs, (c) targeted population aged 8-21, (d) incorporated dependent variable measures relating to general mental health, emotional/mental wellbeing, emotional resilience, self-efficacy, anxiety symptoms or depressive symptoms, and (e) included quantitative pre-test and post-test outcome measures.

Articles included assessment of educational programs, which are characterized by the presence of learning goals for mental health/wellbeing, such as knowledge goals, attitudinal goals, and/or skill development competencies. Educational programs must have specific learning curricula designed for delivery through teaching-learning processes and pedagogical practices by educators or trained personnel. Additionally, learning curricula can be combined with other pedagogical actions performed in formal school settings that involve educational agents or environmental changes (e.g., family workshops, peer tutoring, and student-help networks).

Exclusion criteria

A study was excluded due to the following reasons: (a) evaluation of specific disorder prevention programs, (b) intervention-target participants with preexisting mental health problems, (c) evaluation of therapeutic intervention programs or programs on specific psychotherapy techniques (e.g., cognitive-behavioral intervention programs), and (d) sample participants are adults over the age of 21.

Study selection

Academic databases identified 801 records using the search string made of all combined search terms. After the removal of all duplicates, 468 records remained. Following the exclusion of titles, 73 reports were sought for retrieval, of which 65 were assessed for eligibility. Additional 24 papers were identified by term search and bibliographic search in reference lists, of which 20 were retrieved. A total of 85 reports were thoroughly assessed.

After excluding reports that did not meet the criteria, 14 reports (belonging to 14 studies) were eventually included.

Figure 1 represents the study selection and assessment process using a PRISMA 2020 flow diagram. A PRISMA 2020 checklist was employed to conduct the review (Page *et al.*, 2021).

----------Figure 1 (PRISMA chart describing search and inclusion procedures)----------

Study Coding

Table I summarizes the characteristics of the 14 studies selected. A single researcher conducted the coding process. Studies were coded using general codes: sample size, participants, study design, method, comparison group and results. Moreover, 14 educational interventions of the assessed studies are synthesized in Table II. Specific educational intervention codes were used based on the literature of previous school-based mental health promotion programs: duration, educational foci of the interventions, intervention structure (manualized or flexible implementation), intervention components (curricula, outside-of-class initiatives, and whole-school intervention), gauging mechanism, and outcomes.

----------Table I (Table detailing study characteristics)----------

----------Table II (Table detailing educational intervention characteristics)----------

Results

Of the selected studies, 12 were conducted in the last five years (i.e., 2016 to 2021). The two remaining studies were published between 2011 and 2015. Half of the studies used quasi-experimental designs and allocated entire school classes to treatment groups. Nevertheless, cluster designs were used by the other half of the studies. Nine of the studies included a comparison control group. Besides, two used different age comparison groups and one study employed different treatments comparison groups. The study's methodology was quantitative in nine studies, and both quantitative and qualitative (mixed methods) in five studies.

Risk of biased assessment

Cochrane risk of a biased assessment tool (Higgins and Green, 2011) was used to evaluate the risk of biases in the included studies.

Only two studies used a *random sequence generation* method (Chisholm *et al.*, 2016; Dray *et al.*, 2017) and were rated *low* for risk of potential biases. Two studies did not explain sequence generation (Gigantesco *et al.*, 2015; Green *et al.*, 2021), and one study was not fully randomized (Pannebakker *et al.*, 2019); these were rated *unclear*. The rest of the studies were not randomized and were rated *high*.

The risk for biases associated with *allocation concealment* was explained in only one of the studies (Chisholm *et al.*, 2016). This dimension was rated *unclear* for every study.

Blinding of participants and staff was not discussed in any of the studies. Due to the educational condition of these interventions, participants were aware they were learning about a specific topic or participating in a learning program. Every study was rated *low* for this dimension, except one which was rated *unclear* (Kirby *et al.*, 2021), as people volunteered to participate in the program.

Two studies were rated *unclear* for the dimensional bias *blinded outcome assessment* (Pannebakker *et al.*, 2019; Raval *et al.*, 2019) as they included teachers who were been blinded. However, other studies obtained a low-risk rate as the outcomes were measured using self-report instruments.

Incomplete outcome data risk for biases was *high* for two studies (Kirby et al., 2021; Punukollu *et al.*, 2020), *unclear* for two studies (Kelley *et al.*, 2021; McMullen and McMullen, 2018), and *low* for the remaining ten studies.

In the dimension bias *selective reporting*, the level of risk was predominantly *low*, and only three studies were rated *unclear* (Kelley *et al.*, 2021; Kirby *et al.*, 2021; Punukollu *et al.*, 2020).

Additional critical sources of biases such as gender differences between experimental groups (Kelley *et al.*, 2021) and sample size (Kirby *et al.*, 2021) were found; these were rated *high*. Two studies obtained unclear risk of biases caused by differences in treatment implementation (Dray *et al.*, 2017) and nested design (Green *et al.*, 2021).

The Robvis visualization tool was used to create summary tables and charts assessing the risk for bias (McGuinness and Higgins, 2021). These have been depicted in Figures 2 and 3.

----------Figure 2 (Risk of bias summary table)----------

----------Figure 3 (Risk of bias summary graphics)----------

Participants

A total of 12,040 participants with an age range of 8–21 years (248 primary school, 390 middle school, and 11,402 secondary school students) were included in the 14 selected studies. Participants included 6,028 male, 4,566 female, and 1,446 unspecified gender students.

There was a wide range of study sample sizes; one study had fewer than 100 participants (Kirby *et al.*, 2021), three had 100–200 participants (McMullen and McMullen, 2018; Raval *et al.*, 2019; Veltro *et al.*, 2017), four had 200–400 participants (Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; Punukollu *et al.*, 2020), four had 700–1500 participants (Chisholm *et al.*, 2016; Lapshina *et al.*, 2019; Pannebakker *et al.*, 2019; Schwager *et al.*, 2019) and two had over 2,000 participants (Dray *et al.*, 2017; Wigelsworth *et al.*, 2012).

Educational focuses

Analysis of educational programs described in studies generated two primary educational foci: resilience traits and skills and mental health education.

The first one, "resilience traits and skills," was present in 13 studies. This focus was a compound of primary areas, including social and emotional aspects, problem-solving skills, self-efficacy, self-esteem, and optimism. Social and emotional aspects were identified in 11 studies. This domain was included in programs targeting SEL (Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; Raval *et al.*, 2019; Wigelsworth *et al.*, 2012), social skills (Pannebakker *et al.*, 2019), emotional education (Schwager *et al.*, 2019), communication skills (Dray *et al.*, 2017; Green *et al.*, 2021; Lapshina *et al.*, 2019), social cohesion/integration (McMullen and McMullen, 2018; Schwager *et al.*, 2019), and peer support (Punukollu *et al.*, 2020).

Other resilience skills were included in 8 interventions. This dimension was included in the curricula of programs aiming for resilience improvement (Dray *et al.*, 2017; Kelley *et al.*, 2021), life skills (McMullen and McMullen, 2018; Schwager *et al.*, 2019; Veltro *et al.*, 2017), coping skills (Punukollu *et al.*, 2020), and problem-solving skills (Dray *et al.*, 2017; Gigantesco *et al.*, 2015; Green *et al.*, 2021; Veltro *et al.*, 2017).

Moreover, educational targets related to self-efficacy (Dray *et al.*, 2017; Pannebakker *et al.*, 2019; Veltro *et al.*, 2017) and self-esteem (Pannebakker *et al.*, 2019; Schwager *et al.*, 2019) are included in 4 interventions.

In addition, optimism related targets were identified in 3 programs. Targets of this dimension were related to developing hope and optimism (Kirby *et al.*, 2021) and goals definition (Dray *et al.*, 2017; Veltro *et al.*, 2017).

The second educational focus, "mental health education," was found in 5 educational programs. Its targets are related to reducing mental health stigma (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015), raising mental health awareness and literacy (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Kirby *et al.*, 2021; Punukollu *et al.*, 2020), and promoting help-seeking behaviors (Chisholm *et al.*, 2016; Lapshina *et al.*, 2019).

Structure of educational interventions

Educational interventions described in the selected studies differed in their implementation structure. Manual-based educational programs, comprising structured and sequenced sessions and activities, accounted for 11 interventions (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Punukollu *et al.*, 2020; Raval *et al.*, 2019; Veltro *et al.*, 2017). The remaining three programs consisted of flexible implementation activities and curricula from which teachers could select content and activities (Dray *et al.*, 2017; Schwager *et al.*, 2019; Wigelsworth *et al.*, 2012).

Intervention components

Single component interventions consisting of a learning curriculum accounted for 9 studies (Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Raval *et al.*, 2019; Veltro *et al.*, 2017). Two studies used a whole-school approach, combining learning curricula with family partnerships and school environmental actions (Dray *et al.*, 2017; Wigelsworth *et al.*, 2012). Two studies included components other than curricula, such as a peer support network and an educational mobile app (Punukollu *et al.*, 2020) and aimed to transform the school environment through the use of visual aid, such as posters, to raise mental health awareness (Schwager *et al.*, 2019). One of the studies included intergroup contact with people suffering mental health concerns combined with learning curricula (Chisholm *et al.*, 2016).

Outcome measures

Measure instruments for mental health concerns were included in 13 studies. Intervention outcomes were measured in terms of overall wellbeing and mental health symptomatology using the Strengths and Difficulties Questionnaire (SDQ) (Goodman *et al.*, 1998) in 5 studies (Chisholm *et al.*, 2016; Dray *et al.*, 2017; Pannebakker *et al.*, 2019; Raval *et al.*, 2019; Wigelsworth *et al.*, 2012). PWBS (Ryff and Keyes, 1995) was used by Gigantesco *et al.* (2015). Kelley *et al.* (2021) used WEMWBS (Stewart-Brown *et al.*, 2009). Anxiety and depression symptomatology was also measured using other instruments. Kirby *et al.* (2021) used GAD-7 (Spitzer *et al.*, 2006) and SCAS (Spence, 1998). Lapshina *et al.* (2019) used DASS-21 (Lovibond and Lovibond, 1995) and MHC-SF (Keyes *et al.*, 2008). Punukollu *et al*. (2020) used HADS (Zigmond and Snaith, 1983). Veltro *et al.* (2017) employed HBSC for health behaviors (HBSC-Italy, 2004). KINDL-R was used by Schwager *et al.* (2019). McMullen and McMullen (2018) employed AYPA (Betancourt *et al.*, 2014).

Measure instruments for emotional resilience and self-efficacy were included in 9 studies. General Self-Efficacy scale (GSE) (Schwarzer and Jerusalem, 1995), was employed in three studies (McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Schwager *et al.*, 2019). Difficulties in Emotion Regulation Scale Short Form (DERS-SF) (Kaufman *et al.*, 2016) was used in two studies (Green *et al.*, 2021; Kirby *et al.*, 2021). RESE (Caprara *et al.*, 2008) was used by Gigantesco *et al.* (2015). Veltro *et al*. (2017) employed (APEN/G) e (APEP/G) (Caprara, 2004). Kirby *et al.* (2021) used ARQ-R (Gartland *et al.*, 2011) and the How I Feel Scale (Walden *et al.*, 2003). Moreover, Kirby *et al*. (2021) included MACS (Thorsteinsson *et al.*, 2013). Chisholm *et al.* (2016) employed RE (Wagnild and Young, 1993). RYDM (California Department of Education, 2013) was used by Dray *et al.* (2017). RSCA (Thorne and Kohut, 2007), was utilized by Green *et al*. (2020). Punukollu *et al.* (2020) used their own developed scale, Causes of Distress, to measure emotional distress.

Other variables such as social integration/cohesion aspects were measured in 2 studies (McMullen and McMullen, 2019; Schwager *et al*., 2019). Moreover, measures

related to life satisfaction and optimism were included in two studies (Gigantesco *et al.*, 2015; Veltro *et al.*, 2017). Additionally, only one of the studies measured self-esteem (Pannebaker *et al.,* 2019). Moreover, four studies assessed skill development related to the educational programs' content using ad hoc measuring tools (Green *et al.*, 2020; Kelley *et al.*, 2021; Veltro *et al.*, 2017; Wigelsworth *et al.*, 2011).

Regarding learning outcomes, two of the selected studies (Chisholm *et al.*, 2016; Green *et al.*, 2021) assessed mental health knowledge.

Mental health/wellbeing promotion outcomes

Out of the 14 interventions, 12 were identified to be effective for promoting mental health. Five studies reported emotional wellbeing improvements (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Kelley *et al.*, 2021; Raval *et al.*, 2019). Six interventions demonstrated self-efficacy improvements (Gigantesco *et al.*, 2015; Green *et al.*, 2021; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Schwager *et al.*, 2019; Veltro *et al.*, 2017). Resilience enhancement was reported in four studies (Chisholm *et al.*, 2016; Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021). Four studies reported a decrease in mental health disorders symptomatology (Kirby *et al.*, 2021; Lapshina *et al.*, 2019; Pannebakker *et al.*, 2019; Punukollu *et al.*, 2020).

Other reported outcomes include: communication skills improvement in two studies (Green *et al.*, 2021; Veltro *et al.*, 2017), emotional distress/negative emotions reduction in two studies (Kirby *et al.*, 2021; Punukollu *et al.*, 2020), internalizing behavior in two studies (McMullen and McMullen, 2018; Raval *et al.*, 2019), externalizing behavior in one study (Raval *et al.*, 2019), increase in mental health knowledge in two studies (Chisholm *et al.*, 2016; Green *et al.*, 2021), stigma reduction and help-seeking attitude increase in one study (Chisholm *et al.*, 2016), improvement in problem-solving skills in one study (Green *et al.*, 2021), life satisfaction in one study (Gigantesco *et al.*, 2015), goal definition in one study (Veltro *et al.*, 2017), and class climate and social integration in one study (Schwager *et al.*, 2019).

Five out of the six studies with an overall low risk of bias reported that their programs were effective. In addition, these studies agreed on some improvements: improvement in depressive symptoms (Lapshina *et al.*, 2019; Pannebakker *et al.*, 2019) and self-efficacy (Pannebakker *et al.*, 2019; Schwager *et al.*, 2019; Veltro *et al.*, 2017). The remaining low-risk study found no program efficacy (Wigelsworth *et al.*, 2012) on depressive symptoms.

Five studies with an overall unclear risk of bias concluded the efficacy of their assessed program. In these cases, improvements were observed in self-efficacy (Gigantesco *et al.*, 2015; Green et al., 2021; McMullen and McMullen, 2018), internalizing problems (McMullen and McMullen, 2018; Raval *et al.*, 2019), and emotional wellbeing (Gigantesco *et al.*, 2015; Raval *et al.*, 2019). The remaining unclear-risk study (Dray *et al.,* 2017) reported no program efficacy on self-efficacy or improvement in depressive symptoms.

On the other hand, the three studies with a high risk of bias (Kelley *et al.*, 2021; Kirby *et al.*, 2021; Punukollu *et al.*, 2020) claimed the efficacy of their programs and agreed on improvements in student resilience.

Every manualized intervention reported mental health improvements (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Punukollu *et al.*, 2020; Raval *et al.*, 2019; Veltro *et al.*, 2017). Out of the three flexible implementation interventions (Dray *et al.*, 2017; Schwager *et al.*, 2019; Wigelsworth *et al.*, 2012), one demonstrated mental health improvements (Schwager *et al.*, 2019).

Out of 13 interventions including "resilience traits and skills", 11 were reported as effective. Out of 11 interventions that targeted both social and emotional aspects, nine reported efficacy (Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Punukollu *et al.*, 2020; Raval *et al.*, 2019; Schwager *et al.*, 2019). Programs including other problem solving, coping, or life skills reported improvements in seven of eight interventions (Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; McMullen and McMullen, 2018; Punukollu *et al.*, 2020; Schwager *et al.*, 2019; Veltro *et al.*, 2017). Three of the four interventions involving self-esteem and self-efficacy as targets demonstrated positive outcomes (Pannebakker *et al.*, 2019; Schwager *et al.*, 2019; Veltro *et al.*, 2017). Out of three educational programs involving life satisfaction and goal definition, two reported improvements (Kirby *et al.*, 2021; Veltro *et al.*, 2017).

Educational programs focusing on "mental health education" reported effectiveness in all five studies (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; Punukollu *et al.*, 2020).

In addition to these findings, various effects related to age and mental health risk were reported. Two studies reported significant differences in outcomes depending on the adolescent's age (Kirby *et al.*, 2021; Veltro *et al.*, 2017). Veltro *et al*. (2017) found greater efficacy for students aged 12–14 and a significant difference in favor of this age group, such as decreasing irrational beliefs. Nevertheless, more prominent effects on self-efficacy and healthy behavior were reported in adolescents aged 15–16 (Veltro *et al.*, 2017). Kirby *et al.* (2021) reported better outcomes for students between ages 8–11 in anxiety scores and emotional self-regulation.

Differences in efficacy related to initial mental health conditions were reported in two studies (Lapshina *et al.*, 2019; Raval *et al.*, 2019). Both studies concluded that students at high risk of mental health concerns demonstrated the most significant differences between pre- and post-test measures.

Discussion

This literature review provides an appraisal of research evidence published over the last decade on preadolescent and adolescent educational mental health promotion delivered in school settings.

This systematic review aimed to examine possible contributions of school-based educational programs to the ongoing global youth mental health problem. Findings were characterized by their preliminary condition due to the limited evidence on educational programs consisting of pedagogical practices rather than therapeutic interventions. However, the outcomes of this review indicate possible contributions from education and current educational intervention foci. Moreover, school settings have been proven to be a suitable environment for the implementation/promotion of a wellbeing program that enables us to reach a universal youth population as previously reported (Durlak *et al.*, 2011; Goldberg *et al.*, 2019; O'Connor *et al.*, 2018).

The primary finding of this review is that universal school-based mental health educational programs have positive effects on preadolescents and adolescents. Educational interventions improved students' emotional wellbeing/mental health, symptomatology, self-efficacy, emotional resilience, coping skills, problem-solving skills, communication, internalizing and externalizing behavior, life satisfaction, goal definition, mental health knowledge, help-seeking behavior, class climate, and social integration (Chisholm *et al.*, 2016; Gigantesco *et al.*, 2015; Green *et al.*, 2021; Kelley *et al.*, 2021; Kirby *et al.*, 2021; Lapshina *et al.*, 2019; McMullen and McMullen, 2018; Pannebakker *et al.*, 2019; Punukollu *et al.*, 2020; Raval *et al.*, 2019; Schwager *et al.*, 2019; Veltro *et al.*, 2017). Nevertheless, two studies reported that the program had no effects on wellbeing or emotional resilience (Dray *et al.*, 2017; Wigelsworth *et al.*, 2012).

Educational programs included in the reviewed studies demonstrated their contribution to adolescent wellbeing improvement through two different educational functions. These contributions were accomplished via educational foci involved in wellbeing promotion. Mental health promotion programs assessment generated two primary educational focuses: mental health education and resilience traits and skills.

This review established that school education can support healthcare through mental health education. Programs including the educational focus point "mental health education" included learning on mental health literacy, mental health awareness, anti-stigma education, and help-seeking behavior. Through these targets, education raises wellbeing awareness, teaches the early detection of mental health problems, facilitates information, and supports early access to mental health services. Moreover, destigmatizing education reduces mental health stigma barriers and increases help-seeking behavior. The success of this intervention is demonstrated by an increase in help-seeking attitude, a decrease in stigma attitudes, and an increase in mental health knowledge. Nevertheless, results of this review indicate that these interventions improved wellbeing, even in the Chisholm *et al.* (2016) program in which "mental health literacy" was the only educational focus, implying that mental health education may also be related to mental health improvement in some way (Chisholm *et al.*, 2016). The outcomes of these programs imply that education can significantly contribute to issues related to worldwide adolescent mental health by reaching students through universal school-based mental health intervention.

A secondary function that a school could carry out is to develop resilience and personal skills through education. Programs including the educational focus point "resilience traits and skills" demonstrate that emotional resilience is buildable in adolescents, and therefore, students' mental wellbeing can be improved by promoting its acquisition. Reviewed studies proved that universal school-based educational programs could contribute to the improvement of emotional wellbeing by developing self-efficacy, self-esteem, social and emotional aspects, problem-solving skills, internalizing and externalizing problems, communication, and life satisfaction.

While research indicates that adolescent and preadolescent resiliency skills can be improved throughout this stage of life, Veltro *et al.* (2017) found particularly different outcomes depending on the adolescents' age. More significant functional beliefs and life satisfaction outcomes were reported for early adolescents (12–14 years) in comparison to late adolescents (15–16 years). On the other hand, attributes such as self-efficacy and negative emotion management demonstrated greater improvements for adolescents over the age of 14 (Veltro *et al.,* 2017). On the contrary, Kirby *et al.* (2021) found better emotion management in younger students aged 8–11 than those aged 12–14. Nevertheless, these findings have been compromised due to small-sample sizing and high-risk bias, as students volunteered to participate in the program. Different age-related outcomes might imply that developmental stages have an essential role in resilience skills and attribute building. Such age comparison findings could enable the design of educational programs sensitive to the cognitive development and maturation rate of adolescents.

Educational mental health promotion programs also showed different effects depending on the risk for students to develop mental health difficulties (Lapshina *et al.*, 2019; Punukollu *et al.*, 2020). However, Punukollu *et al.* (2020)'s outcomes were compromised due to incomplete outcome data. These findings suggest that universal programs can have more significant beneficial effects on those students at risk—those who most need them—while also benefitting all students. These preliminary outcomes indicate the high potential of universal school-based interventions in addressing every student's healthy development needs.

Moreover, manualized interventions with structured and sequenced lessons have demonstrated better results than flexible interventions with non-sequential lessons. This preliminary finding carefully denotes designed didactic planning, and content sequencing seems critical for successful mental health promotion educational interventions. Development of some skills might need activities and content coordination and specific order for learning, according to (Durlak *et al.*, 2011).

Multicomponent programs have demonstrated less efficacy than single-component programs. However, three out of four of the interventions with components other than curricula were also adaptable in terms of implementation. This circumstance made it difficult for an effective assessment, as the structure on which interventions have been implemented have influenced efficacy (Durlak *et al.,* 2011), and another

review on multicomponent interventions concluded this as well (Goldberg *et al.,* 2019). Due to uncertainty, conclusions about the effectiveness based on program components cannot be enunciated.

Previous universal school-based mental health promotion intervention reviewed by O'Connor *et al.* (2017) indicated the disparity in dependent variables and their gauging mechanisms in this field and its consequent difficulty in comparing results from different types of intervention. Due to this problem, this review pays special attention to it. Overall wellbeing was identified as the primary outcome variable, which was assessed predominantly using the SDQ (Goodman *et al.*, 1998) and alternatively measured using other wellbeing scales. In addition, self-efficacy and emotion regulation, as wellbeing mediators, are measured in the majority of studies. The most frequently used instruments were the GSE (Schwarzer and Jerusalem, 1995) scale and DERS-SF (Kaufman *et al.*, 2016). Despite the wide variety of gauging mechanisms and dependent variables, these similarities shed some light on/into the capacity to measure the variable.

Strengths and limitations

The inclusion of diverse design studies has enabled the understanding of existing evidence. Therefore, this study provides an overview of the current state of promoting and intervening in wellbeing awareness over the last decade. However, high risks of biases present in some studies (Kelley *et al.*, 2021; Kirby *et al.*, 2021; Punukollu *et al.*, 2020) must be considered when interpreting the results.

A critical limitation of this study is that the coding process was done by only one researcher. This method implies that there are no data on possible coding disagreements, and intercoder reliability was not calculated.

Additionally, the findings of this review should be interpreted with caution due to the limited number of studies assessed. The incipient state of this discipline is characterized by few studies about educational school-based universal mental health promotion programs. Most school-based programs include therapeutic techniques and are not suitable for being implemented by pedagogues or educators in everyday school settings. This circumstance not only represents a research limitation but also confers added value to this study, as mental health promotion research with a pedagogical approach is rare.

Additionally, another considerable limitation was identified because the included studies did not always choose the same outcome variables. This circumstance complicates the comparison between programs. Therefore, the included studies' results were assessed regarding their authors' conclusions on effectiveness and the variables that have been measured and showed improvement according to the study's authors.

Another limitation found in this review was that most of the assessed interventions were single-component interventions that only implemented class-based curricula and activities. From this limitation emerges a future research direction on the

effectiveness and adequacy of mental health didactic methods and diverse pedagogical practices.

Certain educational aspects of mental health promotion remain unexplored. To address the research questions that arise in this review, future research on mental health promotion through education must assess the influence of variables such as age or previous mental health risks. Findings regarding influent variables are essential to ensuring that educational interventions are beneficial for everyone and address the needs of all students.

Conclusion

This systematic review found evidence of the positive effects of universal school-based mental health educational programs on preadolescents and adolescents. Moreover, it provides further insight into each program and has been able to identify two primary curricula foci: mental health education and the development of resiliency traits and skills. Despite the study's limitations, the findings have some practical implications. Most appropriate interventions for adolescent wellbeing improvement comprise manual-based sequenced learning curricula targeting focus points, and such implementation should begin before the crucial age of 14, as an early start increases efficacy on resiliency development.

Moreover, this paper demonstrates that school is a suitable environment for mental health promotion and that education can play a vital role in contributing to the development of mental health among students. As adolescents worldwide experience higher rates of depression, anxiety, and stress post COVID-19 pandemic (Jones *et al*., 2021), this study's findings encourage the global education community to address the adolescent mental health crisis and prevent its future consequences by implementing educational curricula that promote the wellbeing of younger generations and increase the society's likelihood of fulfilling lives as adults.

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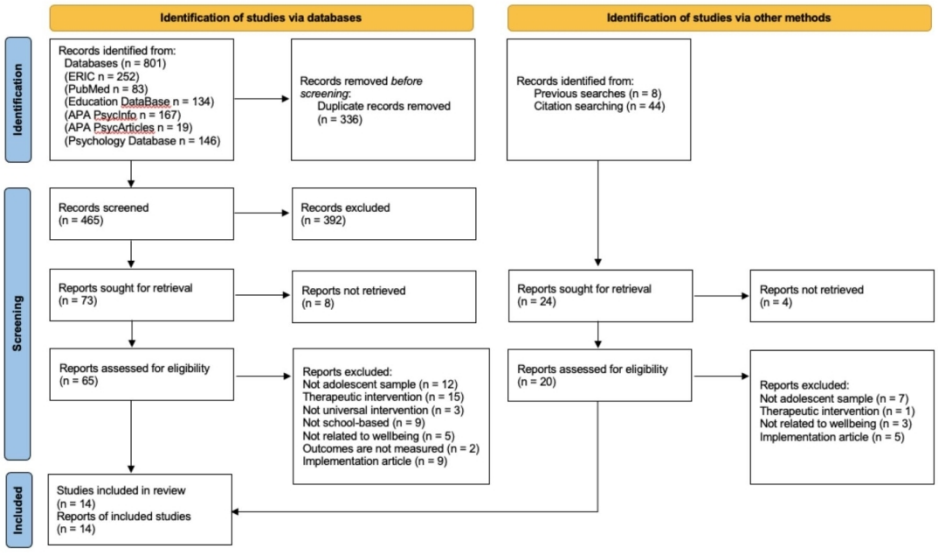


PRISMA chart describing search and inclusion procedures

508x285mm (96 x 96 DPI)

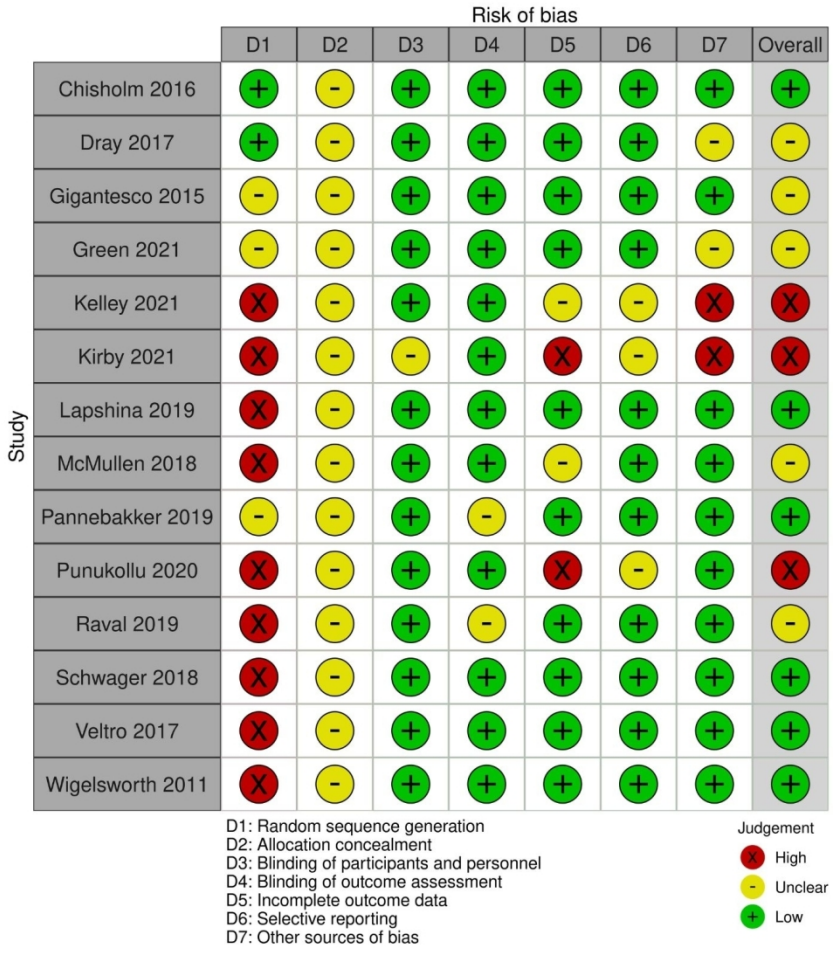
Study	N	Sample Age (years)	Design	Method	Comparison groups	Efficacy
[1]	924	12-13	CRCT	Mixed methods	T1: Education T2: Education and intergroup contact	Effective No significant differences between treatments
[2]	2105	12-16	CRCT	Quantitative	T1 Control	Ineffective Small significant difference in favor of control
[3]	391	14-18	CRCT	Quantitative	T1 Control	Effective
[4]	357	10-13	CRCT	Quantitative	T1 Control	Effective
[5]	205	11-15	NEGD	Mixed methods	T1 Control	Effective
[6]	88	8-14	NEGD	Mixed methods	N1: Primary School N2: Secondary School	Effective Greater effect for N1
[7]	722	11-21	Pre-Post	Quantitative	T1	Effective for students with high depression scores
[8]	170	13-18	Cluster Controlled	Quantitative	T1 Control	Effective
[9]	995	13-16	CRCT	Quantitative	T1 Control	Effective
[10]	367	11-17	Pre-Post	Mixed methods	T1	Effective
[11]	185	9-11	Pre-Post	Quantitative	T1	Effective Greater effect for high risk students
[12]	912	10-17	Cluster Controlled Parallelized	Mixed methods	T1 Control	Effective
[13]	113	12-17	NEGD	Quantitative	N1: Middle School N2: High School	Effective Significant difference in favor of N1 (IB) Significant difference in favor of N2 (SEf, HB)
[14]	4506	11-12	Cluster Controlled Parallelized	Quantitative	T1 Control	Ineffective

CRCT: Cluster randomized controlled trial; NEGD: Non-equivalent groups design; Pre-Post: Pretest-posttest design; T1: Treatment one; T2: Treatment two; N1: Comparison condition 1; N2: Comparison condition; IB: Irrational beliefs; SEf: Self-efficacy; HB: Healthy behaviors.

Study	Focuses	Duration	Structure	Components	Measure Instrument	Improvement
[1]	MH Literacy MH Stigma HS	1 day	Manualized	Curricula Intergroup contact	SDQ RS RIBS MAKS	EW Resilience Stigma HS MH Knowledge
[2]	Resilience SEf Communication PS Goal Definition	18h	Flexible	Curricula	SDQ RWDM	No
[3]	MH Literacy MH Stigma PS	20 lessons 60mins	Manualized	Curricula	PWBS RESE SWLS	EW SEf Life satisfaction
[4]	SEL Communication PS	12 lessons 60mins	Manualized	Curricula	DERS-SF RSCA CDP 3PI	SEf Resilience PS Skills Communication MH Knowledge
[5]	SEL Resilience	10 lessons 50mins	Manualized	Curricula	WEMWBS I-ORQ	EW Resilience
[6]	SEL MH Literacy Hope	16 lessons 45mins	Manualized	Curricula	DERS-SF ARQ-R GAD-7 SCAS HIFS MACS	Resilience Anxiety Negative Emotions Coping Skills
[7]	SEL Communication Help Seeking Risk Behaviors	36 weeks	Manualized	Curricula	MHC-SF DASS-21	MH Depressive Symptoms
[8]	MH LS Social cohesion	24 lessons 45-60mins	Manualized	Curricula	GSE AYPA MAC-5	SEf IP
[9]	SEs SEf Social Skills	17 sessions 60mins	Manualized	Curricula	SDQ GSE RSE BDI	Depressive Symptoms SEf
[10]	MH Awareness Peer support Coping Skills	24 weeks	Manualized	Curricula Peer net Mobile App	HADS COD	Symptomatology Emotional distress HS
[11]	SEL	12 weeks	Manualized	W-SA	SDQ	EW IP EP
[12]	SEs LS Emotional Ed.	15 lessons 10-15mins	Flexible	Curricula Exposition	GSE KINDL-R LQSCC	SEf Class climate SI

	SI				SI Scale	
[13]	PS LS SEf	20 lessons 60mins	Manualized	Curricula	HBSC APEP/G APEN/G LAQ Idea Inventory	SEf Communication Goal Definition
[14]	SEL	6 lessons 20mins	Flexible	W-SA	SDQ ELAI	No

MH: Mental Health, HS: Help Seeking, EW: Emotional Wellbeing, SEL: Social and Emotional Learning, PS: Problem Solving, LS: Life Skills, SEf: Self-efficacy, SEs: Self-esteem, W-SA: Whole-School Approach, SI: Social Integration, IP: Internalizing Problems, EP: Externalizing Problems.



Risk of bias summary table

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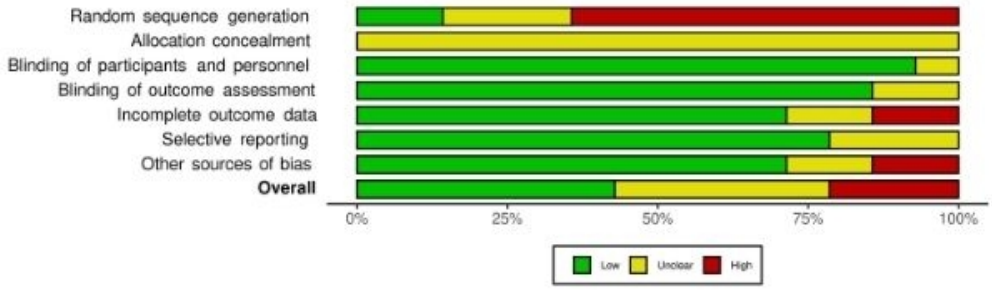

Risk of bias summary graphics

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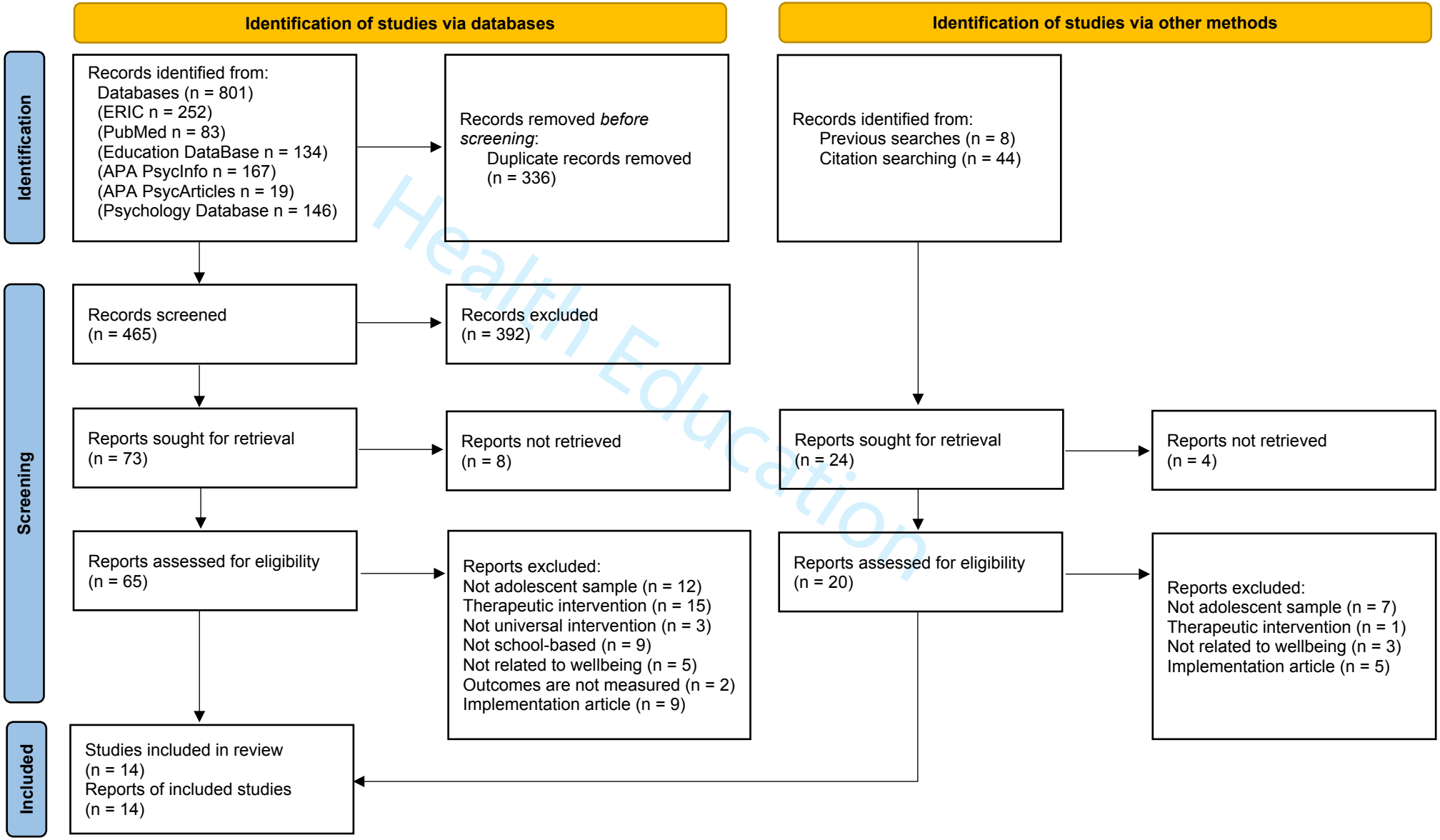
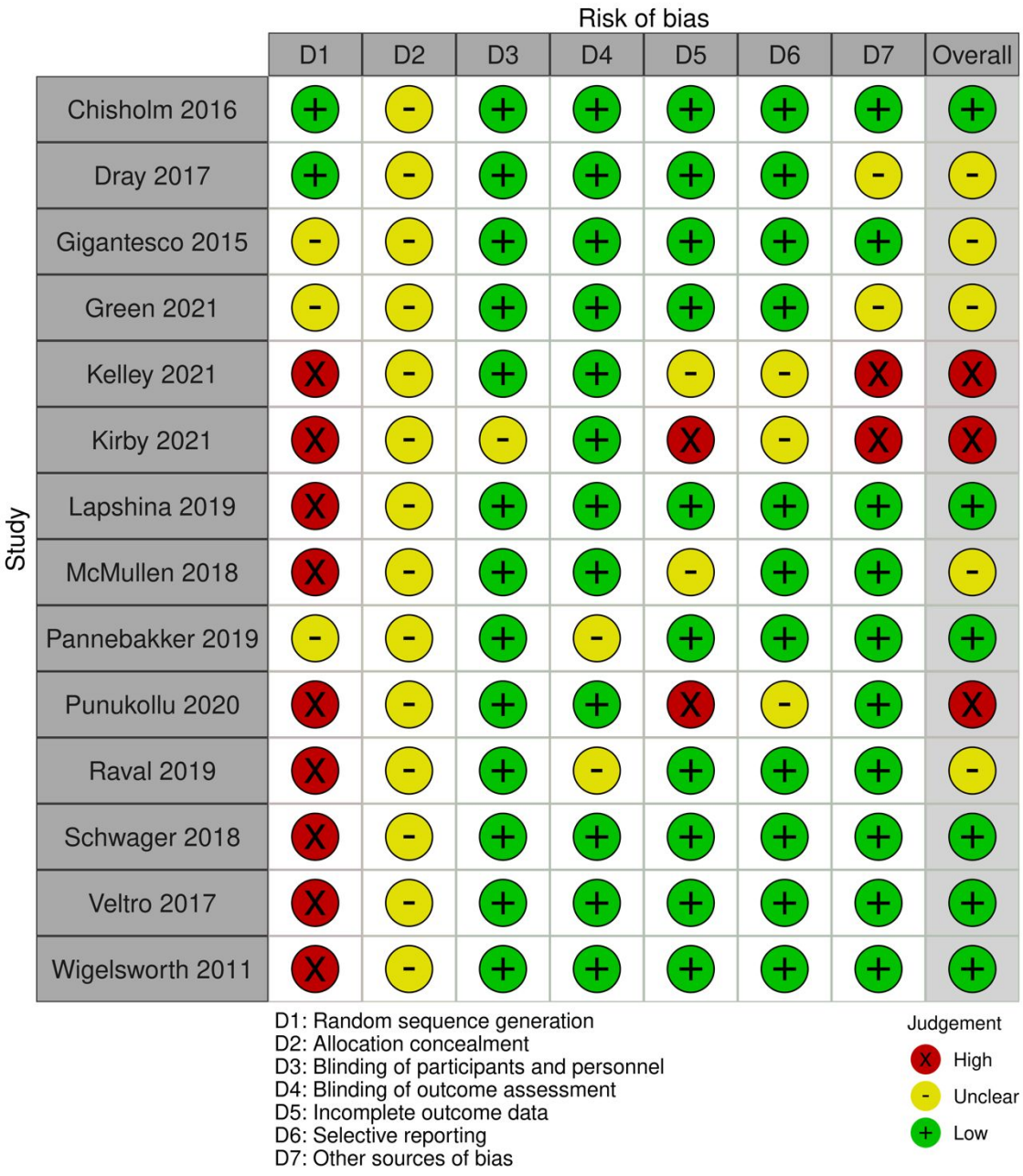
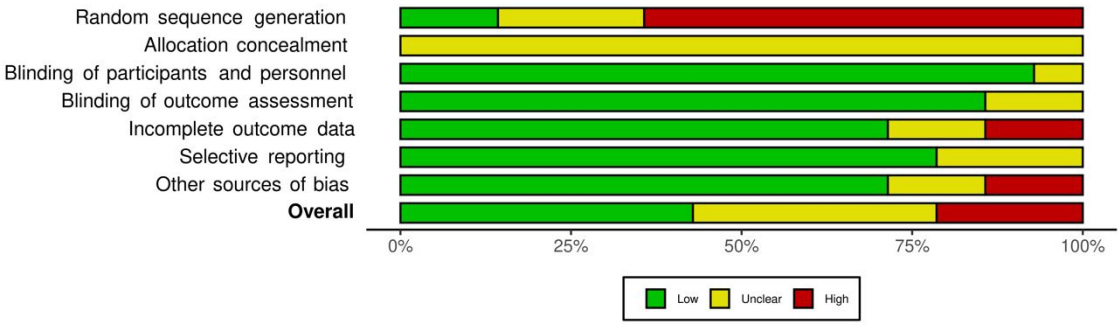



Risk of bias
D1
D2
D3
D4
D5
D6
D7
Overall
Study
Chisholm 2016
Dray 2017
Gigantesco 2015
Green 2021
Kelley 2021
Kirby 2021
Lapshina 2019
McMullen 2018
Pannebakker 2019
Punukollu 2020
Raval 2019
Schwager 2018
Veltro 2017
Wigelsworth 2011
D1: Random sequence generation
D2: Allocation concealment
D3: Blinding of participants and personnel
D4: Blinding of outcome assessment
D5: Incomplete outcome data
D6: Selective reporting
D7: Other sources of bias
Judgement
High
Unclear
Low


Random sequence generation
Allocation concealment
Blinding of participants and personnel
Blinding of outcome assessment
Incomplete outcome data
Selective reporting
Other sources of bias
Overall
0%
25%
50%
75%
100%
Low
Unclear
High

The mental health support needs of university students with long-term physical health conditions.

Abstract

Purpose: Supporting the mental health of university students is a key priority for higher education. Students living with long-term health conditions are at increased risk of poor mental health; yet little work has focused on their particular mental health needs or indeed, the implications for health education in the university setting. This study sought to identify the mental health support needs of students with long-term conditions, including best ways for universities to support these students. *Design/methodology/approach*: A UK national online survey of 200 university students living with long-term physical health conditions (e.g. asthma, endometriosis, epilepsy) was conducted in 2019. *Findings*: 95% of respondents reported that their long-term condition/s had at least a moderate impact on their mental wellbeing, with 81% reporting that they felt depressed and anxious at least once a month because of their health. The most common suggestion for how universities can better support their mental wellbeing was to raise awareness about long-term conditions on campuses, with many reporting a lack of understanding about long-term conditions from academic and support services staff members – with negative impacts on their mental health. Because of this, some respondents reported a reluctance to come forward and seek help from university services, with 25% not formally disclosing their conditions. *Originality*: These reported concerns underscore the need to develop health education amongst university staff about long-term conditions and to ensure these students are supported with their health at university.

Keywords: chronic illness; disability; long-term conditions; mental health; university students; wellbeing.

Article Classification: Original article.

Introduction

Supporting the mental health of university students is a key priority for the UK higher education sector (e.g. Universities UK, 2015; Department of Health/Department for Education, 2017). For many young adults, beginning university represents an important transition point with significant changes to personal, family and social relationships and living situations. Coupled with academic demands, such changes have triggered concerns about the impacts on students' mental health at university (Wilcox *et al*., 2005) and there are increasing calls to develop new forms of health education and mental health promotion to better support students.

Despite an increasing focus on mental health, relatively little attention has been directed towards students with a long-term physical health condition and how this may affect their mental wellbeing or the additional forms of support these students might need. Indeed, there is a paucity of research that focuses specifically on the mental health of students living with chronic conditions (some exceptions are discussed shortly). Long-term conditions (LTCs), such as epilepsy, diabetes, autoimmune disorders and asthma, often require management of complex symptoms and treatments (Department of Health: DH 2012). Research with young adults has found that living with LTCs can lead to poorer mental wellbeing due to pain, fear for the future, stigma, social isolation, and struggling to adapt to changes to lifestyle and

identity (e.g. Tunnicliffe *et al*., 2016; Wilson and Stock, 2019). The added stresses and pressures of university life may well have greater impacts on the mental health of young adults with LTCs and there is a need for universities to consider how health education might be enhanced to better support the needs of these students.

In the UK, one-in-five young people aged 16-24 years live with at least one LTC (Shah *et al*., 2019). The Higher Education Student Statistics Agency (HESA, 2019) reported that in 2018/19, 14% of UK students declared that they had a disability. Yet, evidence suggests that this is likely to be a gross underrepresentation of the numbers of students with LTCs because of complex issues tied to disclosure and the term 'disability', which many students with chronic conditions do not see as being relevant to them (Grimes *et al.,* 2019, Spencer *et al*., 2018, 2019). Under reporting of LTCs is likely to mean that many students do not receive appropriate support for their health. Other research indicates how fear of stigma and labelling as 'different' deters students with LTCs from disclosing their conditions and seeking support (e.g. Hill *et al.,* 2013; Sheridan *et al.,* 2016; Habenicht *et al.,* 2018; Thompson-Ebanks and Jarman, 2018). Indeed, a recent survey found that 91% of 584 students with Type 1 diabetes had never or rarely contacted university support services (Kellett *et al*., 2018).

A small body of research has explored the prevalence of mental health difficulties amongst students living with LTCs. Studies have shown that university students with LTCs have increased feelings of loneliness, depression and anxiety, decreased quality of life, and are less likely to graduate compared to healthy peers (Maslow *et al.,* 2011; Herts *et al.,* 2014; Mullins *et al.,* 2017). Research specifically with students living with asthma also indicates that these students have lower quality of life, lower social

functioning, greater anxiety and distress, and have more missed university days compared to healthy peers (Carpentier *et al.,* 2007; Fedele *et al.,* 2009). Additionally, students with Irritable Bowel Syndrome (IBS) have been found to experience increased mental strain and chronic stress compared to healthy peers (Gulewitsch *et al.,* 2013). Other research with students with Type 1 diabetes highlights the lack of awareness about LTCs, resulting in increased anxiety (Kellet *et al.* 2018). For these students, not being believed or having their conditions taken seriously adds to the struggles they experience, all the while trying to navigate academic demands and inflexible university environments and processes (Spencer *et al.,* 2018, 2019; Spencer and Almack, 2022). Access to a university support network (e.g. friends/peers, lecturers, disability services) is critical to their success at university (Balfe 2007, 2009a, 2009b; Hill *et al.,* 2013; Fredette *et al.,* 2016; Spencer *et al.,* 2018, 2019; Saylor *et al.,* 2019). A recent report from the UK's Association of Young People's Health (AYPH) calls for, "a greater understanding…across…the Higher Education sector of the challenges that students face when managing a long-term condition" (AYPH 2019 p.8). Here, we see an important opportunity for university-based health education to enhance the support offered to these students.

Against these concerns, this paper reports survey findings from a mixed-methods study that aimed to examine the mental health needs of university students living with LTCs and to identify relevant forms of support for these students whilst at university. Data were collected prior to the Covid-19 pandemic.

Materials and methods

In March 2019, we launched a national survey targeting current UK university students (undergraduate and postgraduate) with LTCs. Follow-up individual interviews were conducted with 12 participants; findings from these are reported elsewhere (*under review*). The survey was open for three months and was advertised via UK university and student unions' social media accounts (e.g. Facebook, Twitter), as well as by a number of UK charities supporting individuals with LTCs.

The study was approved by a university Research Ethics Panel and participants were provided with information at the beginning of the online survey to explain the aims of the study and what the survey would involve. Information about data protection requirements and storage of anonymised data was provided. Consent was ascertained at the start of the survey and before the participant was able to proceed with the questions. Respondents were free to skip any questions they did not want to answer, and at the end of the survey a list of organisations that support young people with LTCs were provided. All data were anonymised and stored electronically in line with General Data Protection Regulation (GDPR) requirements.

The survey comprised both closed-ended and open/free-text response questions, divided into three sections: 'about you' (demographic questions: age, gender, year of study, level of study, i.e. undergraduate or postgraduate, region of study, course subject, any breaks from their course), 'about your LTC/s' (questions asking which LTCs they had been diagnosed with, symptoms that had significant impacts on their lives, lifestyle adjustments made, frequency of contact with healthcare professionals, and impacts on their mental wellbeing – see below for full details), and support for

your LTC/s' (questions about disclosure, types of support received, strategies used to promote their mental wellbeing, what they would like to see available at universities to support students with LTCs, examples of how their university had supported them in living with their LTCs, and examples where their university could have improved how they supported them).

Impacts on mental wellbeing were identified via four questions, which we developed based on our previous research in this area (references removed for blind review). Our intention was not to measure levels of anxiety/depression through a standardised tool, but rather to identify the impacts of their LTCs on their mental wellbeing. As such, participants were first asked to rate on a scale of 1-10 (with 1 indicating no impact, 5 indicating a moderate impact, and 10 indicating a very large impact), how much of an impact does their LTC/s generally have on their mental wellbeing. The following three questions asked, on average, how often they felt down or depressed, anxious, and stressed, as a result of their LTC/s. Available responses included: none of the time (1), rarely e.g. once a year (2), some of the time e.g. a few times a year (3), often e.g. once a month (4), usually e.g. once a week (5) and all of the time e.g. every day (6). Cronbach's alpha for these three items was .854, indicating high internal consistency.

Closed-ended questions were analysed using simple descriptive statistics. Inferential statistics were used to assess any significant differences in reported mental wellbeing impacts between undergraduate and postgraduate students, and between students who had formally disclosed their LTC/s and those who had not. Due to non-normally distributed data, Mann Whitney U-tests using SPSS version 27 were conducted to

compare undergraduate and postgraduate students, and those who had and had not disclosed their LTC/s. The significance level was adjusted to account for carrying out multiple tests. We divided the typical alpha level of 0.5 by the number of tests (four) for each group comparison, leading to a significance level of .0125.

Free-text responses were analysed using a combination of content and thematic analysis. Content analysis involved identifying the presence of words, phrases and meanings and the relationship between them. To enable a deeper understanding of responses, a thematic analysis (following Braun & Clarke, 2006) was also conducted. The first author read and then re-read all responses for each open-response question, making notes about potential themes. Initial codes were discussed with the second author and codes were then grouped into emergent themes by the first author. Both authors reviewed the themes by re-reading the open-response data to reach consensus on the core themes. These identified themes aided our explanations and understandings of the closed-ended responses.

Results

Participant demographics

The survey was completed by 200 students, of which 198 were female (reasons for this are explored in the discussion). Participants ranged between 18 to 67 years, with a mean age of 26.87. The majority of respondents (71%) were aged between 18 and 28 years. Most respondents were undergraduate students (*n*=130: 65%), were studying full-time (*n*=154: 77%), and were in their first (*n*=74: 37%), second (*n*=55: 28%) or third year (*n*=49: 25%) of study. Out of those participants who were studying part-time, the majority were postgraduates (58.7%). Respondents studied across a range of

disciplines (e.g. Politics, History, Geography, Law, Philosophy, English, Chemistry, Nursing, Computer Technology). Respondents were relatively equally spread across all regions of the UK, except for low representation from the North East of England (*n*=2). See Table I for participant demographics.

[INSERT TABLE I NEAR HERE]

Conditions and related symptoms

75 different LTC/s were reported by participants, with many reporting more than one condition (for this reason the total percentages combined in Table II exceed 100% as participants reported multiple conditions). The most commonly stated condition was endometriosis, with 162 respondents (81%) having been diagnosed with this condition (most likely due to the largely female sample), with 96 (60%) of those respondents having also been diagnosed with at least one other LTC (such as asthma, IBS, or Chronic Fatigue Syndrome [CFS]). The second most commonly reported conditions were IBS and chronic pain, both reported by 42 participants each (21%). The next most commonly reported condition was asthma (35 respondents: 18%), followed by polycystic ovary syndrome (25 respondents: 13%). See Table II for details of conditions reported by five or more participants.

[INSERT TABLE II NEAR HERE]

Despite the variety of conditions reported, the most commonly reported symptoms with a significant impact on their everyday life were pain (91%) and fatigue (85%). The most commonly reported lifestyle adjustments included: dietary changes (34%) (e.g. reducing or excluding gluten, dairy, sugar, caffeine, alcohol); reduced physical activity/exercise (24%); reduced/adjusted work/study hours (21%) (including later

starts, regular breaks, missing some classes); more sleep/rest and 'pacing' (21%); and engaging in less social activities (14%). 57% of respondents reported they had taken a short break from their course (e.g. one term), 39% reported having a long break from their course (e.g. one year), 21% reported having changed their course, and 11% reported having repeated a year of their course – with 92% reporting that this was due to health reasons.

University support

As part of the survey, we also aimed to capture students' experiences of support for their LTC/s. The most common response to the question, 'Where do you get support from for managing your LTC/s?' (See Figure 1) was family members (*n*=141: 70.5%). This was followed by General Practitioners (GPs) (*n*=125: 62.5%). University services was selected by 46 respondents (23%). A follow-up question asked those who selected 'university services' as a source of support to specify the nature of this support. The most common source of support was from the university disability services (*n*=36: 76.6%), followed by a university staff member such as a personal tutor (*n*=28: 59.6%). Only seven respondents (14.9%) reported receiving support from university counselling services, and only three (6.4%) cited receiving support from their student's union.

When asked whether they had any good examples of how their university had supported them in living with their LTC/s, 59 out of 140 (42%) respondents said 'no' or 'not applicable'. Of the remaining respondents, the most common responses included: the university granting extensions for academic work (*n*=26); individual staff members (e.g. personal tutors, dissertation supervisors, lecturers, disability

advisors) being understanding and supportive (*n*=22); the university allowing for short-term absences (*n*=14); the university allowing for special examination accommodations, such as rest breaks or extra time (*n*=11); student support plans being put in place (*n*=6); and having access to free university counselling services (*n*=5). Open-ended responses provided insights into how students valued these forms of support:

> The student disability services team have been great this year - allowing me to have extensions, special exam arrangements and allowances for absences.
>
> My lecturer is very helpful when it comes to understanding my condition. She allows me to link into lectures from home and keep in contact through email as and when it's needed.

> My department has been excellent at allowing me time to recover, extending deadlines, and supporting me in my course. When I needed it, I was also fast tracked on the university counselling services.
>
> My university designs Learning Support Programmes which are tailored to each student and sent to departments/lecturers…mine has a section specifically on the result of absences and how this isn't my fault, a section on assessments giving me access to extensions without having to provide medical proof…and advice on fieldwork and how I may not be able to do anything/everything so lecturers should have contingency plans in place.

As suggested, accessing university-based support is usually dependent on disclosure. When asked whether they had disclosed their LTC/s to their university, 147 participants (75%) said 'yes'. Reasons for disclosure included: the impact of their condition/s on their attendance and performance (36%), having specific needs and requiring adjustments to their course or assessment (e.g. requiring extensions to deadlines or needing specialised equipment) (21%), needing time off (e.g. for operations, appointments, tests/procedures) (17%), and needing general support (16%). Reasons for non-disclosure from the remaining 48 respondents (25%) included fear of stigma/lack of understanding (22%), not envisioning getting any help/support (20%), not seeing the need to disclose (20%), the word 'disability' (7%) – a term that has been previously reported as not seeming relevant to students with chronic conditions and because they do not see themselves as being 'disabled' (see Grimes *et al.,* 2019, Spencer *et al*., 2018, 2019), not knowing how to disclose (7%) and not having been asked about their health (7%).

We also asked respondents to provide examples of how their university could have improved how they had supported them in living with their LTC/s. Responses to this question highlighted the issues students encountered at university to illustrate areas that needed improvement. For example, many cited being inadequately supported and reported a lack of understanding/sensitivity and/or not being believed by staff members (e.g. lecturers/tutors, professional services) (*n*=20). The second most commonly provided examples related to the university's approach to poor attendance due to their LTC/s (e.g. being penalised for absence) (*n*=10). Other responses included staff not 'checking-in' on students with LTCs (*n*=7); delays accessing support (*n*=6); a lack of support with catching up with work (*n*=4); a need for better

communication between disability services and other university services/staff members (*n*=4); a lack of financial support (*n*=4); a general lack of support from disability services for invisible LTCs (*n*=3); experiencing only short-term and or infrequent support (from disability and counselling services) (*n*=3); and difficulties related to the need to provide ongoing medical evidence (*n*=2):

> They [staff] could be more understanding and sensitive. My tutor wasn't professional when it came to talking about my medical conditions. She made me talk about it out in the open with other students and staff around and made me feel so humiliated and judged. Definitely more staff is needed at the student services department too. A lot of conversations got miscommunicated or lost and payments and situations delayed a lot because of the lack of educated/knowledgeable staff in that particular area.

> The university gave me an awful reference for my postgraduate job due to my attendance surrounding sickness. They failed to mention this was due to a long-term condition and could have affected my future employment.
> Not loading disabled students with more labour or providing ‘evidence’ via never-ending cycles of paperwork…

> My university initially sent me to student services who sent me to disability services but…it was a waste of time and the lady at disability services wasn't very supportive at all and started to question my condition.

Mental wellbeing

Perhaps unsurprisingly, survey responses revealed important impacts on respondents' mental health. When asked to rate on a scale of 1-10 how much of an impact their LTC/s generally have on their mental wellbeing, 95% of respondents (*n*=190) reported experiencing at least a moderate impact on their mental wellbeing (i.e. a score of 5 or more). The maximum impact was reported by 24.5% of respondents (*n*=49) (see Figure 2). The mean score overall was 7.79 (*SD*=1.86). A Mann-Whitney U Test revealed that undergraduate students reported a significantly larger impact on their mental wellbeing than postgraduate students: *z*=-3.115, *p*=.002. There was no significant difference between students who had or had not formally disclosed their LTCs: *z*=-1.699, *p*=.089.

80.5% (*n*=161) of respondents reported feeling down or depressed at least once a month because of their LTC, with 21.5% feeling this way every day (see Figure 3). Undergraduate students reported feeling down or depressed significantly more frequently than postgraduate students: *z*=-2.653, *p*=.008. Again, there was no significant difference between students who had or had not formally disclosed their LTCs: *z*=-1.428, *p*=.153. 81% of participants (*n*=162) reported feeling anxious as a result of their LTC/s at least once a month, with 26.5% reporting feeling anxious every day (see Figure 4). Undergraduate students reported feeling anxious more frequently than postgraduate students, but this was non-significant: *z*=-2.011, *p*=.044. There was no significant difference between those who had or had not disclosed their LTC: *z*= -1.629, *p*=.103. Finally, 88.5% (*n*=177) reported feeling stressed as a result of their LTC/s at least once a month, with 30.2% feeling stressed every day (see Figure 5). Undergraduate students again reported feeling more stressed than

postgraduate students, but this only approached significance: z=-2.349, p=.019. Again, there was no statistically significant difference between students who did or did not disclose their condition/s: z=-1.161, p=.246.

In addition to asking students about the support they receive for their physical health, the survey also asked questions about support for mental health. When asked, 'Do you seek any support to promote your mental wellbeing?' 55% of respondents said 'yes'. The most common source of support received was psychological therapies (58%). Other forms of support included family members (46%), peers/friends (41%), GPs (35%) and the use of antidepressants (35%). Twenty-four respondents (21%) cited receiving support for their mental wellbeing from university services. When asked to specify which aspect of university services they received support from, the majority (n=15: 56%) cited university disability services, followed by individual university staff members such as a personal tutor (n=12: 44%), and university counselling services (n=10: 37%).

When asked what strategies they used to help promote their mental wellbeing, 98 (61%) said they engaged in exercise/sport, 79 (49%) said they engaged in meditation/mindfulness, 76 (47%) made dietary changes, 51 (32%) engaged in arts and cultural activities, and 32 (20%) engaged in alternative and complementary therapies. When given the option to expand on how these strategies promoted their mental wellbeing, 31 respondents elaborated on the impact of exercise on their wellbeing. Exercise was typically described as providing a stress relief (n=16), distraction/escapism (n=7), some relief from pain (n=6), and a sense of accomplishment (n=2):

> …clears my mind and reduces stress which is the main trigger for flare ups.

> Exercise makes me feel better about myself and provides a lengthy distraction.

> I play sport as often as I can as it really helps with stress and unwinding from uni as well as it is something I have always enjoyed.

However, 11 respondents explained that exercise was not always possible due to their condition/s:

> I find it hard to exercise regularly because of physical issues but when I do, my mental wellbeing improves.

> …now can't exercise due to hip condition, even walking is a challenge. Used to do yoga and Pilates as a way to connect with my body in a positive way and feel in control but can't even do that now.

> Exercise does [*help my mental wellbeing*] but when the pain sets in from the endometriosis I can't do anything for 10+ days and it gets me out of the habit of it.

Thirty-two respondents explained how arts and cultural activities such as knitting, dancing, colouring, singing, writing, and going to art galleries, promoted their wellbeing through providing: escapism and distraction from their problems (*n*=10),

calm and relaxation (*n*=6), a sense of achievement and productivity (*n*=4), enjoyment/improved mood (*n*=3), time to think, reflect and work through emotions (*n*=2), and social networks (*n*=2). These types of activities were also emphasised as activities that were manageable within the constraints imposed by their condition/s (in contrast to the previous descriptions of exercise):

> I use crafts e.g. knitting to give me a sense of calm and productivity when too tired to leave the house or work.

> … I attend a dance class as this…gives me a chance to escape.

> Art and craft activities gave me something I could be good at and achieve that did not require physical skills that I no longer possess. I still had full capabilities with these activities so was not faced with constant reminder of what I 'used to be able to do'.

> Means I engage with other people, which prevents from shutting myself away and improves my mood a lot.

We also asked, 'What would you like to see available at universities to support the mental wellbeing of students living with LTC/s?' and received 170 responses. The most common response was raising awareness, reducing stigma, and increasing the understanding of various LTCs within universities (for example through staff training) – suggested by 45 participants (26.5%). The second most common response (*n*=30: 17.6%), was for universities to facilitate quicker and easier access to talking therapies

such as counselling. Twenty-seven respondents (15.9%) suggested peer support groups would be helpful, including meeting other students with LTCs to provide mutual support. Other suggestions included more support from university staff to work from home, including less penalties when classes are missed due to ill health (*n*=11, 6.5%). Eight respondents (4.7%) suggested that it would be useful for university staff to 'check-in' with students to see how they are managing. Six respondents (3.5%) suggested that universities should introduce a support system to help students catch up with their studies after a period of illness, and another six (3.5%) suggested having a health-specific personal tutor/mentor who could be a key point of contact.

Discussion

The main aim of this study was to examine the mental health needs of university students living with LTCs and to identify the forms of support they see as being most needed. To our knowledge, this is the first UK national survey exploring the mental health needs of university students living with LTCs. Our findings highlight the significant difficulties these students can face (particularly undergraduate students), with important implications for higher education and the development of relevant forms of health education and support for these students.

Of particular concern is the number of students reporting the impacts of their LTCs on their mental health and wellbeing. The pressures and stresses reported by these students warrants careful attention, including how the transition to university affects

these students' wellbeing and academic studies. In particular, it seems that inflexible university processes, including timetabling and assessments, can exacerbate the difficulties these students encounter (Kellet *et al.,* 2018, Spencer *et al.,* 2018, AYPH, 2019). In keeping with a healthy settings approach to health education (WHO n.d.), developing flexible modes of study – perhaps similar to those offered by postgraduate programmes – may offer one way to help better support undergraduates with LTCs.

Yet changes to academic processes provide only a partial response to some of the issues raised by our results and the particular challenges these students face. The impacts of stigma, and how this affects students' willingness to come forward for help, appears highly relevant to the development of effective responses from universities and reflects some of the more socially located aspects of (ill) health that are important to effective health education responses (Spencer *et al.,* 2018). Reports of negative reactions from staff members and other students may account for the low disclosure rates found in other research (Grimes *et al.,* 2019) but also need to be understood within the context of being seen as a 'normal' healthy student (Balfe, 2007, Spencer *et al.,* 2018, Spencer and Almack 2022). Research to date documents the complex interplays between students' preferred outward normal student identities and the tricky issues of disclosing a health condition that sets them apart from their peers (Spencer *et al.,* 2018, Spencer and Almack 2022). These identities, in turn, guide health practices and students' broader engagement (or lack of) in university life (Balfe, 2007, 2009b; Saunders, 2011, Spencer *et al.*, 2018, 2019) – sometimes with adverse consequences for their physical, mental and social health (Spencer *et al.,* 2019, Spencer and Almack 2022).

Complex issues of disclosure can mean many students do not access appropriate support. We found that students who had disclosed their condition/s to their university experienced comparable negative mental health and wellbeing impacts to those who had not disclosed their condition/s, perhaps signalling that disclosure did not lead to effective university support. This may be illuminated by our other findings which suggest that when students do come forward, the services offered are not well tailored to their specific needs, or available to them in a timely way (e.g. reports of long waiting times for counselling services). In this study, just 23% reported that they received support from university-based services; with only 18% reporting support from specific disability services (see also Kellett *et al.*, 2018). Whilst enhancing access to relevant health and wellbeing services, including support for mental health, has been called for as part of broader university-based health education and promotion strategies (Universities UK, 2015), it seems much more work is needed to ensure students with LTCs can access the types of help they need. A deeper understanding of the different types of relevant support for both undergraduate and postgraduates is much needed. The latter group may be juggling family commitments, working part-time and have prior experiences of university. These factors may influence how they manage and negotiate their health conditions – as well as the types of support available to them. However, because our sample were largely undergraduate (65%), full-time students (77%) we are cautious about making specific suggestions about the distinct support needs and services relevant for different groups of students.

Furthermore, clear improvements are required in terms of developing broader forms of health education to promote awareness and an appreciation of chronic health conditions by others – especially university staff. Reports of a lack of understanding

and not being believed by university staff is reflected in other research (Hill *et al.,* 2013, Spencer *et al.,* 2018, AYPH, 2019). Not being believed as genuinely ill can result in students being penalised for non-attendance or late submission of work and may mean students are not sufficiently supported to catch-up on their studies following periods of ill health (Spencer *et al.,* 2018, 2019). Of concern are reports of students working through lengthy bureaucratic processes in an effort to evidence ill health (and at the difficult time of ill health) in order to access appropriate support (Spencer *et al.,* 2018, AYPH, 2019).

Despite facing clear struggles, some positive responses from the survey highlight important clues for how best to develop forms of health education in the university setting to better support students with LTCs. This might include granting extensions for assessments but also through the development of empathy and understanding by staff including lecturers, personal tutors and disability service advisors. Broader forms of health promotion may also offer alternative opportunities to support these students' wellbeing. For example, exercise and other activities seemed to help with the day-to-day management of symptoms as well as promoting general mental wellbeing. Extending opportunities for participation in tailored exercise programmes or arts-based 'therapies', for example, may offer important ways for these students to manage their health on campus – as well as engage socially with their peers. Although more work is needed to assess the direct benefits of these activities to the physical and mental health of young people with LTCs, especially in light of some students reporting difficulties with particular activities because of their health, our findings do point to the possible relevance of enhancing behavioural activation therapies and the development of individual, tailored health and academic plans.

Despite these opportunities for health education, some caution is needed with respect to their broader relevance to other students with LTCs. Indeed, our survey yielded a significant response from women with endometriosis, which was unexpected. Reasons for this are not readily apparent, although the tendency for women, compared to men, to come forward and discuss health-related issues may, in part, account for this response (Curtin *et al.,* 2000; Kwak and Radler, 2002; Markanday *et al.,* 2013). Furthermore, endometriosis has received more attention in the media and again the topical nature of this condition may have encouraged these individuals to come forward.

Just as health conditions differ, so do university environments and systems. Our results suggest some universities may be more able to accommodate the needs of students with LTCs, whilst others are less adapting. This may be due to differences between modes of study and/or flexibility offered by postgraduate courses compared to undergraduate programmes (e.g. some require full-time contact hours, placements, opportunities for independent or online learning), but also the size and locality of campuses and university buildings, which may have different effects on students. These issues remind us of the importance of taking a settings-based approach to health education (WHO n.d.) in order to understand better the range of socio-contextual influences on health and wellbeing. Adapting the university environment may be challenging but our results highlight the importance of this setting for the enhancement of student health.

Based on findings reported here, and supported by other work, there is a clear identifiable need to enhance appropriate support mechanisms for students with LTCs. More can be done to ensure these students are not unduly disadvantaged at university and through ensuring systems and processes are in place to support flexible modes of study/assessments (including removal of penalties for non-attendance, offering extensions). Supporting these students to come forward and seek out help necessitates a greater understanding and awareness of chronic conditions to ensure these students do not feel unduly different or stigmatised because of their health. Without such efforts, these students may be at greater risk of poorer mental health with significant impacts on their academic and social lives and overall health.

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