Health Education

"We should at least have basic survival skills, right?": young males support mandatory food skills education

Lucy Yixuan Zhang, Kristen Simonds and June Matthews
Food and Nutritional Sciences, Brescia University College, London, Canada

Received 30 June 2021
Revised 27 August 2021
Accepted 3 October 2021

Abstract

Purpose – This study explored young males' suggestions for food skills education in three domains: food selection and planning, food preparation and food safety and storage. It also solicited young males' perspectives on mandatory food skills education.

Design/methodology/approach – This descriptive qualitative study employed a semi-structured interview guide. A one-page list of food skills was provided to each participant to form a consistent basis for the interviews. Data were analyzed using the constant comparative method.

Findings – Forty-four young men aged 17 to 35 participated in the study. Thirty-seven supported mandatory education for food skills. Gender stereotypes around food skills were identified as a barrier to young males enrolling in elective food skills courses. When asked how food skills should be taught, the two main strategies mentioned were "online" and "hands-on." Most participants identified skills in the food preparation domain as essential to include in the curriculum, although some recognized the importance of incorporating skills from all three domains.

Practical implications – Understanding important characteristics of effective food skills education for young males may increase their participation in school, virtual and community-based food skills education. Curricular content should consider young males' interests and baseline competencies and emphasize practical hands-on skills. Mandatory food skills education in secondary schools for all genders represents a comprehensive solution.

Originality/value – This study is among the first to report young males' opinions on crucial components of, and methods for, effective food skills education for this population.

Keywords Food, Skills, Men, Learning, Qualitative methods

Paper type Research paper

Introduction

Young adults have intentions to follow a healthy eating pattern, but many lack understanding of how to implement dietary advice (Matthews *et al.*, 2015). Many young adults are often not taught essential food-related skills during childhood, potentially resulting in a generation of adults who will lack basic skills and rely heavily on convenience foods of low nutritional value rather than fresh food ingredients (Burton *et al.*, 2016). Expecting this population to consume the recommended intakes may be overly optimistic if they do not have basic knowledge of how to select and prepare food, and how to handle food safely (Caraher *et al.*, 1999). Several studies have suggested that inadequate selection, preparation and food safety skills may be a barrier to healthy eating (Caraher *et al.*, 1999; Larson *et al.*, 2006; Lichtenstein and Ludwig, 2010; Reicks *et al.*, 2014). These fundamental activities are referred to as "food skills" and can be classified into three domains: food selection and planning, food preparation, and food safety and storage (Kennedy *et al.*, 2019). Young males in particular have reported lower involvement in food preparation (Health Canada, 2015) and lower

The authors wish to thank Research Assistant, Matthew Nguyen, for his help with this research.

Funding: The work received funding from Brescia University College Graduate Student Research Fund.

Health Education
Vol. 121 No. 6, 2021
pp. 541-553

0965-4283
DOI 10.1108/HE-06-2021-0098

confidence in food skills than females (Adams *et al.*, 2015; McGowan *et al.*, 2016, 2017; Wilson *et al.*, 2017). Nearly half of young Canadian adults believe they have excellent/very good eating habits, but most, especially males, may not be involved in food skills behaviors, even weekly (Slater and Mudryj, 2016). Rarely have males been interviewed to elicit their perceptions of the barriers to seeking food skills education, their preferred teaching environment and the influence of gender on the pursuit of food skills information.

Many young males have expressed interest in learning food skills (Lawe *et al.*, 2013; Ronto *et al.*, 2016; Worsley *et al.*, 2014); however, there is a lack of resources targeted to this demographic. Mandatory food and nutrition education has been recommended as a means to ensure that all students receive food skills training (Desjardins *et al.*, 2013; Howard and Brichta, 2013; Lavelle *et al.*, 2016; Lichtenstein and Ludwig, 2010; Ronto *et al.*, 2016; Slater, 2013); therefore, it is imperative to gain an understanding of effective ways to teach these skills such that resources are invested wisely. Previous research (Simonds *et al.*, 2021) revealed that many young males were embarrassed by their lack of food skills and they wanted to learn more. The objective of this paper is to report on young males' perceptions of mandatory food skills education, gender stereotypes as a barrier to participation in such education, and the most effective teaching methods and content for food skills education that would resonate with this young demographic.

Methods

Young males aged 17–35 were recruited via convenience and snowball sampling through posters at [blinded university], community sites in [blinded city], and online advertisements. Students enrolled in food and nutrition programs were excluded.

A semi-structured interview guide (Table 1) was developed and piloted with three young males who were not part of the final sample. Based on the Food Skills Questionnaire (FSQ) (Kennedy *et al.*, 2019), a one-page list of food skills (Table 2) was provided to each participant to form a consistent basis for the interviews. Written consent was obtained from each participant. Participants received a $25 gift card for their time and effort. The study was approved by the [blinded] Research Ethics Board.

Introductory question	1. What program/faculty are you in? (Students) where do you work? (Non-students)
Opening questions	2. When we talk about "food skills", it can mean many things. What do "food skills" mean to you?
	3. There's been some research in this area, and they've found that food skills fall into 3 domains (show list of food skills). Take a moment to read it, as it helps create a basis for our conversation. You can refer to it at any time. We're not going to quiz you on it
	4. Some people say that food preparation takes too much time or too much work, but others say they enjoy it. How do you feel about it?
	5. Some people say making meals at home helps them to eat healthier. What do you think?
Transition question	6. If I asked you to describe "young men and food skills", what would you say?
Key questions	7. How would you describe your level of food skills? (e.g. No food preparation ability to preparing full meals starting from basic ingredients)
	8. In which area of food skills do you feel most confident and/or competent?
	9. In which area of food skills do you feel least confident and/or competent?
	10. Would you like to improve your food skills?
	11. Thinking about other young men (e.g. living on their own, attending university, or still going to high school), what are your suggestions for ensuring that they have good food skills?
	12. Many people are saying that food and nutrition education should be mandatory. What do you think about that idea?

Table 1.
Semi-structured interview guide

Food selection and planning	Budget for groceries
	Plan meals before shopping
	Use a grocery list
	Read food labels
	Check "best before" date before purchasing
	Select fresh vegetables and fruits
	Purchase a variety of vegetables
	Plan quick, healthy meals with foods available at home
	Adjust recipe to make it healthier
Food preparation	Make home-prepared meals (breakfast, lunch, dinner)
	Make nutritionally-balanced meals
	Prepare food from basic ingredients
	Follow a simple recipe
	Use knives in the kitchen
	Peel/chop/slice fruits and vegetables
	Use vegetables in food preparation
	Use beans and lentils in food preparation
	Boil, steam or stew foods
	Stir-fry or pan fry foods
	Bake, grill, or roast foods
	Prepare new food and recipes
Food safety and storage	Wash countertops before preparing food
	Wash hands before preparing food
	Wash fruits and vegetables before eating them
	Use microwave/fridge/cold water when thawing frozen meat
	Keep raw meat/poultry/seafood – and their juices – separate from foods that will not be cooked
	Cook foods to the correct internal temperature and serve them immediately
	Check that food is reheated throughout when re-heating
	Put leftovers in fridge within two hours
	Follow instructions for storage on packaged foods
	Stay safe in the kitchen (avoid burns and cuts)

Source(s): Kennedy *et al.* (2019)

Table 2.
List of food skills in three domains from the Food Skills Questionnaire

Data collection occurred between October 2017 and April 2018. Data saturation occurred when no new themes were generated from our interpretation of the data (Braun and Clarke, 2021) (interviews 37 to 39), not from an *a priori* decision on the number of participants to be included in the study. Five additional interviews (interviews 40 to 44) were conducted to confirm the resultant themes. All interviews, but one, were audio-recorded. Audio recordings were transcribed verbatim. Transcriptions, as well as notes from the non-recorded interview, were entered into Microsoft Office Word (v.16.14.1) and organized using Microsoft Office Excel (v.16.14.1). Data were coded using the constant comparative method (Glaser and Strauss, 1967). A full description of the study methods can be found in Simonds *et al.* (2021).

Results

Demographic characteristics of the sample are included in Table 3. In total, 44 participants were enrolled in the study. Interviews lasted, on average, 41 min (range 23–65 min). Most participants (65.9%) were undergraduate students aged 17–22 years. Participants' perceptions of the meaning of food skills, their experiences of learning (or not learning) food skills during childhood, and their current self-assessed level of confidence are reported elsewhere (Simonds *et al.*, 2021). This paper reports on the last two questions of the interview guide (i.e. suggestions for ensuring that young males have good food skills and perspectives on mandatory food and nutrition education).

Characteristic	% (*n*)
Age (years)	
17–24	75 (33)
25–34	25 (11)
Education	
High school	2 (1)
College/University	98 (43)
Marital status	
Single	96 (42)
Married	4 (2)
Previous FN course (high school/College/University)	
Yes	34 (15)
No	66 (29)
Primary cook	
Yes	59 (26)
No	41 (18)
Living arrangements	
University residence/With parents/Family	32 (14)
With spouse/Roommates/On own in house/Apartment	68 (30)
Living away from parental home (years)	
0–4	82 (36)
5–10	18 (8)
Access to kitchen facilities	
Yes	93 (41)
No	7 (3)

Table 3. Demographic characteristics of young males discussing their perceptions of food skills ($n = 44$)

Overwhelming support for mandatory education

The majority of participants ($n = 37$) supported mandatory food skills education, arguing it provides the opportunity to gain exposure and build foundational knowledge on what many consider a basic life skill that they would have to eventually learn when living independently.

> I think it [mandatory education] would be a good idea. If people at least had a basic idea, we can say we tried. It's up to them to decide if they eat well or not, but if you at least give someone the tools then it's up to them to decide what they want to do with it. (P1)

> Food is necessary for us to survive, so we should at least have basic survival skills, right? Like, if you cannot boil water, that's a problem. You cannot live if you do not eat so . . . I think it makes sense to teach people, like make it a mandatory thing instead of optional, so you can learn how to feed yourself. (P9)

> I would say 100%, yeah! We should have that . . . math and English are definitely important, but so is surviving and living by yourself. And it's money skills too. Like cooking, money skills, how to manage yourself as a human being apart from the academic world. You are only going to be in school for what, let's just say 12 years, right? You are going to be living and cooking for the rest of your lives. That's just a skill you need to have. (P43)

One-third of these young males ($n = 15$) had taken a food and nutrition course in high school, college, or university. Of the remaining participants, some revealed that they would have enjoyed taking such a course (even if it was mandatory): "*It's a real-life example of how to watch your health. If it was mandatory, I definitely would've taken it and would've found it*

interesting." (P4) Another expressed remorse for not taking it when it was available, "*Honestly, I regret not taking it [foods course in high school]*" (P20).

> Several participants (n = 13) felt parents hold shared responsibility with schools in teaching food skills. As one young man stated,
>
> If you have kids, part of your job is to prepare them for when they become an adult. Definitely cooking is part of that process. Once you go out on your own it obviously becomes your own responsibility. I would not necessarily say it's on any one person or group. It's kind of shared. (P36)

Some recognized, however, that not all parents might be in a position to teach food skills, either from lack of time or little meal preparation at home: "*In some households, the parents are not there to teach them and they do not have time to teach food skills or maybe they eat out a lot.*" (P5) Another participant shared, "*I do not think you can assume every parent knows what they're doing in the kitchen. I'm fortunate to have a parent that knew how to do that stuff, but if I did not, I'd like to have that in school*" (P24).

High school was identified by many participants (n = 27) as the favored window of opportunity for teaching and learning food skills, as it immediately preceded independent living. Participants were divided with regards to earlier/junior years (n = 11) versus later/senior (n = 9) years. Resonating through several interviews, this participant's quote sums up the case for intervening in earlier years: "*The earlier the better because as soon as it becomes a habit, it sticks with you.*" (P16) Another participant contemplated both options and justified his final decision in this way:

> Probably grade 9 and 10 because, again, the earlier you intervene on stuff, the better the results will be in the long term. It would maybe be beneficial for them to do it in grade 12 right when they're about to leave the nest, but if you did it earlier, like grade 9 or 10, they'd have more time to experience cooking before they left [home]. So, I'd say grade 9 or 10 is probably the better choice. (P10)

Others countered with their rationales for mandatory food skills education in later/senior years of high school, when teachers and parents are "*trying to help you with everything, like getting you ready for leaving home.*" (P33) Another suggested, "*It would make the most sense probably in senior year, because [students] might be on their own after that. [Food skills] is something they would have to worry about in the more immediate future*" (P37).

A few (n = 5) participants felt there is great value in initiating food skills before high school:

> We establish a lot of our habits when we're kids and teenagers. I think that'd be awesome to do both in elementary school and high school. If you're trying to establish good eating habits at, like, 40, it's hard to erase those years of doing things a certain way. The earlier you can start is better. (P15)

Others provided additional benefits of earlier interventions:

> A kid who's 5 is much more apt to make a mistake. They're not going to care about it compared to a kid who's 15 and around his peers. [A 15-year-old] is probably going to have more of a negative social reaction than a kid who's 5. (P30)
>
> Grades 5–8 would be good. It could be really, really simple stuff too. Not all four years necessarily, but somewhere in that range before they get to high school. Then you can have an elective in high school if you want to learn to make more complicated things. Grade 6, 7, 8 is prime time to be teaching people basic food skills. It's kind of a cool independence thing to give kids at that age too. (P14)

Those who disagreed with the idea of mandatory education (n = 7) stated that food skills cannot be forcibly taught: "*People that are not interested, will not make an effort, and they will not learn*" (P19). Another stated, "*It will not be functional [if it's mandatory]. We've all been there. When you are at school, if there's something that you have to do, then it will not work, especially if it is tied to a grade*" (P13).

> I do not think that's something that's going to be effective. Unfortunately, back in high school, I just did not take it seriously enough. It's all very hypothetical. It's not a real-world situation. It's school, right? Even if they make it fun, it's not fun. It's still school. (P26)

Gender stereotypes in foods skills education

While many ($n = 16$) participants agreed that schools have at least a partial responsibility to educate students on essential food skills, the perceived gender stereotypes surrounding food skills education appear to discourage young males from enrolling in these classes. One quote represented the sentiment of these young men: "*Some males may feel intimidated and feel like they do not belong because of the stereotypes*" (P42). A number of participants ($n = 18$) mentioned that food skills courses were offered as electives during secondary school. When asked about their perception of these courses, many said that they and their male peers "*never took [the course] because of the stereotypes*" (P42). The primary reason for this was "*learning food preparation and being good at cooking is a woman's work*" (P2) and "*the perception of [food skills] courses isn't too appealing to young men*" (P27). One also explained that "*in high school there are home economics classes, which are usually for women, and the boys go off and take something else*" (P10).

These stereotypes extended beyond the classroom: "*I guess if families have that gender segregation in the kitchen, it will trickle down to the kids. They might not know it, but subconsciously they see that mom's in the kitchen*" (P26). Stereotypes were observed in media as well: "*It's not cool to be a guy and interested in cooking unless you're a jerk chef that yells at everybody*" (P42). Another explained,

> Media still has those lines drawn. Take like big TV chefs. The women are always . . . and this sounds super generalizing . . . but the women are all nice and proper in TV shows . . . there's no female equivalent to Gordon Ramsay. As for social media and stuff, I would say most of the blog posts I see and most of the stuff on actual social media are by women. When I look up barbecuing techniques or how to make a barbeque sauce, it's men doing those websites. I would definitely say there is still that segregation. (P26)

Despite the stereotypes associated with these courses, most participants ($n = 37$) believed mandatory food skills education would be of great value to all students, regardless of gender: "*If they made that part of the curriculum where they taught cooking more to everyone, that could benefit them a lot in the future*" (P10).

Methods and content of food skills education

When asked about how food skills should be taught and what participants felt were effective methods, the two main strategies mentioned were "online" and "hands-on." Nearly all participants ($n = 43$) used online sources such as YouTube, social media platforms, blog posts and online recipes to obtain food skills information. One participant explained his position: "*Online would be good. I feel that'd be the most casual approach. [People] could tune in whenever it suited them or needed the resource rather than having an in-person class*" (P22).

Some suggested that, despite the plethora of easily accessible online resources, hands-on experience was considered an essential component for effective learning: "*I think you need a certain amount of hands-on experience as well. It's one thing to watch videos but it's another thing to do it. I think there has to be some sort of practical element to it*" (P10). Others supported the practical aspect as well:

> I think hands on is a big part of generating interest; otherwise, the course becomes boring, and if it's something people are not interested in or do not have previous interest. it becomes dry. It's like if they had a wood shop class where you did not work with wood. It would be a lot more dry. (P12)

> Cooking is pretty hands-on, so it'd be best if [young men] could actually taste the meal for themselves to know that this goes well with this, rather than [someone] just telling them. I think hands-on would definitely make [learning] better. (P28)

> Videos and self-learning are good because you can do it anywhere. But during a hands-on session, they transfer the skills to you and it stays in your mind better. Having everything in front of you and cooking with [someone]. The learning process would be faster if you're doing it with a professional compared to just looking at a video and doing your best. I think hands-on is better. (P32)

When participants were asked which food skills are most important to teach, food preparation was the most frequent response ($n = 28$), followed by food safety and storage ($n = 22$), then food selection and planning ($n = 16$). As one explained, "*The biggest hurdle appears to be the preparation aspect because it's the most daunting and most abstract one for someone who's never done it*" (P12).

Food safety skills were also acknowledged as important basic skills to learn: "*If you're cutting meat on a chopping board and you're using that again to chop vegetables, it's a bit problematic*" (P18). Participants also recognized that "*food safety with meat is a big thing. Make sure you cook something thoroughly, so you do not get sick when you eat it*" (P10).

Alluding to the gendered perceptions of food skills, one participant suggested the following:

> Most men like bacon or meat. Show them how to make a steak, like really good. Then throw alongside some potatoes or salad or steamed vegetables. If they can do that one thing really well, then [teach] the other ones [so they can see], "This is a meal." (P30)

Knife skills for "*cutting and chopping stuff*" (P20), especially dicing onions, and simple recipes (e.g. cooking eggs) were frequently emphasized because "*those very simple things would go a long way*" (P18). Other preparation skills included, "*how to use the stove without burning things, how to adjust the heat on a stove (cause there's people that do not know how to do that), and how go to a grocery store and actually pick food out*" (P9).

Some participants ($n = 7$) felt it would be important to provide foundational knowledge in all three food skills domains. Other frequently mentioned topics of interest included nutrition, fitness, health and various cuisines.

> People are becoming more health aware and health conscious and are realizing that the habits we've had in the past are not necessarily the habits we should be carrying forward for future generations. I think that would be really cool in terms of learning about food and what to put in your body. Being a student, you do not really think about it as much. (P44)

Discussion

While food skills courses are offered only as elective options in the [blinded] school curriculum, there appears to be increasing interest and acknowledgement of the value of compulsory food skills education. A proposed amendment to the *Education Act* in [blinded location] will require that students are given opportunities to grow food, prepare food, and learn about local food in every grade (Kramp, 2020). Findings from the present study suggest the majority of young males are in favor of mandatory food skills education. Similar views have been reported among young adults (Nanayakkara *et al.*, 2018; Worsley, 2006), and by the public at large (Pendergast *et al.*, 2011; Wolfson *et al.*, 2017). Although the majority ($n = 37$) of the participants in this study supported mandatory education, only a third ($n = 16$) deemed schools responsible for teaching food skills. This contradiction may stem from the fact that most of these young males attributed at least partial responsibility to parents for teaching food skills to their children but acknowledged that not all parents are able to do so (Simonds *et al.*, 2021). Consistent with previous findings, such courses were identified by participants to

be an opportunity to address gaps in food skill teaching at home (i.e. lack of parental food skills) and equip students with basic life skills that are important for being self-reliant in college/university (Ronto *et al.*, 2016). A small proportion of participants did maintain that they felt food skills cannot be forcibly taught. This may relate to the fact that some young males believe that learning food skills is solely a personal responsibility (Simonds *et al.*, 2021).

In a study of Australian food systems professionals, most identified senior secondary years to be an important stage for the delivery of food literacy education, though it was argued by some that such curricula should start in primary school and continue into secondary (Nanayakkara *et al.*, 2017). Similarly, the current participants identified secondary school to be a prime window of opportunity for teaching and learning food skills, while also recognizing the value of early initiation of food skills education. The way forward may involve food skills programming that spans elementary and high school and merges modalities (e.g. hands-on with online) to support young people's development of food skills now and in the future. An important aspect of school curriculum would also include teaching students how to learn new things about food skills during their adulthood.

Food skills education in schools remains a predominantly female subject (Nanayakkara *et al.*, 2018), a viewpoint shared by participants in the present study. In one Canadian province, the female to male ratio for home economics food and nutrition courses across grades 7 to 12 averaged 1.32 (Slater, 2013). The Canadian Community Health Survey also indicates that females continue to be responsible for the majority of cooking in Canadian households (Health Canada, 2015). Females consistently demonstrate higher competency in food and nutrition-related skills compared to their male counterparts (Adams *et al.*, 2015; Kalkan, 2019; McGowan *et al.*, 2016, 2017; Wilson *et al.*, 2017). Of all family members, mothers continue to play a prominent role in teaching food skills to young men (Simonds *et al.*, 2021). This represents a call to action to address the apparent gender disparity in food skills. Participants in the current study identified perceived gender stereotypes in food skills education to be a barrier that may discourage young males from enrolling in such courses, thereby inhibiting their food skills development and participation. Certainly, gendered views regarding domestic cooking responsibilities are complicated by factors beyond food skills education. Division of child care at home (Szabo, 2012), gender equality in the public sphere (Szabo, 2014) and the depiction of male celebrity chefs who propagate traditional views of masculinity (Leer, 2016) all contribute to the gendered landscape around cooking.

Laska *et al.* (2012) found that food preparation during adolescence was associated with food preparation in early adulthood, which in turn predicted both liking to cook and more frequent preparation of meals with vegetables for males and females in their mid-to late-twenties. Higher self-perceived adequacy of cooking skills by early adulthood (ages 18–23) has been associated with a higher likelihood a decade later of self-identification as usual food preparer, less frequent consumption of fast food, and more frequent family meals among participants with children (Utter *et al.*, 2018). In a large survey of university students, Seabrook *et al.* (2019) found that the strongest single predictor of food skills in this population was meal preparation as a teen. They also found that having taken a food and nutrition course remained a significant predictor of students' self-reported Total Food Skills Score across all four regression models in their analysis (Seabrook *et al.*, 2019). Thus, the value of all genders learning and practicing food skills before living independently cannot be understated.

Research demonstrates that the act of cooking itself improves culinary skills, confidence and enjoyment, which, in turn, may contribute to men becoming important contributors to domestic cooking responsibilities (Szabo, 2014). Thus, beyond cultivating foundational knowledge for food skills, mandatory education for all students can be employed as a tool to mitigate the gender gap in food skills development and serve as a starting point for reshaping

the gendered landscape of domestic cooking. If these mandatory courses are taught by highly engaged teachers and offer relevant and current content, then this may increase young males' interest in enrolling in such courses and override their perceptions that they are only for girls/young women. It would also complement the increased interest in food and nutrition that is evidenced by the growing amount of television shows, Internet websites and social media discourse, often highlighting male chefs/commentators.

Fordyce-Voorham (2016) found that among secondary school home economics teachers, the food skills identified to be most important were those related to food safety, nutrition (e.g. how to prepare healthy snacks and healthy meals), and those that involve more critical thinking and experience (e.g. how to adapt a recipe, how to exchange cooking methods). In an Australian-based study of food-related professionals, ranging from dietitians and home economists to environmental scientists and agricultural scientists (Sadegholvad *et al.*, 2017), curriculum components identified as essential for the secondary school level included nutrition, food skills, food ethics (e.g. environmental sustainability, farm animal welfare, food security), as well as an introduction to food systems. In contrast, while food safety and storage were also recognized as important by the majority of current interviewees, food ethics and food systems knowledge were rarely mentioned. Rather, easy basic meals were emphasized as essential. This may reflect the emphasis on food skills in the Food Skills Questionnaire (Kennedy *et al.*, 2019) rather than the broader concept of food literacy (Vidgen, 2016). This also suggests that participants recognize that some students may lack even basic exposure to food skills. With online resources and social media being increasingly sought out as the primary source for food skills-related queries among young people (Simonds *et al.*, 2021; Utter *et al.*, 2016), home economics teachers (Fife *et al.*, 2021) and the general public (Steils and Obaidalahe, 2020), there is a demonstrated need for curricula to incorporate online as well as in-person resources to support food skills development.

The main strength of this study was that it explored the perception of young males, an underrepresented population in food skills literature, and is among the first to report young males' opinions on crucial components for effective food skills education. Another strength is that the two interviewers were graduate students who were similar in age to the participants. Limitations include the high percentage of undergraduate students and the high education level of almost all participants. While it is good to know that a well-educated, self-selected group of young men feel that food skills education should be mandatory in schools (which can be useful in policy decisions about school curriculum), it is also well known that individuals with higher education will go on to have higher income levels and better health (CSDH, 2008); thus, this limits the generalizability of our findings. Although many attempts were made to recruit male participants from the general community (in addition to those on university/college campuses), few responses were received. Young males with less than post-secondary education, therefore, represent an important population for future research, particularly since there is a stronger association between cooking at home and better diet quality among higher- rather than lower-income adults (Wolfson *et al.*, 2020). There was also the potential for self-selection and self-report bias as the young males in this study may not have fully shared their perceptions with the female interviewers. Finally, results that seemed contradictory or not in alignment could have been explored further (e.g. the number of participants who supported mandatory education were greater than the number of participants who felt that schools were responsible for educating students). Closer adherence to the suggested prompts in the interview guide by the two graduate students (who alternated interview roles) could also have minimized these contradictions.

Understanding the characteristics identified as important for effective food skills education may help inform food skills initiatives that would increase young males' interest and participation. These characteristics apply not only to school settings, but also to other food skills programming implemented by dietitians (i.e. virtual, community-based).

Curricular content should consider young males' interests and baseline competencies and emphasize practical hands-on skills necessary to make basic meals. Fredericks *et al.* (2020) created a comprehensive framework of 10 experiential drivers of behavior change that can help guide program development. Skill building and skill reinforcement are the core of culinary interventions for adults and adolescents (Fredericks *et al.*, 2020). In addition to programming, mandatory food skills education in secondary schools represents a comprehensive and universal solution to address gender gaps and instil basic life skills in young people. This would also provide the tools necessary to foster self-reliance in adulthood and potentially enhance adherence to healthy lifestyle recommendations.

References

Adams, J., Goffe, L., Adamson, A.J., Halligan, J., O'Brien, N., Purves, R., Stead, M., Stocken, D. and White, M. (2015), "Prevalence and socio-demographic correlates of cooking skills in UK adults: cross-sectional analysis of data from the UK National Diet and Nutrition Survey", *International Journal of Behavioural Nutrition and Physical Activity*, Vol. 12 No. 99, pp. 1-13, doi: 10.1186/s12966-015-0261-x.

Braun, V. and Clarke, V. (2021), "To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales", *Qualitative Research in Sport, Exercise and Health*, Vol. 13 No. 2, pp. 201-216, doi: 10.1080/2159676X.2019.1704846.

Burton, M., Reid, M., Worsley, A. and Mavondo, F. (2016), "Food skills confidence and household gatekeepers' dietary practices", *Appetite*, Vol. 108, pp. 183-190, doi: 10.1016/j.appet.2016.09.033.

Caraher, M., Dixon, P. and Lang, T. (1999), "The state of cooking in England: the relationship of cooking skills to food choice", *British Food Journal*, Vol. 101 No. 8, pp. 590-609.

Commission on the Social Determinants of Health (CSDH) (2008), *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health*, Final Report of the Commission on Social Determinants of Health, World Health Organization, Geneva, available at: https://www.who.int/teams/social-determinants-of-health/equity-and-health/commission-on-social-determinants-of-health (accessed 27 August 2021).

Desjardins, E. and Azevedo, E. (2013), "Making something out of nothing: food literacy among youth, young pregnant women and young parents who are at risk for poor health", available at: https://nutritionconnections.ca/resources/making-something-from-nothing-food-literacy-among-youth-young-pregnant-women-and-young-parents-who-are-at-risk-for-poor-health/ (accessed 27 August 2021).

Fife, D., Slater, J., Fordyce-Voorham, S. and Worsley, A. (2021), "Food literacy education in Manitoba, Canada and Victoria, Australia: a comparative pilot study", *International Journal of Home Economics*, Vol. 13 No. 2, pp. 16-28.

Fordyce-Voorham, S.P. (2016), "Predictors of the perceived importance of food skills of home economics teachers", *Health Education*, Vol. 116 No. 3, pp. 259-274, doi: 10.1108/HE-01-2015-0003.

Fredericks, L., Koch, P.A., Liu, A., Galitzdorfer, L., Costa, A. and Utter, J. (2020), "Experiential features of culinary nutrition education that drive behavior change: frameworks for research and practice", *Health Promotion Practice*, Vol. 21 No. 3, pp. 331-335, doi: 10.1177/1524839919896787.

Glaser, B.G. and Strauss, A.L. (1967), "The constant comparative method of qualitative analysis", *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Aldine, Chicago, IL, pp. 101-115.

Health Canada (2015), "A look at food skills in Canada", available at: https://nutritionconnections.ca/resources/a-look-at-food-skills-in-canada/ (accessed 27 August 2021).

Howard, A. and Brichta, J. (2013), *What's to Eat? Improving Food Literacy in Canada*, Conference Board of Canada, Ottawa, available at: http://www.conferenceboard.ca/e-library/abstract.aspx?did=5727 (accessed 27 August 2021).

Kalkan, I. (2019), "The impact of nutrition literacy on the food habits among young adults in Turkey", *Nutrition Research and Practice*, Vol. 13 No. 4, pp. 352-357, doi: 10.4162/nrp.2019.13.4.352.

Kennedy, L.G., Kichler, E.J., Seabrook, J.A., Matthews, J.I. and Dworatzek, P.D.N. (2019), "Validity and reliability of a food skills questionnaire", *Journal of Nutrition Education and Behavior*, Vol. 51 No. 7, pp. 857-864, doi: 10.1016/j.jneb.2019.02.003.

Kramp, D. (2020), "Bill 216, Food Literacy for Students Act, 2020", Legislative Assembly of Ontario, available at: https://www.ola.org/en/legislative-business/bills/parliament-42/session-1/bill-216.

Larson, N.I., Perry, C.L., Story, M. and Neumark-Sztainer, D. (2006), "Food preparation by young adults is associated with better diet quality", *Journal of the American Dietetic Association*, Vol. 106 No. 12, pp. 2001-2007, doi: 10.1016/j.jada.2006.09.008.

Laska, M.N., Larson, N.I., Neumark-Sztainer, D. and Story, M. (2012), "Does involvement in food preparation track from adolescence to young adulthood and is it associated with better dietary quality?", *Public Health Nutrition*, Vol. 15 No. 7, pp. 1150-1158, doi: 10.1017/S1368980011003004.

Lavelle, F., Spence, M., Hollywood, L., McGowan, L., Surgenor, D., McCloat, A., Mooney, E., Caraher, M., Raats, M. and Dean, M. (2016), "Learning cooking skills at different ages: a cross-sectional study", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 13 No. 119, pp. 1-11, doi: 10.1186/s12966-016-0446-y.

Lawe, B. (2013), "Teaching university students to cook, to improve their diet: a pilot study at Nottingham Trent University", *International Journal of Health Promotion and Education*, Vol. 51 No. 3, pp. 161-168, doi: 10.1080/14635240.2012.758884.

Leer, J. (2016), "What's cooking, man? Masculinity in European cooking shows after the Naked Chef", *Feminist Review*, Vol. 114, pp. 72-90.

Lichtenstein, A.H. and Ludwig, D.S. (2010), "Bring back home economics education", *Journal of the American Medical Association*, Vol. 303 No. 108, pp. 1857-1858.

Matthews, J.I., Doerr, L. and Dworatzek, P.D.N. (2015), "University students intend to eat better, but lack coping self-efficacy and knowledge of dietary recommendations", *Journal of Nutrition Education and Behavior*, Vol. 48 No. 1, pp. 12-19, doi: 10.1016/j.jneb.2015.08.005.

McGowan, L., Pot, G.K., Stephen, A.M., Lavelle, F., Spence, M., Raats, M., Hollywood, L., McDowell, D., McCloat, A., Mooney, E., Caraher, M. and Dean, M. (2016), "The influence of socio-demographic, psychological and knowledge-related variables alongside perceived cooking and food skills abilities in the prediction of diet quality in adults: a nationally representative cross-sectional study", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 13 No. 111, pp. 1-13, doi: 10.1186/s12966-016-0440-4.

McGowan, L., Caraher, M., Raats, M., Lavelle, F., Hollywood, L., McDowell, D., Spence, M., McCloat, A., Mooney, E. and Dean, M. (2017), "Domestic cooking and food skills: a review", *Critical Reviews in Food Science and Nutrition*, Vol. 57 No. 11, pp. 2412-2431, available at: http://www.tandfonline.com/loi/bfsn20.

Nanayakkara, J., Margerison, C. and Worsley, A. (2017), "Importance of food literacy education for senior secondary school students: food system professionals' opinions", *International Journal of Health Promotion and Education*, Vol. 55 Nos 5-6, pp. 284-295, doi: 10.1080/14635240.2017.1372695.

Nanayakkara, J., Burton, M., Margerison, C. and Worsley, A. (2018), "Parents' and young adults' perceptions of secondary school food education in Australia", *British Food Journal*, Vol. 20 No. 5, pp. 1151-1166, doi: 10.1108/BFJ-10-2017-0554.

Pendergast, D., Garvis, S. and Kanasa, H. (2011), "Insight from the public on home economics and formal food literacy", *Family and Consumer Sciences Research Journal*, Vol. 39 No. 4, pp. 415-430, doi: 10.1111/j.1552-3934.2011.02079.x.

Reicks, M., Trofholz, A.C., Stang, J.S. and Laska, M.N. (2014), "Impact of cooking and home food preparation interventions among adults: outcomes and implications for future programs", *Journal of Nutrition Education and Behavior*, Vol. 46 No. 4, pp. 259-276, doi: 10.1016/j.jneb.2014.02.001.

Ronto, R., Ball, L., Pendergast, D. and Harris, N. (2016), "Adolescents' perspectives on food literacy and its impact on their dietary behaviours", *Appetite*, Vol. 107, pp. 549-557, doi: 10.1016/j.appet.2016.09.006.

Sadegholvad, S., Yeatman, H., Parrish, A.-M. and Worsley, A. (2017), "What should be taught in secondary schools' nutrition and food systems education? Views from prominent food-related professionals in Australia", *Nutrients*, Vol. 9 No. 1207, pp. 3-14, doi: 10.3390/nu9111207.

Seabrook, J.A., Dworatzek, P.D.N. and Matthews, J.I. (2019), "Predictors of food skills in university students", *Canadian Journal of Dietetic Practice and Research*, Vol. 80, pp. 205-208, doi: 10.3148/cjdpr-2019.011.

Simonds, K., Zhang, L.Y. and Matthews, J. (2021), "My roommates would laugh at me": young males reveal embarrassment over lack of food skills", *Canadian Journal of Dietetic Practice and Research*, Vol. 82 No. 2, pp. 51-58.

Slater, J. (2013), "Is cooking dead? The state of Home Economics Food and Nutrition education in a Canadian province", *International Journal of Consumer Studies*, Vol. 37 No. 6, pp. 617-624, doi: 10.1111/ijcs.12042.

Slater, J.J. and Mudryj, A.N. (2016), "Self-perceived eating habits and food skills of Canadians", *Journal of Nutrition Education and Behavior*, Vol. 48 No. 7, pp. 486-495, doi: 10.1016/j.jneb.2016.04.397.

Steils, N. and Obaidalahe, Z. (2020), "'Social food': food literacy co-construction and distortion on social media", *Food Policy*, Vol. 95, pp. 101932-101941, doi: 10.1016/j.foodpol.2020.101932.

Szabo, M. (2012), "Foodwork or foodplay? Men's domestic cooking, privilege and leisure", *Sociology*, Vol. 47 No. 4, pp. 623-638, doi: 10.1177/0038038512448562.

Szabo, M.K. (2014), "'I'm a real catch': the blurring of alternative and hegemonic masculinities in men's talk about home cooking", *Women's Studies International Forum*, Vol. 44, pp. 228-235, doi: 10.1016/j.wsif.2013.08.003.

Utter, J., Denny, S., Lucassen, M. and Dyson, B. (2016), "Who is teaching the kids to cook? Results from a nationally representative survey of secondary school students in New Zealand", *International Journal of Adolescent Medicine and Health*, Vol. 30 No. 3, pp. 1150-1162, doi: 10.1515/ijamh-2016-0064.

Utter, J., Larson, N., Laska, M.N., Winkler, M. and Neumark-Sztainer, D. (2018), "Self-perceived cooking skills in emerging adulthood predict better dietary behaviors and intake 10 years later: a longitudinal study", *Journal of Nutrition Education and Behavior*, Vol. 50 No. 5, pp. 494-500, doi: 10.1016/j.jneb.2018.01.021.

Vidgen, H. (2016), *Food Literacy: Key Concepts for Health and Education*, Taylor and Francis, Routledge, London, doi: 10.4324/9781315708492.

Wilson, C.K., Matthews, J.I., Seabrook, J.A. and Dworatzek, P.D.N. (2017), "Self-reported food skills of university students", *Appetite*, Vol. 108, pp. 270-276, doi: 10.1016/j.appet.2016.10.011.

Wolfson, J.A., Frattaroli, S., Bleich, S.N., Smith, K.C. and Teret, S.P. (2017), "Perspectives on learning to cook and public support for cooking education policies in the United States: a mixed methods study", *Appetite*, Vol. 108, pp. 226-237, doi: 10.1016/j.appet.2016.10.004.

Wolfson, J.A., Leung, C.W. and Richardson, C.R. (2020), "More frequent cooking at home is associated with higher Healthy Eating Index-2015 score", *Public Health Nutrition*, Vol. 23 No. 13, pp. 2384-2394, doi: 10.1017/S1368980019003549.

Worsley, A. (2006), "Lay people's views of school food policy options: associations with confidence, personal values and demographics", *Health Education Research*, Vol. 21 No. 6, pp. 848-861, doi: 10.1093/her/cyl138.

Worsley, A., Wang, W., Ismail, S. and Ridley, S. (2014), "Consumers' interest in learning about cooking: the influence of age, gender and education", *International Journal of Consumer Studies*, Vol. 38 No. 3, pp. 258-264, doi: 10.1111/ijcs.12089.

About the authors

Lucy Yixuan Zhang, MScFN, RD, CDE, is a renal Dietitian at the Lakeridge Health Regional Nephrology Program. She is also the owner of Beyond Diabetes Nutrition, a virtual nutrition counselling practice. Recognizing the challenging and often conflicting nutrition advice patients receive when juggling multiple health conditions, Lucy supports patients in prioritizing nutrition needs and translating nutrition recommendations into practical everyday actions. Lucy believes food should nourish and satisfy. With a passion for knowledge translation, Lucy continues to explore new ways to utilize visual mediums in communicating evidence-based health information.

Kristen Simonds, MScFN, RD, is the Manager of Healthcare Menu Systems at Aramark Canada Ltd., where she supports the development and execution of acute care and long-term care menus. As a Registered Dietitian, Kristen adheres to the philosophy that food should be simple, nutritious and easy to prepare – and free of all the stringent food rules. She previously worked in post-secondary institutions designing residential and retail menus and educating students on nutrition. Kristen has a passion for sharing her knowledge of nutrition to empower others to make healthy choices.

June Matthews, PhD, RD, PHEc, is an Associate Professor in the School of Food and Nutritional Sciences at Brescia University College (London, Canada) and an Adjunct Research Professor with the School of Graduate and Post-Doctoral Studies at Western University (London, Canada). As a Professional Home Economist and a Registered Dietitian, Dr. Matthews values a holistic approach to teaching and learning about the whole food system. Dr. Matthews' current areas of research include food skills of young adults, agriculture education and Canadian farmers' perspectives of sustainable food production. June Matthews is the corresponding author and can be contacted at: jmatth22@uwo.ca

Received 7 June 2021
Revised 16 August 2021
Accepted 21 September 2021

Two aspects of health literacy and their importance for the use of health-promotion measures by teachers in the school setting

Anne-Cathrin Hoppe-Herfurth, Birgit Burkhardt, Nancy John and Ludwig Bilz
Department of Health Sciences, Brandenburg University of Technology Cottbus-Senftenberg, Cottbus, Germany

Abstract

Purpose – Teachers are exposed to many stressors. Compared to other occupational groups, they are more frequently affected by psychosomatic complaints. In recent decades, numerous prevention and intervention measures for promoting health have been developed and implemented for this target group. However, it remains unclear how the uptake of health-promotion measures (HPMs) by teachers can be increased in order to prevent stress-related disorders. This paper examines two facets of health literacy—health awareness and health value—in terms of their importance in both the take-up and intended take-up of HPMs.
Design/methodology/approach – In the 2017/2018 school year, data were collected by paper and pencil from a representative sample of 830 teachers across all school types in the German State of Brandenburg.
Findings – Teachers who place great value on their own health show significantly higher levels of take-up and intended take-up of HPMs. The findings regarding health awareness are more heterogeneous. Further associations were found with age and psychosocial stress.
Originality/value – While there has been growing academic interest in developing HPMs for teachers, there has been relatively little focus on the factors that may influence the implementation and uptake of these measures. The paper contributes to addressing this gap by shedding light on the relevance of two facets of health literacy. Strengthening the perceived importance of health could be a starting point for increasing the use of HPMs by teachers and thus improving their health.

Keywords Health promotion, Health literacy, Teacher health, Healthcare utilization, Health value
Paper type Research paper

Background

Introduction

Teachers work in a profession that is psychologically and physically very demanding (Gray *et al.*, 2017). Compared with other professional groups, teachers suffer more frequently from mental and psychosomatic illnesses as well as non-specific complaints. They report a higher degree of exhaustion, fatigue, headaches, tension and burnout symptoms (De Heus and Diekstra, 1999; Scheuch *et al.*, 2015). The effects of these heightened stress levels are not only evident in the high levels of early retirement due to incapacity, which was 12% among German teachers in 2016 (Statistisches Bundesamt, 2017), but correlations have also been shown between teachers' psychological well-being and their teaching behavior. Emotional exhaustion and subclinical depressive symptoms in teachers are significantly associated with an increased physical stress response in the students they are teaching (Oberle and Schonert-Reichl, 2016), whereas better teacher wellbeing is associated with better student wellbeing and lower student distress (Harding *et al.*, 2019). In addition to this, teacher-

Funding: The authors acknowledge with gratitude the Unfallkasse Brandenburg, Germany who provided funding to support the study.

Health Education
Vol. 121 No. 6, 2021
pp. 554-568

0965-4283
DOI 10.1108/HE-06-2021-0091

reported emotional exhaustion directly affects students, leading to a feeling of not being supported, higher dissatisfaction with school (Arens and Morin, 2016; Klusmann *et al.*, 2006) and poorer math performance (Klusmann *et al.*, 2016).

In view of these findings, appropriate measures must be developed and implemented to promote the health of teachers and consequently to ensure the fulfillment of the educational mission of the school. Various prevention and intervention measures for teachers have been developed in recent years in the context of workplace health promotion programs (Awa *et al.*, 2010; Emerson *et al.*, 2017). Workplace health promotion, by definition, aims to "improve the health and well-being of people at work" (European Network for Workplace Health Promotion, 2017, p. 2). Behavioral prevention measures in particular were examined for their effectiveness (Hwang *et al.*, 2017; Iancu *et al.*, 2017).

In the general population, participation in workplace health promotion is typically modest (Robroek *et al.*, 2009; Rongen *et al.*, 2014). A study on the use of health-promotion measures (HPMs) by German teachers has shown that they primarily make extensive use of environmental HPMs (e.g. health-promotion through the organization of the school and the shaping of the school climate), while behavioral HPMs (e.g. dealing with workloads, strengthening effective working practices) are used much less frequently (Burkhardt *et al.*, 2021). It is not yet clear how the take-up of these measures by teachers can be increased. An important prerequisite for this is to understand which factors increase the willingness of teachers to make use of HPMs. This paper aims, therefore, to focus on two personal aspects of teachers' health literacy—the value that teachers place on their own health and their health awareness.

Health literacy and the use of health promotion

Andersen's (1995) Behavioral Model of Health Services Use, which provides the theoretical framework for this paper, distinguishes between predisposing characteristics and enabling resources, alongside need factors, which, taken together, influence whether or not people take part in health-related offers. Demographic and socio-structural factors, as well as health beliefs, are considered predisposing characteristics that indirectly influence a person's requirement for medical care or prevention. Enabling resources include conditions that directly influence access to healthcare services. These can be person-related resources, such as income or the existence of health insurance, as well as community-related resources, reflected, for example, in how easily health facilities can be accessed. The third component in the behavioral model is need factors, with Andersen distinguishing between subjectively perceived need through, for example, perceptions of high levels of strain and stress, which is contrasted with one's objective need for medical care.

Recently, the importance of individual health literacy has been intensively researched and discussed in the context of health behavior. Health literacy is considered to be a cognitive skill that encompasses an individual's knowledge, motivation and competence to access, understand, appraise and apply health information in order to promote and maintain good health (Sørensen *et al.*, 2012). The extent of these capabilities significantly determines people's health as well as their health-related behaviors. Research consistently shows that low health literacy is associated with poorer physical and mental health (Berkman *et al.*, 2011), as well as lower health-related knowledge about one's own illnesses (Fang *et al.*, 2006; Lindau *et al.*, 2002) and a lower utilization of health services, such as preventive and screening services (Berkman *et al.*, 2011). Furthermore, it has been shown that limited health literacy is associated with increased mortality and hospitalization, especially for chronic diseases (Fabbri *et al.*, 2017; Taylor *et al.*, 2017). A survey on health literacy conducted in eight European countries showed that 47.6% of the total population had a limited (inadequate or problematic) level of health literacy which means that they have difficulties dealing with

health-related knowledge (Sørensen *et al.*, 2015). In the context of the behavioral model (Andersen, 1995), health literacy can be classified as a predisposing characteristic.

Health awareness and health value as two aspects of health literacy

Despite the large number of academic studies that have focused on the construct of health literacy, there has been no consensual model to date on the specific skills and abilities that constitute health literacy. The structural model of health literacy from Soellner *et al.* (2017) distinguishes between basic and advanced skills. Basic skills describe basic knowledge and skills concerning health, such as reading and math comprehension. However, the core of the model is represented by the advanced skills, which are assigned to a perceptive-motivational level and are necessary for health-related activities in everyday life. This includes the ability for health-related self-perception (health awareness) and a proactive approach to health (health value). In the case of stress-related psychosomatic complaints in particular, good self-awareness or mindfulness about stress signals and signs of overload has found to be of great importance for maintaining health. Mindfulness has not only been shown to have positive effects on general health and well-being (Gu *et al.*, 2015; Lomas *et al.*, 2017), but mindfulness as well as mindfulness training is also associated with significantly reduced symptoms of mental illness, such as psychological stress (Bränström *et al.*, 2010; Foley *et al.*, 2010), depression (Foley *et al.*, 2010) and more frequent use of more functional stress management strategies (Haarig *et al.*, 2016).

In addition to health awareness, a major role in health literacy is also played by people's value of their health. It has been shown, for example, that people who place a high value on their own health and at the same time have a high internal control expectation in regards to it that is to say, they strongly believe their own behaviors influence their health search more intensively for health-related information (Wallston *et al.*, 1976). Some authors suggest that people who consider their own health to be particularly important are more sensitive to health-related risks and take more care of their own health (Pundt and Felfe, 2017). In a representative study, the German population rated their own health as the most important area of their lives (Hinz *et al.*, 2010).

Research questions

To date, there are no findings on the importance of health awareness and health value for teachers' uptake of HPMs. Since relevant psychological models refer to the distinction between intention and the actual behavior (Ajzen, 1991; Fishbein and Ajzen, 1975), both of these aspects are also considered here.

The aim of this study, then, is to clarify, for the first time, the importance of these two aspects of health literacy in explaining the utilization of HPMs (both intention and actual uptake) by teachers.

With reference to the theoretical models described, we assume that:

(1) A higher health awareness as well as a higher health value is associated with a higher intention of teachers to make use of HPMs, *and*

(2) A higher health awareness as well as a higher health value is associated with a higher utilization of HPMs by teachers.

Methods

Sample

From all general education schools in the German federal State of Brandenburg, a stratified sample (stratification factor: school type) of 158 schools were randomly selected according to

the PPS design (probability proportional to size). This design allows for equal selection probabilities at the individual level regardless of school size. 49 schools and 3 school centers (fusion of elementary school and secondary school or elementary school and comprehensive school) were recruited to participate in the study (response rate at school level: 32.9%), from which 830 teachers took part in the survey (response rate at teacher level: 52.3%). With regard to the characteristics age ($M = 48.1$, SD = 10.7), gender (80.1% female), type of school (special school: 6.9%; comprehensive school: 7.1%; elementary school: 43.3%; secondary school: 12.7%; school center: 9.4%; grammar school: 20.6%) and sponsorship (public: 91.3%; free: 8.7%), the sample achieved is representative of the population of all Brandenburg teachers ($N = 18.465$) in the 2017/2018 school year (Amt für Statistik Berlin-Brandenburg, 2018).

Procedure

The teacher survey was conducted as a paper–pencil questionnaire in 2018. The survey took place in parallel with the student survey of the HBSC Study Brandenburg ("Health Behaviour in School-aged Children" John and Bilz, 2020). The management of the selected schools were invited in writing to take part in the survey and were informed about data protection rights and the survey procedure. Participation in the survey was voluntary and anonymous. The questionnaire took about 30 min to complete.

Ethics statement

All investigations described that included people were performed with the approval of the ethics committee responsible, in accordance with national law, and in accordance with the Declaration of Helsinki of 1975 (in the current, revised version). Before starting data collection, the ethics committee of the Brandenburg University of Technology Cottbus-Senftenberg approved the study (file number: EK 2018-6), while the Ministry of Education, Youth and Sports of the State of Brandenburg approved the survey (registration number: 07/2018).

Measures

The utilization of HPMs as well as the intention to utilize HPMs were measured in a total of 10 categories. These categories emerged in a multistage, rational construction process. For this purpose, relevant categories were first derived from the definition of workplace health promotion of the European Network for Workplace Health Promotion (2017). In further steps, classic areas of behavioral based and environmental based health promotion in the workplace setting (Faller, 2017, 2018) were added to this list. Further categories of HPMs were identified that are specifically offered to teachers in the State of Brandenburg (Landesinstitut für Schule und Medien Berlin-Brandenburg, n.d.) and in other German federal states (Ministerium für Bildung, Wissenschaft und Kultur Mecklenburg-Vorpommern, 2014; Ministerium für Kultus, Jugend und Sport Baden-Württemberg, 2014). The resulting final 10 categories of HPMs can be found in Table 1.

The study variables were measured by asking the following questions:

Intention. "Would you like to use one or more measures from this area in the future?" Response categories: "yes" and "no." For statistical analysis, the intention to use was summed across all 10 individual categories.

Utilization. "Have you used this measure(s) in the last 24 months?" Response categories: "no", "yes, one", "yes, several." For further analyses, these responses were dichotomized (no vs. yes) and summed across all 10 individual measures.

Health awareness and health value. To measure the two aspects of health literacy, two subscales of the Health Oriented Leadership questionnaire (HOL; Pundt and Felfe, 2017)

HPM-area	Example measures
Healthy body, exercise, and sports	Medical examinations at companies' medical service, break sports, yoga or sports group at your school, physiotherapeutic applications, voice training
Healthy diet	Food options at your school, healthy cafeteria food, nutrition counseling
Substance use prevention	Smoking cessation program, medical or psychosocial counseling for addiction
Strengthening of effective working methods and personal handling of workloads	Further training on topics such as stress or time management, work organization, ability to recover or work-life balance, relaxation courses, psychosocial counseling, supervision or intervision
Occupational safety	Training in first aid or fire protection, hygiene measures, such as instructions on proper hand washing, disinfectants
Health-promotion design of school rooms and equipment	Disturbance-free extracurricular workplace, rest area, ergonomic computer workstations, height-adjustable desks
Health-promotion school organization	Binding substitution plan, fixed break times, existence of support systems, such as school psychology or social service, possibility of mutual work shadowing
Active participation of the teaching staff in the health-promotion school design	Health circles or discussion groups on health problems, surveys of the teaching staff on health and well-being or on school working conditions, joint school year planning by the teaching staff
Strengthening a health-promotion school climate	Joint school program work by teachers as well as learners, regular school conferences, celebrations, or festivities at the school
Strengthening pedagogical competencies in dealing with (challenging) student behavior	Further training on topics such as conflict management, communication, dealing with noise or classroom disturbances, pedagogical days

Table 1.
Areas of health promotion measures (HPMs) for teachers at the school workplace with example measures listed in the questionnaire

were used. For this purpose, six items measured health awareness (e.g. "I immediately notice when something is wrong with my health," $\alpha = 0.78$) and three items measured the health value (e.g. "My health is my highest priority," $\alpha = 0.72$). For both scales, the answers were given on a five-point Likert scale, from "strongly disagree" to "strongly agree".

Teachers' overall psychosocial stress was assessed as a multidimensional construct using several indicators to map the current need for health promotion interventions. These indicators capture aspects of mental well-being as well as mental health limitations. The index is hereinafter referred to as the Psychosocial Stress Index. The following indicators were used for this purpose:

Depressiveness. Aspects of depressiveness were assessed using the depression module of the Patient Health Questionnaire (PHQ; Löwe *et al.*, 2002). The question: "During the past two weeks, how often did you feel affected by the following complaints?" was to be answered in terms of nine complaints (e.g. "tiredness or feeling of having no energy," $\alpha = 0.82$) on a four-point scale, from "not at all" to "almost every day".

Emotional exhaustion. According to the COACTIV research program (Baumert *et al.*, 2009), a subscale of the Maslach Burnout Inventory (Maslach *et al.*, 1996) with four items (e.g. "I feel overloaded overall," $\alpha = 0.84$) was used. The opening question was: "To what extent do the following statements apply to you as a teacher?" and responses were given on a four-point scale, from "applies" to "does not apply".

Subjective psychological well-being. The WHO-5 Well-Being Index (Bech, 2004) was used, which explored various aspects of subjective psychological well-being by means of five items (e.g. "In the last two weeks I was happy and in a good mood," $\alpha = 0.89$). Responses were given on a six-point scale, from "at no time" to "all the time".

An overall index was calculated from these three indicators, which reflects the psychosocial stress of the teachers. In order to achieve this, subjective psychological well-being was inverted in the index formation.

Based on existing findings on the importance of sociodemographic aspects for the uptake of HPMs in the general German population (Jordan and von der Lippe, 2013), the age as well as the gender of the teachers were included in the analyses as control variables. Furthermore, due to inconsistent health-promotion structures of schools, the sponsorship of the school (public vs free) as well as the type of school (special school, comprehensive school, elementary school, secondary school, school center and grammar school) were included as control variables in the calculations. The type of school was considered based on previous findings that highlighted different levels of stress and health in teachers at different types of schools (Bauer *et al.*, 2007).

Statistical analysis

First, we examined possible group differences in teachers' intention to use HPMs as well as their actual use of HPMs in terms of age, gender, type of school and legal sponsorship of the school, using Pearson's χ^2-tests with Cramer's V calculated as a measure of effect size. Following this, we examined the relationship between intention or utilization as a dependent variable and health awareness as well as health value (controlled for age, gender, sponsorship, school type and Psychosocial-Stress-Index) as independent variable, using a stepwise multiple linear regression analysis. First, we included the control variables in the regression models. We went on to include the two independent variables. For each step, we calculated the proportion of the explained variance. All analyses were performed using SPSS statistical and analysis software (version 26).

Results

Intention to use and actual use of HPMs by teachers

Of the teachers surveyed ($N = 830$), 95.7% said they planned to use one or more HPM in the future. Regarding the actual use of HPMs, 81.3% of the teachers reported that they used at least one of these measures within the last 24 months. For a more detailed overview of the uptake of HPMs by teachers in the school setting, see Burkhardt *et al.* (2021). In the bivariate analyses, there are no significant group differences regarding gender, age, type of school and school sponsorship (see Table 2).

After testing the requirements of homoscedasticity, linearity as well as normal distribution of the residuals, multiple linear regressions were used to test the associations between the independent variables and the uptake as well as the intention to utilize HPMs.

Predicting the intention to use HPMs from health awareness and health value

To examine the importance of these two aspects of health literacy on teachers' intention to use HPMs, we began by including the control variables in the multivariate regression model. This model showed a significant negative relationship between age ($\beta = -0.196, p < 0.001$) and the intention to use HPMs, and a positive relationship between teachers' Psychosocial-Stress-Index ($\beta = 0.087, p < 0.05$) and their intention to use HPMs. No significant associations exist with gender, school sponsorship and school type. We then added both factors of health literacy (health awareness and health value) to the model. Here, health value emerged as a

	Intention to use HPMs (%)		Test statistics		Utilization of HPMs (past 24 months, %)		Test statistics	
	None	One or more	χ^2 (df)	V	None	One or more	χ^2 (df)	V
Gender								
Male	6.1	93.9	1.746 (1)$^{n.s.}$	0.046	19.6	80.4	0.133 (1)$^{n.s.}$	0.013
Female	3.8	96.2			18.4	81.6		
Age group								
Under 40 years	3.2	96.8	1.068 (2)$^{n.s.}$	0.036	16.9	83.1	2.131 (2)$^{n.s.}$	0.051
40–50 years	3.5	96.5			15.3	84.7		
Over 50 years	4.8	95.2			20.0	80.0		
Type of school								
Special school	5.3	94.7	0.911 (5)$^{n.s.}$	0.033	19.3	80.7	1.983 (5)$^{n.s.}$	0.049
Comprehensive school	5.1	94.9			16.9	83.1		
Elementary school	4.5	95.5			17.8	82.2		
Grammar school	4.1	95.9			18.6	81.4		
School center	5.1	94.9			24.4	75.6		
Secondary school	2.9	97.1			18.1	81.9		
School sponsorship								
Free	6.9	93.1	1.291 (1)$^{n.s.}$	0.039	12.5	87.5	1.979 (1)$^{n.s.}$	0.049
Public	4.1	95.9			19.3	80.7		
Total	4.3	95.7			18.7	81.3		

Note(s): N = 809–830. χ^2 = test value, df = degrees of freedom, V = measure of effect size, $^{n.s.}$ = not significant

Table 2. Intention and use of health promotion measures (HPMs) by teachers in the last 24 months by gender, age group, type of school and school sponsorship

significant predictor ($\beta = 0.113$, $p < 0.01$), with higher value associated with higher intention to use HPMs. For health awareness, there are no significant associations with the dependent variable. Adding both health literacy factors to the regression model resulted in an increase of 1.2% in explained variance, with a total explained variance of 5.4%. A detailed presentation of the results can be found in Table 3.

Predicting the use of HPMs from health awareness and health value

We also entered the control variables into the model to predict the uptake of HPMs. This revealed one significant negative relationship of the Psychosocial Stress Index to the use of HPMs ($\beta = -0.189$, $p < 0.001$), suggesting that higher levels of psychological stress are associated with lower levels of HPMs use. Furthermore, a significant effect indicates that teachers in grammar schools are slightly less likely to use HPMs. Adding both aspects of health literacy into the model in a second step, an increase in explained variance of 1.5% was achieved, giving this model an overall explained variance of 6.5%. More specifically, health value emerged as a significant positive predictor ($\beta = 0.108$, $p < 0.01$) and health awareness emerged as a significant negative predictor ($\beta = -0.091$, $p < 0.05$) of the use of HPMs. This means that a more intensive use of HPMs in the past 24 months is associated with a greater emphasis on one's own health by teachers and less health awareness. A detailed presentation of the results can be found in Table 4.

Step	Predictor variable	B	SE	β	95% CI Lower	95% CI Upper	R^2	ΔR^2
Step 1: control variables	Gender	−0.068	0.236	−0.011	−0.532	0.395		
	Age in years	−0.047	0.009	−0.196***	−0.065	−0.030		
	Psychosocial-stress-index	0.025	0.010	0.087*	0.004	0.045		
	School sponsorship	0.049	0.372	0.005	−0.682	0.780		
	Type of school							
	Special school	0.549	0.381	0.054	−0.199	1.297		
	Comprehensive school	−0.044	0.406	0.004	−0.752	0.840		
	Grammar school	−0.149	0.255	0.023	−0.352	0.650		
	School center	0.387	0.331	0.044	−0.263	1.038		
	Secondary school	0.343	0.293	0.045	−0.233	0.919	0.043	
Step 2: control variables + health awareness and health value	Health awareness	−0.161	0.207	−0.029	−0.566	0.245		
	Health value	0.326	0.107	0.113**	0.116	0.537		
	Gender	−0.081	0.236	−0.013	−0.543	0.382		
	Age in years	−0.048	0.009	−0.200***	−0.066	−0.031		
	Psychosocial–stress-index	0.029	0.010	0.102**	0.009	0.049		
	School sponsorship	0.109	0.371	−0.012	−0.620	0.838		
	Type of school							
	Special school	0.536	0.380	0.053	−0.209	1.281		
	Comprehensive school	0.001	0.404	0.000	−0.793	0.794		
	Grammar school	0.219	0.255	0.034	−0.282	0.720		
	School center	0.332	0.332	0.038	−0.319	0.983		
	Secondary school	0.357	0.292	0.046	−0.216	0.931	0.054	0.012

Note(s): Reference categories: Gender: female; School sponsorship: free; Type of school: Elementary school. N = 758; B = unstandardized regression coefficient, SE = Standard error, β = standardized regression coefficient, CI = Confidence interval, R^2 = Determination coefficient. *p < 0.05; **p < 0.01; ***p < 0.001

Table 3.
Results of the multiple linear regression to predict health-promotion intentions

Discussion

The HPMs offered in the school sector are important for keeping teachers healthy and indirectly contribute to safeguarding the educational mission of schools. Schools should thus aim to improve not only the way that these offers are structured in schools, but also to promote the utilization behavior of teachers regarding HPMs. The results of this study show that two facets of health literacy—health-related self-perception (health awareness) and a proactive approach to health (health value)—are associated with teachers' use of HPMs. When it comes to the intention of teachers to utilize HPMs, however, these associations are different and the formulated hypotheses can only be confirmed in part.

Intention to utilize HPMs

According to Andersen (1995), age is considered to be a predisposing factor in the behavioral model. Our results show that as age increases, intention to use HPMs decreases.

Step	Predictor variable	B	SE	β	95% CI Lower	95% CI Upper	R^2	ΔR^2
Step 1: control variables	Gender	−0.003	0.207	−0.001	−0.409	0.403		
	Age in years	−0.009	0.008	0.043	−0.024	0.006		
	Psychosocial-stress-index	−0.047	0.009	−0.189***	−0.065	−0.029		
	School sponsorship	−0.215	0.326	−0.026	−0.856	0.426		
	Type of school							
	Special school	0.586	0.334	0.066	−0.070	1.242		
	Comprehensive school	−0.528	0.355	−0.060	−1.226	0.170		
	Grammar school	−0.445	0.224	−0.079*	−0.884	−0.006		
	School center	−0.051	0.290	−0.007	−0.621	0.519		
	Secondary school	0.114	0.257	0.017	−0.391	0.618	0.050	
Step 2: control variables + health awareness and health value	Health awareness	−0.447	0.181	−0.091*	−0.802	−0.092		
	Health value	0.274	0.094	0.108**	0.090	0.458		
	Gender	−0.039	0.206	−0.007	−0.443	0.366		
	Age in years	−0.008	0.008	−0.039	−0.024	0.007		
	Psychosocial-stress-index	−0.044	0.009	−0.177***	−0.062	−0.026		
	School sponsorship	−0.176	0.325	−0.021	−0.814	0.462		
	Type of school							
	Special school	0.589	0.332	0.066	−0.063	1.241		
	Comprehensive school	−0.534	0.354	−0.061	−1.229	0.160		
	Grammar school	−0.381	0.223	−0.067	−0.819	0.057		
	School center	−0.052	0.290	−0.007	−0.622	0.518		
	Secondary school	0.134	0.255	0.020	−0.367	0.636	0.065	0.015

Table 4.
Results of the multiple linear regression to predict health-promotion behavior

Note(s): Reference categories: Gender: female; School sponsorship: free; Type of school: Elementary school; $N = 758$; B = unstandardized regression coefficient, SE = Standard error, β = standardized regression coefficient, CI = Confidence interval, R^2 = Determination coefficient. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

One explanation for this could be that more utilitarian objectives tend to be pursued in working life the older one gets. Shortly before retirement, the effort–benefit trade-offs for HPMs could be perceived by teachers in such a way that they are more likely to decide against participating in, for example, stress management or sports programs. The anticipated expense of such measures, possibly in addition to regular working hours, no longer outweighs the potential benefits from the teachers' point of view. Furthermore, we have been able to show that higher psychosocial stress in teachers is associated with a stronger intention to use HPMs. This finding is consistent with the statements of Andersen's behavioral model (1995) as they relate to health-related care utilization, according to which psychosocial strain and distress as well as poor or fair perceived health, as a need factor, promotes utilization (Blackwell *et al.*, 2009; Dhingra *et al.*, 2010).

Regarding the central research variables of this study, the research hypotheses were only partially empirically supported. Consistent with the hypothesis, the results indicate that teachers who place greater importance on their health are more likely to say that they intend

to use HPMs. Viewing this facet of health literacy as an attitudinal variable, according to the theory of planned behavior (Ajzen, 1991), this finding supports other findings that aim to predict health behaviors. For example, meta-analytic findings show that a negative attitude toward smoking or increased alcohol consumption is associated with a lower intention to smoke or drink excessively, but also that a favorable attitude toward physical activity or healthy eating strengthens the intention to do that activity (Conner and Sparks, 2005).

The situation however is different when it comes to health awareness. Contrary to the assumptions of research question 1, there is no connection here with the intention to use HPMs in the future. Health awareness in terms of one's self-awareness of stress symptoms can represent a central component in maintaining health, especially when psychosomatic stress is high, as is the case in teachers (Bränström *et al.*, 2010; Foley *et al.*, 2010; Haarig *et al.*, 2016; Hillert and Schmitz, 2004). The fact that no significant association was found in this study could be due to the nature of the HPMs queried, as well as the aggregation of these as a common index summed up across all 10 categories. Not all areas related to HPMs explored in this study are primarily aimed at preventing psychosomatic illnesses. Although areas such as "Strengthening of effective working methods and personal handling of workloads" include measures such as stress management, time management and relaxation courses, categories such as "Occupational safety" with measures such as "Training in first aid or fire protection" are not connected to mental health in the same way. A possible effect of health awareness might be "diluted" by this association. Another reason for this result could be that increased health awareness among teachers may be associated with a more pronounced tendency to take care of oneself. If teachers pay more attention to health-related signals, avoiding work-related stress may become a priority in maintaining health. Teachers with this kind of approach are classified as "Type S" according to the findings of Kieschke and Schaarschmidt (2008). In addition to a pronounced ability to distance themselves from professional concerns, this group also possesses an increased level of inner calm as well as balance, which together indicate a high level of resistance to occupational stresses. Consequently, it might be the case that teachers with high levels of health awareness experience HPMs as additional professional obligations and are more likely to distance themselves from them or are less interested in using them.

Utilization of HPMs

Surprisingly, the results on the actual use of HPMs by teachers show a decreasing use of HPMs as stress increases. Here too, the findings of Kieschke and Schaarschmidt (2008) can offer an explanatory approach. Very highly stressed teachers, assigned to "Risk Type B," are characterized by, among other things, an increased tendency toward resignation, lowered resistance to stress and feelings of hopelessness. Remaining mental resources are often no longer sufficient to cope with additional demands (Kieschke and Schaarschmidt, 2008). Thus, primary prevention services, such as those examined in this study, might also be experienced as too high an additional demand that more stressed teachers are not able to handle due to their scarce emotional resources.

The value that teachers place on their own health also plays an important role in their actual use of HPMs. Here, the results point in the same direction as those for intention and thus confirm our hypotheses for research question 2. A higher evaluation of one's own health is thus not only associated with a stronger intention to utilize HPMs, but also with increased actual take-up, thus corresponding with the predictions based on the theory of planned behavior (Ajzen, 1991). Consequently, this aspect of health literacy emerges as a meaningful predictor of teachers' health behaviors.

Contrary to our hypothesis, however, health awareness is shown to be a negative predictor of the utilization of HPMs, insofar as high levels of health awareness are associated with reduced utilization. Here, the same alternative explanatory approach used to classify the unexpected findings on intention could also be relevant. That is to say, teachers with higher

levels of health awareness may be more inclined to take more care of themselves in the face of the demands of the job and professional stress. The use of HPMs in the school setting may be experienced as an additional chore and these teachers may have a stronger tendency to distance themselves from additional occupational stress, according to the description of the "Type S" teacher described by Kieschke and Schaarschmidt (2008). Higher health awareness as a personal resource could also be related to higher stress resistance and consequently to a lower need for HPMs in the context of schools.

Practical implications

The results of this study show that, above all, health value can be seen as a key personal factor in increasing the use of HPMs by teachers. The aim for schools and governing bodies should therefore be to raise teachers' awareness of the importance of their own health in order to strengthen their health literacy and, as a consequence, their health behaviors. Organized and structured health education is an essential component of health promotion and disease prevention. This primarily involves providing health-related information, for example through open communication about the benefits of a healthy lifestyle and promoting health internally in schools, but also teaching personal and social skills that promote health awareness, such as strengthening teachers' self-efficacy beliefs (Nutbeam *et al.*, 2010; Suggs *et al.*, 2015). As early as the vocational training stage, emphasis should be placed on informing prospective teachers about the health risks of their profession. This kind of transparency not only supports individual educational and professional decision-making processes but also helps to demonstrate the importance of one's own health and strengthen health-related attitudes. In addition, the health norms among colleagues could be strengthened through positive social influence by the school management, for instance, as well as school supervision based on the subjective norm of the theory of planned behavior (Ajzen, 1991; Franke and Felfe, 2011).

Considering the declining utilization of HPMs by teachers, possibly due to high psychosocial stress caused by insufficient personal resources, the need for appropriate procedures for early detection of occupational stress is of increasing importance. Established screening structures in the school setting can help to identify stress in a timely manner and offer primary prevention services before teachers are completely exhausted. Increased utilization of HPMs should be the result of this work.

Limitations

Due to the regional focus on teachers in the German State of Brandenburg, this study allows only limited conclusions to be drawn for other countries. Furthermore, self-selection effects cannot be ruled out, due to the voluntary nature of study participation, such that teachers with a particular connection to the topics of health and health promotion may have been more likely to participate. The information provided by the teachers is based on a subjective assessment, which means that conclusions about actual health needs and health behaviors are only possible to a limited extent.

Research needs

Differentiation in HPMs offers huge potential for future research. Psychosocial HPMs in particular should be utilized in a more differentiated manner in order to meet the specific health-related requirements of teachers. As part of this, the aspect of health awareness should also be examined in more detail. Our results provide evidence that there may have been confounding effects with other attitudes. Other aspects of health literacy, such as self-regulatory skills, as well as contextual factors in the school setting (e.g. availability of HPMs),

including the school climate and health-related norms among the teaching staff, all also deserve closer consideration in terms of the extent to which they are associated with the uptake of HPMs. In the light of the ongoing SARS-CoV2-pandemic, with its many additional burdens for teachers, the topic of health promotion for this professional group is only gaining in importance.

Conclusion

This paper has examined the importance of two aspects of health literacy in the intention as well as actual use of HPMs, namely health awareness and health value. The results show that teachers who place a higher value on their own health are more likely to intend to use HPMs and do generally go on to utilize them more often. The findings regarding health awareness are more heterogeneous. These findings expand our understanding of those factors that contribute to teachers' health-promotion behaviors. Strengthening the value teachers put on their own health could promote the utilization of HPMs and thus improve teachers' health.

References

Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211, doi: 10.1016/0749-5978(91)90020-T.

Amt für Statistik Berlin-Brandenburg (2018), "Statistischer Bericht - Allgemeinbildende Schulen im Land Brandenburg Schuljahr 2017/18", available at: https://www.statistik-berlin-brandenburg.de/publikationen/stat_berichte/2018/SB_B01-01-00_2017j01_BB.pdf (accessed 20 June 2018).

Andersen, R.M. (1995), "Revisiting the behavioral model and access to medical care: does it matter?", *Journal of Health and Social Behavior*, Vol. 136 No. 1, pp. 1-10, doi: 10.2307/2137284.

Arens, A.K. and Morin, A.J.S. (2016), "Relations between teachers' emotional exhaustion and students' educational outcomes", *Journal of Educational Psychology*, Vol. 108 No. 6, pp. 800-813, doi: 10.1037/edu0000105.

Awa, L.W., Plaumann, M. and Walter, U. (2010), "Burnout prevention: a review of intervention programs", *Patient Education and Counseling*, Vol. 78 No. 2, pp. 184-190, doi: 10.1016/j.pec.2009.04.008.

Bauer, J., Unterbrink, T., Hack, A., Pfeifer, R., Buhl-Grießhaber, V., Müller, U., Wesche, H., Frommhold, M., Seibt, R., Scheuch, K. and Wirsching, M. (2007), "Working conditions, adverse events and mental health problems in a sample of 949 German teachers", *International Archives of Occupational and Environmental Health*, Vol. 80, pp. 442-449, doi: 10.1007/s00420-007-0170-7.

Baumert, J., Blum, W., Brunner, M., Dubberke, T., Jordan, A., Klusmann, U., Krauss, S., Kunter, M., Löwen, K., Neubrand, M. and Tsai, Y.M. (2009), *Professionswissen von Lehrkräften, kognitiv aktivierender Mathematikunterricht und die Entwicklung von mathematischer Kompetenz (COACTIV): Dokumentation der Erhebungsinstrumente*, Max-Planck-Institut für Bildungsforschung, Berlin.

Bech, P. (2004), "Measuring the dimensions of psychological general well-being by the WHO-5", *QoL Newsletter*, Vol. 32, pp. 15-16.

Berkman, N.D., Sheridan, S.L., Donahue, K.E., Halpern, D.J. and Crotty, K. (2011), "Low health literacy and health outcomes: an updated systematic review", *Annals of Internal Medicine*, Vol. 155 No. 2, pp. 97-107, doi: 10.7326/0003-4819-155-2-201107190-00005.

Blackwell, D.L., Martinez, M.E., Gentleman, J.F., Sanmartin, C. and Berthelot, J.-M. (2009), "Socioeconomic status and utilization of health care services in Canada and the United States: findings from a binational health survey", *Medical Care*, Vol. 47 No. 11, pp. 1136-1146.

Bränström, R., Kvillemo, P., Brandberg, Y. and Moskowitz, J.T. (2010), "Self-report mindfulness as a mediator of psychological well-being in a stress reduction intervention for cancer patients – a randomized study", *Annals of Behavioral Medicine*, Vol. 39 No. 2, pp. 151-161, doi: 10.1007/s12160-010-9168-6.

Burkhardt, B., Hoppe-Herfurth, A.-C., John, N. and Bilz, L. (2021), "Gesundheitsförderung für Lehrkräfte – Inanspruchnahme von gesundheitsförderlichen Maβnahmen im Setting Schule", *Das Gesundheitswesen*, eFirst, doi: 10.1055/a-1386-4252.

Conner, M. and Sparks, P. (2005), "Theory of planned behaviour and health behaviour", Conner, M. and Norman, P. (Eds), *Predicting Health Behaviour: Research and Practice with Social Cognition Models*. Open University Press, Buckingham, pp. 170-222.

De Heus, P. and Diekstra, R.F.W. (1999), "Do teachers burn out more easily? A comparison of teachers with other social professions on works tress and burnout symptoms", Vandenberghe, R. and Huberman, A.M. (Eds), *Understanding and Preventing Teacher Burnout: A Sourcebook of International Research and Practice*, Cambridge University Press, New York, pp. 269-284.

Dhingra, S.S., Zack, M., Strine, T., Pearson, W.S. and Balluz, L. (2010), "Determining prevalence and correlates of psychiatric treatment with Andersen's behavioral model of health services use", *Psychiatric Services*, Vol. 61 No. 5, pp. 524-528, doi: 10.1176/ps.2010.61.5.524.

Emerson, L.M., Leyland, A., Hudson, K., Rowse, G., Hanley, P. and Hugh-Jones, S. (2017), "Teaching mindfulness to teachers: a systematic review and narrative synthesis", *Mindfulness*, Vol. 8, pp. 1136-1149, doi: 10.1007/s12671-017-0691-4.

European Network for Workplace Health Promotion (2017), "Luxembourg declaration on workplace health promotion in the European Union", available at: https://www.enwhp.org/resources/toolip/doc/2018/05/04/luxembourg_declaration.pdf (accessed 06 June 2021).

Fabbri, M., Yost, K., Finney Rutten, L.J., Manemann, S.M., Boyd, C.M., Jensen, D., Weston, S.A., Jiang, R. and Roger, V. (2017), "Health literacy and outcomes in patients with heart failure: a prospective community study", *Mayo Clinic Proceedings*, Vol. 93 No. 1, pp. 9-15, doi: 10.1016/j.mayocp.2017.09.018.

Faller, G. (2017), "Was ist eigentlich Betriebliche Gesundheitsförderung?", in Faller, G. (Ed.), *Lehrbuch Betriebliche Gesundheitsförderung*, Hogrefe, Bern, pp. 25-38.

Faller, G. (2018), "Umsetzung Betrieblicher Gesundheitsförderung/Betrieblichen Gesundheitsmanagements in Deutschland: stand und Entwicklungsbedarfe der einschlägigen Forschung", *Das Gesundheitswesen*, Vol. 57 No. 3, pp. 278-285, doi: 10.1055/s-0042-100624.

Fang, M.C., Machtinger, E.L., Wang, F. and Schillinger, D. (2006), "Health literacy and anticoagulation-related outcomes among patients taking warfarin", *Journal of General Internal Medicine*, Vol. 21, pp. 841-846, doi: 10.1111/j.1525-1497.2006.00537.x.

Fishbein, M. and Ajzen, I. (1975), *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.

Foley, E., Baillie, A., Huxter, M., Price, M. and Sinclair, E. (2010), "Mindfulness-based cognitive therapy for individuals whose lives have been affected by cancer: a randomized controlled trial", *Journal of Consulting and Clinical Psychology*, Vol. 78 No. 1, pp. 72-79, doi: 10.1037/a0017566.

Franke, F. and Felfe, J. (2011), "Diagnose gesundheitsförderlicher Führung - das instrument ‚Health-oriented leadership'", Badura, B., Ducki, A., Schröder, H., Klose, J. and Macco, K. (Ed.s), *Fehlzeiten-Report 2011*, Springer, Berlin, Heidelberg, pp. 3-13, doi: 10.1007/978-3-642-21655-8_1.

Gray, C., Wilcox, G. and Nordstokke, D. (2017), "Teacher mental health, school climate, inclusive education and student learning: a review", *Canadian Psychology*, Vol. 58 No. 3, pp. 203-210, doi: 10.1037/cap0000117.

Gu, J., Strauss, C., Bond, R. and Cavanagh, K. (2015), "How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies", *Clinical Psychology Review*, Vol. 37, pp. 1-12, doi: 10.1016/j.cpr.2015.01.006.

Haarig, F., Winkler, D., Graubner, M., Sipos, L. and Mühlig, S. (2016), "Achtsamkeit zur Stressbewältigung – Ergebnisse einer randomisiert-kontrollierten Pilotstudie zu einem

Achtsamkeitsorientierten Stressbewältigungstraining (AST)", *Zeitschrift für Psychiatrie, Psychologie und Psychotherapie*, Vol. 64 No. 3, pp. 187-197, doi: 10.1024/1661-4747/a000278.

Harding, S., Morris, R., Gunnell, D., Ford, T., Hollingworth, W., Tilling, K., Evans, R., Bell, S., Grey, J., Brockman, R., Campbell, R., Araya, R., Murphy, S. and Kidger, J. (2019), "Is teachers' mental health and wellbeing associated with students' mental health and wellbeing?", *Journal of Affective Disorders*, Vol. 242, pp. 180-187, doi: 10.1016/j.jad.2018.08.080.

Hillert, A. and Schmitz, E. (2004), *Psychosomatische Erkrankungen bei Lehrerinnen und Lehrern*, Schattauer, Stuttgart.

Hinz, A., Hübscher, U., Brähler, E. and Berth, H. (2010), "Ist Gesundheit das höchste Gut? – Ergebnisse einer bevölkerungsrepräsentativen Umfrage zur subjektiven Bedeutung von Gesundheit", *Das Gesundheitswesen*, Vol. 72, pp. 897-903, doi: 10.1055/s-0029-1246151.

Hwang, Y.-S., Bartlett, B., Greben, M. and Hand, K. (2017), "A systematic review of mindfulness interventions for in-service teachers: a tool to enhance teacher wellbeing and performance", *Teaching and Teacher Education*, Vol. 64, pp. 26-42, doi: 10.1016/j.tate.2017.01.015.

Iancu, A.E., Rusu, A., Măroiu, C., Păcurar, R.P. and Maricuțoiu, L.P. (2017), "The effectiveness of interventions aimed at reducing teacher burnout: a meta-analysis", *Educational Psychology Review*, Vol. 30 No. 2, pp. 373-396, doi: 10.1007/s10648-017-9420-8.

John, N. and Bilz, L. (2020), *Kinder- und Jugendgesundheit in Brandenburg. Ergebnisse der HBSC-Gesundheitsstudie im Auftrag der WHO*, Pabst Science Publishers, Lengerich.

Jordan, S. and von der Lippe, E. (2013), "Teilnahme an verhaltenspräventiven Maßnahmen", *Bundesgesundheitsblatt*, Vol. 56, pp. 878-884, doi: 10.1007/s00103-013-1664-y.

Kieschke, U. and Schaarschmidt, U. (2008), "Professional commitment and health among teachers in Germany: a typological approach", *Learning and Instruction*, Vol. 18 No. 5, pp. 429-437, doi: 10.1016/j.learninstruc.2008.06.005.

Klusmann, U., Kunter, M., Trautwein, U. and Baumert, J. (2006), "Lehrerbelastung und Unterrichtsqualität aus der Perspektive von Lehrenden und Lernenden", *Zeitschrift für Pädagogische Psychologie*, Vol. 20 No. 3, pp. 161-173, doi: 10.1024/1010-0652.20.3.161.

Klusmann, U., Richter, D. and Lüdtke, O. (2016), "Teachers' emotional exhaustion is negatively related to students' achievement: evidence from a large-scale assessment study", *Journal of Educational Psychology*, Vol. 108 No. 8, pp. 1193-1203, doi: 10.1037/edu0000125.

Landesinstitut für Schule und Medien Berlin-Brandenburg (n.d.), "Zur Lehrergesundheit an Schulen im Land Brandenburg", available at: https://bildungsserver.berlin-brandenburg.de/schule/schulen-in-berlinbrandenburg/as/zur-lehrergesundheit-an-schulen-im-land-brandenburg/ (accessed 12 June 2020).

Lindau, S.T., Tomori, C., Lyons, T., Langseth, L., Bennett, C.L. and Garcia, P. (2002), "The association of health literacy with cervical cancer prevention knowledge and health behaviors in a multiethnic cohort of women", *American Journal of Obstetrics and Gynecology*, Vol. 186 No. 5, pp. 938-943, doi: 10.1067/mob.2002.122091.

Löwe, B., Spitzer, R.L., Zipfel, S. and Herzog, W. (2002), *Gesundheitsfragebogen für Patienten (PHQ-D): Manual und Testunterlagen*, Pfizer, Karlsruhe.

Lomas, T., Medina, J.C., Ivtzan, I., Rupprecht, S. and Eiroa-Orosa, F.J. (2017), "The impact of mindfulness on the wellbeing and performance of educators: a systematic review of the empirical literature", *Teaching and Teacher Education*, Vol. 61, pp. 132-141, doi: 10.1016/j.tate.2016.10.008.

Maslach, C., Jackson, S.E. and Leiter, M.P. (1996), *Maslach Burnout Inventory Manual*, Consulting Psychologists Press, Palo Alto, CA.

Ministerium für Bildung, Wissenschaft und Kultur Mecklenburg-Vorpommern (2014), "Leitfaden für ein Betriebliches Gesundheitsmanagement an den öffentlichen Schulen des Landes Mecklenburg-Vorpommern", available at: https://www.bildung-mv.de/export/sites/bildungsserver/downloads/lehrer/Lehrergesundheit_-Konzept_BGM__04_11_2014_finale_Fassung.pdf (accessed 12 June 2020).

Ministerium für Kultus, Jugend und Sport Baden-Württemberg (2014), "Gesundheitsmanagement für die öffentlichen Schulen in Baden-Württemberg: Maßnahmen und Ziele", available at: https://lehrerfortbildung-bw.de/st_lehrgesund/lgfb/140715_broschuere-gesundheitsmanagement-fuer-die-oeffentlichen-schulen.pdf (accessed 12 June 2020).

Nutbeam, D., Harris, E. and Wise, W. (2010), *Theory in a Nutshell: A Practical Guide to Health Promotion Theories*, McGraw-Hill, Sydney.

Oberle, E. and Schonert-Reichl, K.A. (2016), "Stress contagion in the classroom? The link between classroom teacher burnout and morning cortisol in elementary school students", *Social Science and Medicine*, Vol. 159, pp. 30-37, doi: 10.1016/j.socscimed.2016.04.031.

Pundt, F. and Felfe, J. (2017), *HOL: Health oriented Leadership - Instrument zur Erfassung gesundheitsförderlicher Führung*, Hogrefe, Bern.

Robroek, S.J., van Lenthe, F.J., van Empelen, P. and Burdorf, A. (2009), "Determinants of participation in worksite health promotion programmes: a systematic review", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 6 No. 26, doi: 10.1186/1479-5868-6-26.

Rongen, A., Robroek, S.J., van Ginkel, W., Lindeboom, D., Altink, B. and Burdorf, A. (2014), "Barriers and facilitators for participation in health promotion programs among employees: a six-month follow-up study", *BMC Public Health*, Vol. 14, p. 573, doi: 10.1186/1471-2458-14-573.

Scheuch, K., Haufe, E. and Seibt, R. (2015), "Teachers' health", *Deutsches Ärzteblatt International*, Vol. 112 No. 20, pp. 347-356, doi: 10.3238/arztebl.2015.0347.

Sørensen, K., van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z. and Brand, H. (2012), "Health literacy and public health: a systematic review and integration of definitions and models", *BMC Public Health*, Vol. 12 No. 80, doi: 10.1186/1471-2458-12-80.

Sørensen, K., Pelikan, J.M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., Fullam, J., Kondilis, B., Agrafiotis, D., Uiters, E., Falcon, M., Mensing, M., Tchamov, K., van den Broucke, S. and Brand, H. (2015), "Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU)", *European Journal of Public Health*, Vol. 25 No. 6, pp. 1053-1058, doi: 10.1093/eurpub/ckv043.

Soellner, R., Lenartz, N. and Rudinger, G. (2017), "Concept mapping as an approach for expert-guided model building: the example of health literacy", *Evaluation and Program Planning*, Vol. 60, pp. 245-253, doi: 10.1016/j.evalprogplan.2016.10.007.

Statistisches Bundesamt (2017), *Finanzen und Steuern: Versorgungsempfänger des öffentlichen Dienstes*, Statistisches Bundesamt (Destatis), Wiesbaden.

Suggs, L.S., Mcintyre, C., Warburton, W., Henderson, S. and Howitt, P. (2015), "Communicating health messages: a framework to increase the effectiveness of health communication globally", available at: https://www.imperial.ac.uk/media/imperial-college/institute-of-global-health-innovation/public/Complex-health-messages.pdf (accessed 26 October 2020).

Taylor, D.M., Fraser, S., Dudley, C., Oniscu, G.C., Tomson, C., Ravanan, R. and Roderick, P. and the ATTOM investigators (2017), "Health literacy and patient outcomes in chronic kidney disease: a systematic review", *Nephrology Dialysis Transplantation*, Vol. 33 No. 9, pp. 1545-1558, doi: 10.1093/ndt/gfx293.

Wallston, K.A., Maides, S. and Wallston, B.S. (1976), "Health-related information seeking as a function of health-related locus of control and health value", *Journal of Research in Personality*, Vol. 10 No. 2, pp. 215-222, doi: 10.1016/0092-6566(76)90074-X.

Corresponding author
Ludwig Bilz can be contacted at: ludwig.bilz@b-tu.de

Influential social marketing interventions in physical activity promotion

Hajar Ebrahimipour and Maryam Mokhtari Dinani
Department of Sport Management, Faculty of Sport Sciences, Alzahra University, Tehran, Iran, and
Abbas Rezaei Pandari
Faculty of Management and Economics, Tarbiat Modares University, Tehran, Iran

Received 8 April 2021
Revised 15 June 2021
Accepted 1 July 2021

Abstract

Purpose – The purpose of this paper is to identify and rank the influential social marketing factors for physical activity promotion.

Design/methodology/approach – A descriptive-survey approach is used in this study. First, the influential social marketing factors for physical activity promotion were determined through the review of theoretical foundations and literature. The factors with a >0.7 content validity index (CVI) value, based on the experts' opinion, were selected. A total of 23 individuals participated in the study, including sports marketing experts and members of physical activity committees of Iranian sports federations, and they were selected purposively. The study data were collected using a pairwise comparison questionnaire and analyzed using the DEMATEL-based analytic network process (DANP) method.

Findings – In this study, a total of 17 influential social marketing factors were identified and categorized in 5 dimensions: product, price, place, promotion and partnership. Based on DEMATEL-based analytic network process (DANP) results, the "promotion" with the weight of 0.212 was the most important dimension and "providing inexpensive sports services" with the weight of 0.096 was the most important social marketing factor influencing the promotion of the physical activity.

Originality/value – The results highlight the importance of sport for all services expenses and costs in promoting physical activity. Thus, the results can be the basis for policies regarding social marketing to promote physical activity.

Keywords Sports for all, Social marketing, Policymaking, Promotion, Price

Paper type Research paper

1. Introduction

Physical inactivity is a worldwide phenomenon that needs global actions (Kohl *et al.*, 2012). According to World Health Organization (WHO), inadequately active individuals have 20–30% higher risk of death than those who are sufficiently active (WHO, 2018). Governments implement policies to promote public health and establish organizations to improve participation in sports activities (Green and Houlihan, 2005; Downward and Rasciute, 2010).

The term "sport for all" describes a wide range of policies adopted by sports authorities to promote the participation of all people in physical activities and sports (McIntosh and Charlton, 1985). Sport for all policies are set and implemented to encourage all the individuals to take part in physical activities and sports, regardless of their age, gender, social class, economic condition, race, etc. (Vandermeerschen *et al.*, 2016). Encouraging people to participate in physical activities has always been a concern of sports policymakers. So, it is necessary to use proper marketing strategies to achieve this goal. "Social marketing" is a behavior change approach that can promote physical activity among certain people (Stead *et al.*, 2007; Berkowitz *et al.*, 2008).

The concept of social marketing is effectively defined to influence target audiences in order to voluntarily accept, modify or abandon behavior that benefits both individual and

Health Education
Vol. 121 No. 6, 2021
pp. 569-583

0965-4283
DOI 10.1108/HE-04-2021-0058

community (Gruneklee *et al.*, 2016). Since behavior changes can last for a long time if the change is voluntary (Sheau-Ting *et al.*, 2013), the influence of social marketing can be unique and significant (Smith, 2002; Domegan, 2008). It is the experts' recommendation to use social marketing techniques for promotion of public health, and the evidence indicates that these techniques have been successful in this regard (Department of Health, 2008, 2011). Therefore, sports authorities must resort to social marketing techniques, because these organizations can provide services as a crucial cycle for the development of social ideas and behaviors (Inoue and Kent, 2012). Efficient and proper management and policymaking regarding social marketing can play a major role in improving the welfare of citizens (Santos, 2019).

"Sports federations" as non-profit organizations in charge of sports are in charge of planning the improvement of participation in sport for all activities by sports for all committees. Also, social marketing is among the new areas that is currently used by many developed countries to solve social problems (Key and Czaplewski, 2017). Since the ultimate goal of social marketing has been to improve individual and social well-being and because its impact extends to professions, organizations and policymakers, this approach can be adopted for the development of sport and physical activity as the urgent needs of people in society. So far, social marketing-based policies have been rarely used by sport for all committees in different federations to change or modify the inactive and machine-like lifestyle toward being more active and promote participation in sport for all activities. Hence, the influential social marketing factors for physical activity promotion should be identified and ranked in order to utilize this new marketing approach properly and achieve the sport for all goals. Considering the serious implications of physical inactivity, this research aims to identify the influential social marketing factors for physical activity promotion, determine the interrelations between factors, calculate their importance and rank them using DEMATEL-based analytic network process (DANP) method.

2. Research background

Since 1960s and early 1970s, the idea that governments should promote people's participation in sports has been developed. The sport for all concept came into sharp focus when the Council of Europe (CE) ratified the sport for all charter in 1975 (Huang and Tan, 2015). Introducing people to physical and psychological benefits of sport and physical activities can lead to further participation in sports (Vehmas, 2012), especially sport for all activities in the world. Therefore, many countries compete for better planning and organization of sport for all and provide various programs to promote participation in sport for all activities (Green, 2006). Obviously, when a country lags behind in the competition, it cannot easily bridge the gap and experiences lower benefits of sport and physical activities (Girginov, 2001). In Iran, sport for all activities began under the title of "Neighborhood Sports" in 1979. The development of sport for all activities was entrusted to Ministry of Sports and Youth and the National Olympic Committee as their first legal duty (Hamidi, 1978). Currently, the sport for all committee in sports federations is responsible for policymaking and planning for promoting participation in sport for all activities. Sports federations should seek new approaches and strategies by which they can solve the increasing problems associated with inactivity. Social marketing is one of the approaches that can be selected for this purpose.

In October 2013, International Social Marketing Association, European Social Marketing Association and Australian Social Marketing Association presented a brief definition of social marketing as follows: "Social marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviors benefiting individuals and communities for further social gain (AASM, ISMA, ESMA, 2013). Thus, many corporations, non-profit organizations, governments and agencies employ social marketing

as a tool to communicate and influence the target audience (Sheau-Ting *et al.*, 2013). Design and implementation of behavioral institutionalization programs through social marketing require a tool called social marketing mix (Barrutia and Echebarria, 2013), which includes the product (i.e. target behavior), price (i.e. cost of behavior adaptation), place (i.e. making the idea available), promotion (providing information about the value of the idea and convincing people to use it), partnership (i.e. teaming up organizations with similar objectives), publics (i.e. paying attention to the target audience and decision-influencer groups) and policy (i.e. continuity of behavior change through macro-policies) (Kotler and Lee, 2008).

Overall, in this study, five dimensions of the social marketing mix influencing the physical activity were addressed: product, price, place, promotion and partnership.

Among social marketing mix, the product is the only element that can provide tangible or intangible benefits (e.g. providing services that facilitate desirable behaviors) to target audiences to change their behavior (Lee and Kotler, 2011). The product factors influencing the physical activity are "diverse sports services and activities" (Kubacki *et al.*, 2017; Tweneboah-Koduah *et al.*, 2019; Goethals *et al.*, 2020), "organizing social marketing conventions to develop sport for all" (Huhman *et al.*, 2017; Clark *et al.*, 2021), "providing essential information and consulting services" (Luecking *et al.*, 2017; Fenerty *et al.*, 2016), "engaging athletic volunteers in sport for all developments" (Tan *et al.*, 2010), "establishing specialized social marketing committees" (Fenerty *et al.*, 2016; Dearing *et al.*, 2006) and "survey of society's interests and preferences regarding sports" (Kamada *et al.*, 2013; Richert *et al.*, 2007).

In social marketing, price is what the target audience pays for behavior change (Kubacki and Szablewska, 2019), which can include financial, psychological, social, opportunit, and other behavior-related costs Vaughn *et al.* (2019). A persuasive strategy showcases a balance between the price and benefits of a product so that the target market is convinced to replace the current behavior with the target behavior. Therefore, the monetary cost is often deemed to be an obstacle to organized physical activities, and it is more effective on low-income groups (Withall *et al.*, 2012). In this study, the price factors influencing physical activity are "providing inexpensive sports services" (Subitha *et al.*, 2013; Rundle-Thiele *et al.*, 2016) and "discounts for sports facilities and equipment" (DiGuiseppi *et al.*, 2014; Keller *et al.*, 2014; Wilson *et al.*, 2015).

In social marketing, place is a platform providing for behavior change in the target audience, so that they can access related services and programs (Luecking *et al.*, 2017). In this study, the place factors influencing physical activity are "increasing the available public sports facilities" (Rundle-Thiele *et al.*, 2016; Da Silva and Mazzon, 2016; Lee and Kotler, 2015), "development of sports facilities in villages and deprived areas" (Williams-Burnett and Kearns, 2018; Wilson *et al.*, 2015) and "sports equipment suitability for men and women" (Verplanken and Wood, 2006).

Promoting indicates proper advertising strategies as the key to achieving behavior change in a social marketing effort. Promotion is not only one of the most prominent components of social marketing, but it also ensures the attainment of social marketing efforts when combined with other mixes (Deshpande *et al.*, 2015). A recent systematic review of social marketing attempts that promote physical activity showed that the promotion criterion is essential for the success of social marketing endeavors. In other words, social marketing efforts fail if marketing strategies are not used to promote behavior change (Xia *et al.*, 2016). In this study, the promotion factors affecting physical activity are "using environmental advertising tools" (Luecking *et al.*, 2017; Subitha *et al.*, 2013), "the diversity of information spreading methods in social and mass media" (DiGuiseppi *et al.*, 2014; Fujihira *et al.*, 2015; Deshpande *et al.*, 2015) and "reporting the

performance of sports federations in the development of sport for all in the media" (Tan *et al.*, 2010).

Social issues are too complex to be solved by a single organization. Thus, organizations whose goals are similar (not necessarily the same) to the organization in question should team up (Weinreich, 2006), which means "partnership." In this study, the partnership factors influencing the physical activity are "using athletic champions, retirees and the credit of professional sports clubs to develop sport for all" (Keel and Nataraajan, 2012; Inoue and Kent, 2012; Behnoosh *et al.*, 2017), "coordination between sport-related organizations" (Fenerty *et al.*, 2016; Bagramian *et al.*, 2019) and "using sponsors for the development of sport for all" (Madill *et al.*, 2014; Kubacki *et al.*, 2018; Bagramian *et al.*, 2019).

3. Research methodology

In this study, an applied descriptive-survey approach is used in a mixed manner. First, the theoretical foundations and literature were reviewed using library studies and the influential social marketing factors for physical activity promotion were identified. Then, the DANP method was selected to assess and explain the relationships between identified factors and rank them with respect to the study objective and nature of the problem. The data required for validation of effective social marketing factors for physical activity promotion, explaining interrelations between factors and calculating their importance were done using a questionnaire based on the opinions of 23 individuals, including 8 sports marketing experts and 15 members of physical activity committees from Iranian sports federations. The participants were selected through purposive sampling, all of whom had relevant executive and research backgrounds (see Table 1). The factors should be identified and compared in pairs, so the interrelations between factors can be determined and the factors can be ranked. Thus, a pair-wise comparison questionnaire was used to collect the required data. The questionnaire consisted of a matrix with factors in the columns and rows. The impact of

Characteristic	*N* (23)	%
Gender		
Male	10	40
Female	13	60
Age		
31–40	12	50
41–50	5	15
>50	6	30
Educational level		
Associate	1	5
Bachelor	4	20
Master	7	35
PhD	11	40
Activity type		
Sport marketing specialist	8	40
Physical activity committees	15	60
Work experience		
10<	11	45
10–20	3	15
21–30	4	20
>30	5	20

Table 1. Sociological characteristics of research experts

each row factor on column factor is determined by the experts on a five-point Likert scale (no influence to very high influence).

3.1 DEMATEL-based analytic network process (DANP) method

In this study, the DANP method was used to determine the interrelations between factors and calculate their importance. The implementation stages of DANP are as follows (Lu *et al.*, 2013):

Step 1: Calculating the direct influence matrix

The assessment of interrelations between factors (influence of one factor on another) is based on experts' opinion. The direct influence matrix D_C is a $n \times n$ matrix based on average expert's opinion. Each element of the direct influence matrix d_C^{ij} is defined as the degree by which the factor i influences the factor j.

$$D = [d_c^{ij}] \tag{1}$$

The data reliability is evaluated using the following equation (Chiu *et al.*, 2013):

$$g = \frac{1}{n(n-1)} \sum_{i=1}^{n} \sum_{j=1}^{n} \frac{\left| d_c^{ij(p)} - d_c^{ij(p-1)} \right|}{d_c^{ij(p)}} \times 100 \tag{2}$$

In which g is the inconsistency rate, p is the number of experts and $d_C^{ij(p)}$ is the element of the average experts' opinion matrix, $d_C^{ij(p-1)}$ represents the elements of the average experts' opinion matrix with expert i removed and n is the number of criteria. The reliability is calculated using the equation as follows:

$$\text{Reliability} = \left(1 - \frac{g}{100}\right) \times 100 \tag{3}$$

If $g < 5\%$ (reliability > 95%), the data reliability is confirmed.

Step 2: Normalizing the direct influence matrix

Using Eq. (4), the D_C matrix is normalized and the resulting matrix is obtained as N.

$$N = V \cdot D_c \quad V = min\left\{ 1/max_i \sum_{j=1}^{n} d_c^{ij},\ 1/max_j \sum_{i=1}^{n} d_c^{ij} \right\},\ i, j \in \{1, 2, \ldots, n\} \tag{4}$$

Step 3: Calculating the total influence matrix factors (T_C)

The total influence matrix T_C is calculated using Eq. (5) in which I is the identity matrix.

$$Tc = N + N^2 + \ldots + N^h = N(I - N)^{-1}, \text{ when } \lim_{z \to \infty} N^h \tag{5}$$

Step 4: Calculating the complete influence matrix of dimensions, intensity and direction of effect

The total influence dimension matrix T_D is an $m \times m$ matrix in which d_D^{ij} is defined as the degree by which the factor i influences the factor j. T_D is calculated based on the average of elements in T_C^{ij}. The sum of columns and rows in total dimension influence and total criteria effect matrices are separately calculated using Eqs. (6) and (7).

$$D = [d_i] = \left[\sum_{j=1}^{n} t_{ij}\right] \tag{6}$$

$$R = [r_j] = \left[\sum_{j=1}^{n} t_{ij}\right] \tag{7}$$

D_i is the sum of elements of column i and R_j is the sum of elements of row j in T_C^{ij} matrix. The index $(D_i + R_j)$ indicates the degree of central roles of factor i and $(D_i - R_j)$ shows the net influences of factor i. In general, if $(D_i - R_j)$ is positive $(i = j)$, the factor i affects the other factors and is called "dispatcher"; otherwise, negative $(D_i - R_j)$ the factor i is influenced by other factors and called "receiver." Similarly, the degree of central roles and net influences of each dimension is calculated using T_D. Based on the two indexes, the influence diagraph is drawn which is known as the network relationships map that is used to decide how the dimension and factors can be improved.

Step 5: Normalizing the total influence matrix of the dimensions (T_D^a)

Each d_D^{ij} element is divided by the sum of each row in T_D. The transpose of the resulting matrix is calculated and is called normalized total influence matrix of dimensions (T_D^a).

Step 6: Normalizing the total influence matrix of factors (T_C^a)

Each d_C^{ij} element is divided by the sum of each row in T_C and the resulting matrix is denoted as T_C^a.

Step 7: Forming the unweighted super-matrix (W)

The unweighted super-matrix W is calculated using the equation as follows:

$$W = (T_c^a)' \tag{8}$$

Step 8: Forming the weighted super-matrix (W^a)

The normalized total dimension influence matrix (T_D^a) is multiplied by the unweighted super-matrix (W) as shown in the equation as follows:

$$W^a = T_D^a W \tag{9}$$

Step 9: Limiting the weighted super-matrix

The weighted super-matrix is raised to a sufficiently large number (Z) until the weighted super-matrix converges and stabilizes. The result is the influential weight (i.e. DANP).

3.2 Research validity and reliability

In this study, credibility and transferability criteria were used to assess the validity and measuring the validation of the instrument. However, the factors were selected through a comprehensive review of credible research and their validity was evaluated using the content validity index (CVI). Based on experts' opinion, the identified factors with a content validity index (CVI) of $\geq$0.7 were selected (Peattie and Peattie, 2009). DANP internal compatibility was evaluated using an index called significant confidence level (SCL). The minimum acceptable value for significant confidence level (SCL) index is 95%. According to Eqs. (2) and (3), the significant confidence level (SCL) was 98.8%, which is acceptable for 23 questionnaires.

4. Results

Since identifying the influential social marketing factors for physical activity promotion was one of the main goals in this study, a list of factors was identified based on theoretical foundations and literature. A total of 17 factors were selected as the influential social marketing factors for physical activity promotion based on the experts' opinion and content validity index (CVI) values (Table 2).

Based on the combined opinions of 23 experts, DANP method was applied to determine the relationships and importance of social marketing factors for physical activity promotion. Following the steps 2–4 in section 3.1, the net influences of factors $(D_i - R_j)$, the degree of central roles of factors $(D_i + R_j)$ and interrelations between factors were calculated (Table 3), and the network relation map was drawn accordingly (Figure 1).

Dimension	Factor	CVI	References
Product (D1)	Diverse sports services and activities (C1)	0.736	Tweneboah-Koduah *et al.* (2019), Kubacki *et al.* (2017), Goethals *et al.* (2020)
	Organizing social marketing conventions to develop sport for all (C2)	0.788	Huhman *et al.* (2017), Clark *et al.* (2021)
	Providing essential information and consulting services (C3)	0.748	Luecking *et al.* (2017), Fenerty *et al.* (2016)
	Engaging athletic volunteers in sport for all development (C4)	0.791	Tan *et al.* (2010)
	Establishing specialized social marketing committees (C5)	0.794	Fenerty *et al.* (2016), Dearing *et al.* (2006)
	Survey of society's interests and preferences regarding sports (C6)	0.773	Kamada *et al.* (2013), Richert *et al.* (2007)
Price (D2)	Providing inexpensive sports services (C7)	0.833	Rundle-Thiele *et al.* (2016), Subitha *et al.* (2013)
	Discounts for sports facilities and equipment discount (C8)	0.773	DiGuiseppi *et al.* (2014), Keller *et al.* (2014), Wilson *et al.* (2015)
Place (D3)	Increasing the availability of sports facilities (C9)	0.830	Lee and Kotler (2015), Rundle-Thiele *et al.* (2016), Da Silva and Mazzon (2016)
	Development of sports facilities in villages (C10)	0.748	Williams-Burnett and Kearns (2018), Wilson *et al.* (2015)
	Deprived areas and sports equipment suitability for men and women (C11)	0.791	Verplanken and Wood (2006)
Promotion (D4)	The diversity of information spreading (C12)	0.800	Luecking *et al.* (2017), Subitha *et al.* (2013)
	Methods in social and mass media (C13)	0.788	DiGuiseppi *et al.* (2014), Fujihira *et al.* (2015), Deshpande *et al.* (2015)
	Reporting the performance of federations in the development of sport for all in the media (C14)	0.855	Tan *et al.* (2010)
Partnerships (D5)	Using athletic champions, retirees and the credit of professional sports clubs to develop sport for all (C15)	0.764	Behnoosh *et al.* (2017), Inoue and Kent (2012), Keel and Nataraajan (2012)
	Coordination between sport-related organizations (C16)	0.827	Bagramian *et al.* (2019), Fenerty *et al.* (2016)
	Using sponsors for the development of sport for all (C17)	0.755	Madill *et al.* (2014), Bagramian *et al.* (2019), Kubacki *et al.* (2018)

Table 2. Influential social marketing factors for physical activity promotion

Table 3.
Central roles and net influences of social marketing factors influencing physical activity

Dimension	*D*	*R*	*D* + *R*	*D*–*R*	Relationship type	Factor	*D*	*R*	*D* + *R*	*D*–*R*	Relationship type
D1	3.228	3.399	6.628	–0.171	Affect	C1	4.097	4.145	8.242	–0.048	Affect
						C2	3.923	4.006	7.929	–0.082	Affect
						C3	3.669	3.630	7.300	0.038	Affect
						C4	3.880	4.106	7.986	–0.226	Affect
						C5	3.851	3.478	7.329	0.373	Influential
						C6	3.831	3.886	7.717	–0.054	Affect
D2	3.314	3.171	6.486	0.142	Influential	C7	1.215	1.238	2.453	–0.022	Affect
						C8	1.206	1.183	2.389	0.022	Influential
D3	3.144	3.246	6.391	–0.103	Affect	C9	2.084	1.883	3.967	0.200	Influential
						C10	1.761	1.791	3.552	–0.029	Affect
						C11	1.484	1.655	3.140	–0.170	Affect
D4	3.629	3.574	7.204	0.055	Influential	C12	2.313	2.179	4.493	0.134	Influential
						C13	2.291	2.297	4.588	–0.005	Affect
						C14	2.193	2.323	4.517	–0.129	Affect
D5	3.510	3.432	6.943	0.077	Influential	C15	1.742	2.072	3.796	–0.347	Affect
						C16	2.324	2.082	4.407	0.242	Influential
						C17	2.264	2.159	4.424	0.104	Influential

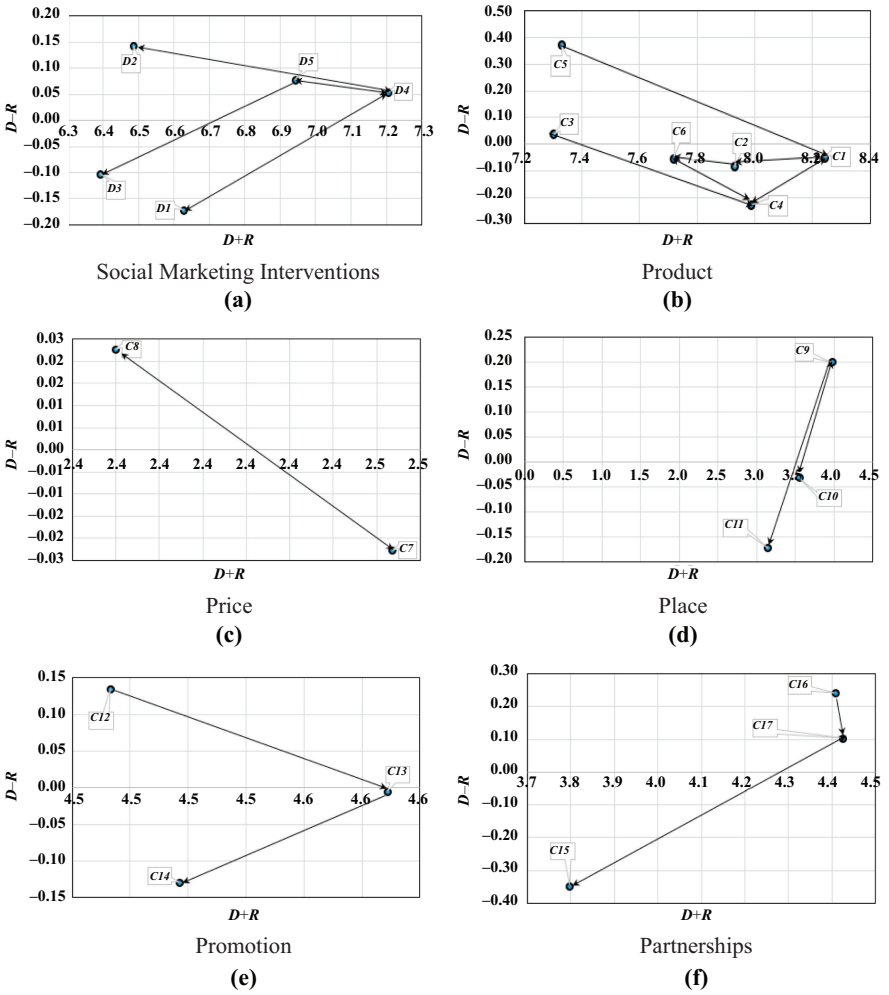


Figure 1.
Network relations map

The price (D2) is the most influential dimension (highest *D–R* value) and affects other dimensions as shown in Figure 1a. The product (D1) is the most influenced dimension (lowest *D–R* value) and is affected by other dimensions. Promotion (D4) has the highest central role (highest $D + R$ value). For the product dimension, Figure 1b indicates that (C5) is the most influential factor (highest *D–R* value) and affects other factors. (C4) is the most influenced factor (lowest *D–R* value) that it is affected by other factors. (C1) is the most important factor (highest $D + R$ value) in terms of central role. For the price dimension, Figure 1c reveals that (C7) and (C8) are receiver and dispatcher factors, respectively. The central role of (C7) is more potent than that of the other factor. For the place dimension, Figure 1d indicates that (C9) is the most influential factor (highest *D–R* value) and affects other factors and that (C11) is the most influenced one (lowest *D–R* value). (C9) is the most important factor (highest $D + R$ value) in terms of central role. For the promotion dimension, Figure 1e reveals that (C12) is the only dispatcher factor and that other factors are receivers. (C13) is the most important factor

(highest $D + R$ value) in terms of central role. For the partnership dimension, Figure 1f shows that (C15) is the receiver factor and that other factors are dispatchers. (C17) is the most important factor (highest $D + R$ value) in terms of central role.

Following the steps 5–9 of DANP method in section 4, the weight of each dimension and its factors were calculated (Table 4). "Promotion" (D4) with a weight of 0.212 and "providing inexpensive sports services" with a weight of 0.096 were the most important dimension and factor of social marketing in promoting physical activity, respectively.

5. Discussion and conclusion

This study aimed to identify and rank the influential social marketing factors for physical activity promotion, which can lead to a higher level of public participation in sport for all activities. The results regarding social marketing dimensions indicated that product (D1) is a challenge for sport in all relevant committees. Thus, this issue can be solved by the price (D2). Withall *et al.* (2012) state that monthly attendance patterns at a properly funded social marketing campaign attract more people to sports sessions and maintain exercise adherence. Therefore, governments and sports authorities should allocate more funds to sport for all activities because sports development, especially sport for all, can play a major role in the vitality and health of society.

The findings regarding product factors indicated that (C4) is a challenge for the sport in all committees, which can be resolved using (C5). Findings of Dearing *et al.* (2006) revealed that social marketing principles can facilitate physical activity promotion programs. Consequently, sports authorities, sponsors and other sports-related organizations should accept social marketing to play a bigger role in the life of inactive people. Sports authorities are responsible for providing educational instruments and culture to modify the machine-like and inactive lifestyle. Considering the main goal of social marketing, which is the institutionalization of desirable behavior and enjoying its benefits, social marketing experts teach social marketing techniques to sports authorities and other individuals responsible for social health and enable them to use the capabilities of this approach in sport for all activities. Thus, it is necessary for the sports federations to employ social marketing and enable the sport for all committees to participate more in sport for all activities.

Table 4.
The weight of influential social marketing factors for physical activity promotion

Dimension	Weight	Factor	Weight in the corresponding dimension	Total factor weight
(D1)	0.202	(C1)	0.179	0. 036
		(C2)	0.172	0.035
		(C3)	0.156	0.032
		(C4)	0.177	0.036
		(C5)	0.150	0.030
		(C6)	0.166	0.034
(D2)	0.189	(C7)	0.510	0.096
		(C8)	0.490	0.092
(D3)	0.193	(C9)	0.354	0.068
		(C10)	0.336	0.065
		(C11)	0.310	0.060
(D4)	0.212	(C12)	0.320	0.068
		(C13)	0.338	0.072
		(C14)	0.342	0.073
(D5)	0.204	(C15)	0.326	0.067
		(C16)	0.332	0.068
		(C17)	0.342	0.070

The results regarding price factor showed that (C7) is a challenge for the sport in all committees, which can be resolved using (C8) DiGuiseppi *et al.* (2014). The results reveal that offering discounts for training classes in churches has a major impact on the promotion of sports classes (Wilson *et al.*, 2015), suggesting that the local social life and income level continuously predict the physical activity situation. When developing sport for all programs, government authorities should pay special attention to issues such as economic conditions and people's income because the price is the most significant factor in people's participation in sport for all activities. In this regard, it is recommended to use different pricing approaches for sports facilities and equipment, hold training classes considering people's level of income, offer discounts for sports facilities during various occasions and prepare leisure cards to use sports facilities and equipment.

The results regarding place factor indicated that (C11) is a challenge for sport in all committees, which can be resolved using (C9) (Lee and Kotler, 2015), suggesting that developing a clear place strategy is the best way to promote biking among Los Angeles citizens. It is necessary for the authorities to develop sport infrastructures and equipment to promote participation in sport for all activities all around the country, because it is difficult to reach maximum participation without proper infrastructures. The availability of sports infrastructures and facilities encourages the higher participation of people in sports activities. Thus, more participation in sport for all activities can be achieved by building safe walking pathways, providing sufficient facilities for sports as well as supplying light and inexpensive equipment for exercise at home or workplace.

The results with respect to promotion factors indicated that (C14) is considered the weakest factor of this dimension in sport for all committees and it can be resolved using (C12). Subitha *et al.* (2013) suggest that communication tools are required to raise health awareness. Therefore, it is essential to use appealing, motivational and influential out-of-home advertising for all ages to raise awareness about the importance of sports, exercise and physical activity in human's mental and physical health and also to encourage citizens to participate in sport for all activities.

The findings concerning participation factors revealed that (C15) is considered the least influential factor for sport in all committees, which can be resolved by (C16). Bagramian *et al.* (2019) proved that organizations can set common goals regarding the promotion of physical activity such as motivating and supporting the youth to be active and have a healthy lifestyle, removing barriers of physical activity for young people and encouraging companies to participate more in these kinds of activities. Therefore, governments and sports authorities can use the help of people and the private sector to develop sport for all.

6. Limitations

Finally, it should be noted that this study has several limitations. First, the prioritization of factors in this study is based on the opinion of public sports service providers (i.e. officials of sports federations). Therefore, it is suggested that in future research, the factors be identified and ranked from the perspective of all participants in public sports programs. Second, in this research, only the opinions of one of the sports trustees in Iran (that is, sports federations) have been used. Therefore, it is recommended that future studies identify and rank the social marketing factors affecting the promotion of physical activity using the opinions of all sports authorities.

References

AASM, ESMA, ESMA (2013), "Consensus definition of social marketing", available at: http://www.i-socialmarketing.org/assets/social marketing definition.pdf (accessed 24 August 2017).

Bagramian, R., Madill, J., O'Reilly, N., Deshpande, S., Rhodes, R.E., Tremblay, M., Berry, T. and Faulkner, G. (2019), "Evaluation of sport participation objectives within a health-focussed social marketing sponsorship", *International Journal of Sports Marketing and Sponsorship*, Vol. 20 No. 2, pp. 206-223.

Barrutia, J.M. and Echebarria, C. (2013), "Networks: a social marketing tool", *European Journal of Marketing*, Vol. 47 Nos 1/2, pp. 324-343.

Behnoosh, S., Naylor, M. and Dickson, G. (2017), "Promoting sport and physical activity participation: the impact of endorser expertise and recognisability", *Managing Sport and Leisure*, Vol. 22 No. 2, pp. 214-233.

Berkowitz, J.M., Huhman, M. and Nolin, M.J. (2008), "Did augmenting the VERB™ campaign advertising in select communities have an effect on awareness, attitudes, and physical activity?", *American Journal of Preventive Medicine*, Vol. 34 No. 6, pp. S257-S266.

Chiu, W.-Y., Tzeng, G.-H. and Li, H.-L. (2013), "A new hybrid MCDM model combining DANP with VIKOR to improve e-store business", *Knowledge-Based Systems*, Vol. 37, pp. 48-61.

Clark, L., Thoreson, S., Goss, C.W., Marosits, M., Zimmer, L.M., Flattes, V. and DiGuiseppi, C. (2021), "Older adults' perceptions of a church-based social marketing initiative to prevent falls through balance and strength classes", *Journal of Applied Gerontology*. doi: 10.1177/0733464820984288.

Da Silva, E.C. and Mazzon, J.A. (2016), "Developing social marketing plan for health promotion", *International Journal of Public Administration*, Vol. 39 No. 8, pp. 577-586.

Dearing, J.W., Maibach, E.W. and Buller, D.B. (2006), "A convergent diffusion and social marketing approach for disseminating proven approaches to physical activity promotion", *American Journal of Preventive Medicine*, Vol. 31 No. 4, pp. 11-23.

Department of Health (2008), *HIP, Social Marketing and Health Related Behavior: Ambitions for Health*, Department of Health, London.

Department of Health (2011), *Changing Behaviour, Improving Outcomes: A New Social Marketing Strategy for Public Health*, Department of Health, London.

Deshpande, S., Berry, T.R., Faulkner, G.E., Latimer-Cheung, A.E., Rhodes, R.E. and Tremblay, M.S. (2015), "Comparing the influence of dynamic and static versions of Media in Evaluating Physical-Activity-Promotion ads", *Social Marketing Quarterly*, Vol. 21 No. 3, pp. 135-141.

DiGuiseppi, C.G., Thoreson, S.R., Clark, L., Goss, C.W., Marosits, M.J., Currie, D.W. and Lezotte, D.C. (2014), "Church-based social marketing to motivate older adults to take balance classes for fall prevention: cluster randomized controlled trial", *Preventive Medicine*, Vol. 67, pp. 75-81.

Domegan, C.T. (2008), "Social marketing: implications for contemporary marketing practices classification scheme", *Journal of Business and Industrial Marketing*, Vol. 23 No. 2, pp. 135-141.

Downward, P. and Rasciute, S. (2010), "The relative demands for sports and leisure in England", *European Sport Management Quarterly*, Vol. 10 No. 2, pp. 189-214.

Fenerty, L., Heatley, J., Young, J., Thibault-Halman, G., Kureshi, N., Bruce, B.S., Walling, S. and Clarke, D.B. (2016), "Achieving all-age helmet use compliance for snow sports: strategic use of education, legislation and enforcement", *Injury Prevention*, Vol. 22 No. 3, pp. 176-180.

Fujihira, H., Kubacki, K., Ronto, R., Pang, B. and Rundle-Thiele, S. (2015), "Social marketing physical activity interventions among adults 60 years and older: a systematic review", *Social Marketing Quarterly*, Vol. 21 No. 4, pp. 214-229.

Girginov, V. (2001), "Strategic relations and sport policy making: the case of aerobic union and school sports federation Bulgaria", *Journal of Sport Management*, Vol. 15 No. 3, pp. 173-194.

Goethals, L., Barth, N., Hupin, D., Mulvey, M.S., Roche, F., Gallopel-Morvan, K. and Bongue, B. (2020), "Social marketing interventions to promote physical activity among 60 years and older: a systematic review of the literature", *BMC Public Health*, Vol. 20 No. 1, pp. 1-11.

Green, M. (2006), "From 'sport for all' to not about 'sport' for all?: Interrogating sport policy interventions in the United Kingdom", *European Sport Management Quarterly*, Vol. 6 No. 3, pp. 217-238.

Green, M. and Houlihan, B. (2005), *Elite Sport Development: Policy Learning and Political Priorities*, Routledge, London, New York, NY, p. 240.

Gruneklee, N., Rundle-Thiele, S. and Kubacki, K. (2016), "What can social marketing learn from Dirichlet theory patterns in a physical activity context?", *Marketing Intelligence and Planning*, Vol. 34 No. 1, pp. 41-60.

Hamidi, M. (1978), *Management in Sport Organisations*, Payam nor University Pub, Tehran.

Huang, Y.-W. and Tan, T.-C. (2015), "Sport-for-All policy in Taiwan: a case of on-going change?", *Asia Pacific Journal of Sport and Social Science*, Vol. 4 No. 2, pp. 85-98.

Huhman, M., Kelly, R.P. and Edgar, T. (2017), "Social marketing as a framework for youth physical activity initiatives: a 10-year retrospective on the legacy of CDC's VERB campaign", *Current Obesity Reports*, Vol. 6 No. 2, pp. 101-107.

Inoue, Y. and Kent, A. (2012), "Investigating the role of corporate credibility in corporate social marketing: a case study of environmental initiatives by professional sport organizations", *Sport Management Review*, Vol. 15 No. 3, pp. 330-344.

Kamada, M., Kitayuguchi, J., Inoue, S., Ishikawa, Y., Nishiuchi, H., Okada, S., Harada, K., Kamioka, H. and Shiwaku, K. (2013), "A community-wide campaign to promote physical activity in middle-aged and elderly people: a cluster randomized controlled trial", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 10 No. 1, pp. 1-16.

Keel, A. and Nataraajan, R. (2012), "Celebrity endorsements and beyond: new avenues for celebrity branding", *Psychology and Marketing*, Vol. 29 No. 9, pp. 690-703.

Keller, C., Vega-López, S., Ainsworth, B., Nagle-Williams, A., Records, K., Permana, P. and Coonrod, D. (2014), "Social marketing: approach to cultural and contextual relevance in a community-based physical activity intervention", *Health Promotion International*, Vol. 29 No. 1, pp. 130-140.

Key, T.M. and Czaplewski, A.J. (2017), "Upstream social marketing strategy: an integrated marketing communications approach", *Business Horizons*, Vol. 60 No. 3, pp. 325-333.

Kohl, H.W. III, Craig, C.L., Lambert, E.V., Inoue, S., Alkandari, J.R., Leetongin, G., Kahlmeier, S. and Group, L.P.A.S.W. (2012), "The pandemic of physical inactivity: global action for public health", *The Lancet*, Vol. 380 No. 9838, pp. 294-305.

Kotler, P. and Lee, N. (2008), "Social marketing: influencing behaviors for good", SAGE Publications, Los Angeles, London, New Delhi, Singapore, available at: https://books.google.com/books?id=V4v1WTiFmIYC.

Kubacki, K. and Szablewska, N. (2019), "Social marketing targeting Indigenous peoples: a systematic review", *Health Promotion International*, Vol. 34 No. 1, pp. 133-143.

Kubacki, K., Ronto, R., Lahtinen, V., Pang, B. and Rundle-Thiele, S. (2017), "Social marketing interventions aiming to increase physical activity among adults", *Health Education*, Vol. 117 No. 1, pp. 69-89.

Kubacki, K., Hurley, E. and Rundle-Thiele, S.R. (2018), "A systematic review of sports sponsorship for public health and social marketing", *Journal of Social Marketing*, Vol. 8 No. 1, pp. 24-39.

Lee, N.R. and Kotler, P. (2011), "Social marketing: influencing behaviors for good", SAGE Publications, Los Angeles, London, New Delhi, Singapore, Washington, DC, available at: https://books.google.com/books?id=NCoCYp-ZcR8C.

Lee, N.R. and Kotler, P. (2015), "Social marketing: changing behaviors for good", SAGE Publications, available at: https://books.google.com/books?id=gPFMBgAAQBAJ.

Lu, M.-T., Lin, S.-W. and Tzeng, G.-H. (2013), "Improving RFID adoption in Taiwan's healthcare industry based on a DEMATEL technique with a hybrid MCDM model", *Decision Support Systems*, Vol. 56, pp. 259-269.

Luecking, C.T., Hennink-Kaminski, H., Ihekweazu, C., Vaughn, A., Mazzucca, S. and Ward, D.S. (2017), "Social marketing approaches to nutrition and physical activity interventions in early care and education centres: a systematic review", *Obesity Reviews*, Vol. 18 No. 12, pp. 1425-1438.

Madill, J., O'Reilly, N. and Nadeau, J. (2014), "Financing social marketing programs through sponsorship: implications for evaluation", *Journal of Social Marketing*, Vol. 4 No. 1, pp. 22-37.

McIntosh, P. and Charlton, V. (1985), *The Impact of Sport for All Policy 1966-1984 and a Way Forward*, Sports Council, London.

Peattie, K. and Peattie, S. (2009), "Social marketing: a pathway to consumption reduction?", *Journal of Business Research*, Vol. 62 No. 2, pp. 260-268.

Richert, M.L., Webb, A.J., Morse, N.A., O'Toole, M.L. and Brownson, C.A. (2007), "Move more diabetes", *The Diabetes Educator*, Vol. 33 No. S6, pp. 179S-184S.

Rundle-Thiele, S., Kubacki, K. and Gruneklee, N. (2016), "Perceived benefits and barriers of physical activity: a social marketing formative study", *Health Marketing Quarterly*, Vol. 33 No. 2, pp. 181-194.

Santos, C.O. (2019), "A national policy process on social marketing", *Journal of Social Marketing*, Vol. 9 No. 1, pp. 5-25.

Sheau-Ting, L., Mohammed, A.H. and Weng-Wai, C. (2013), "What is the optimum social marketing mix to market energy conservation behaviour: an empirical study", *Journal of Environmental Management*, Vol. 131, pp. 196-205.

Smith, W.A. (2002), "Social marketing and its potential contribution to a modern synthesis of social change", *Social Marketing Quarterly*, Vol. 8 No. 2, pp. 46-48.

Stead, M., Gordon, R., Angus, K. and McDermott, L. (2007), "A systematic review of social marketing effectiveness", *Health Education*, Vol. 107 No. 2, pp. 126-191.

Subitha, L., Soudarssanane, M.B. and Murugesan, R. (2013), "Community-based physical activity intervention using principles of social marketing: a demonstration project in Southern India", *National Medical Journal of India*, Vol. 26 No. 1, pp. 12-17.

Tan, E.J., Tanner, E.K., Seeman, T.E., Xue, Q.-L., Rebok, G.W., Frick, K.D., Carlson, M.C., Wang, T., Piferi, R.L. and McGill, S. (2010), "Marketing public health through older adult volunteering: experience corps as a social marketing intervention", *American Journal of Public Health*, Vol. 100 No. 4, pp. 727-734.

Tweneboah-Koduah, E.Y., Adams, M. and Acheampong, G. (2019), "The role of theories in social marketing in predicting physical activity behavior among the youth", *Journal of Social Marketing*, Vol. 9 No. 4, pp. 398-417.

Vandermeerschen, H., Vos, S. and Scheerder, J. (2016), "Towards level playing fields? A time trend analysis of young people's participation in club-organised sports", *International Review for the Sociology of Sport*, Vol. 51 No. 4, pp. 468-484.

Vaughn, A.E., Bartlett, R., Luecking, C.T., Hennink-Kaminski, H. and Ward, D.S. (2019), "Using a social marketing approach to develop Healthy Me, Healthy We: a nutrition and physical activity intervention in early care and education", *Translational Behavioral Medicine*, Vol. 9 No. 4, pp. 669-681.

Vehmas, H. (2012), "Participation in sport. International policy perspectives", *EJSS. European Journal for Sport and Society*, Vol. 9 No. 4, pp. 311-314.

Verplanken, B. and Wood, W. (2006), "Interventions to break and create consumer habits", *Journal of Public Policy and Marketing*, Vol. 25 No. 1, pp. 90-103.

Weinreich, N.K. (2006), "What is social marketing", *Weinreich Communications*, Vol. 10.

WHO (2018), "Global action plan on physical activity 2018–2030: more active people for a healthier world", available at: https://www.who.int/ncds/prevention/physical-activity/global-action-plan-20182030/en/.

Williams-Burnett, N.J. and Kearns, P. (2018), "A new perspective: consumer values and the consumption of physical activity", *Education+ Training*, Vol. 60 No. 9, pp. 930-952.

Wilson, D.K., Van Horn, M.L., Siceloff, E.R., Alia, K.A., St. George, S.M., Lawman, H.G., Trumpeter, N.N., Coulon, S.M., Griffin, S.F. and Wandersman, A. (2015), "The Results of the Positive Action for Today's Health (PATH) trial for increasing walking and physical activity in underserved African-American Communities", *Annals of Behavioral Medicine*, Vol. 49 No. 3, pp. 398-410.

Withall, J., Jago, R. and Fox, K.R. (2012), "The effect a of community-based social marketing campaign on recruitment and retention of low-income groups into physical activity programmes-a controlled before-and-after study", *BMC Public Health*, Vol. 12 No. 1, pp. 1-14.

Xia, Y., Deshpande, S. and Bonates, T. (2016), "Effectiveness of social marketing interventions to promote physical activity among adults: a systematic review", *Journal of Physical Activity and Health*, Vol. 13 No. 11, pp. 1263-1274, doi: 10.1123/jpah.2015-0189.

Further reading

Kotler, P. and Clarke, R.N. (1986), *Marketing for Health Care Organizations*, Prentice Hall.

Wilson, D.K., St George, S.M., Trumpeter, N.N., Coulon, S.M., Griffin, S.F., Wandersman, A., Forthofer, M., Gadson, B. and Brown, P.V. (2013), "Qualitative developmental research among low income African American adults to inform a social marketing campaign for walking", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 10 No. 1, pp. 1-16.

Corresponding author

Maryam Mokhtari Dinani can be contacted at: m.mokhtaridinani@alzahra.ac.ir

Received 5 February 2021
Revised 21 April 2021
21 June 2021
Accepted 13 July 2021

Supporting health literacy in adolescent populations: distinguishing pedagogies for sun safety education in schools

Donna Barwood
School of Education, Edith Cowan University, Perth, Australia

Abstract

Purpose – The aim of this paper is to distinguish pedagogies supporting critical health literacy development in adolescent populations. Specifically, for sun safety education in schools.

Design/methodology/approach – The paper draws on an exploratory intrinsic case study design to qualitatively examine the learning conditions that Pre-Service Teachers' (PsTs) mobilise to advance Health Literary (HL) in learning activities.

Findings – This paper presents data that shows the different ways thirty Pre-Service Teachers (PsTs) in Western Australia conceptualise HL in sun safety education for Year 7 students (12–13 years old). Examination of three consecutive lesson plans categorised learning activities ($n = 444$) according to HL competencies. Data shows that the PsTs pedagogically advance HL but are constrained when conceptualising learning to support critical HL. Further examination of the lesson plans of the 11 PsTs who pedagogically advanced learning to support a critical level of health literacy, distinguished the learning conditions and pedagogies supporting critically health literate adolescents.

Originality/value – By distinguishing pedagogies to situate individual and social health within broader societal goals, the paper identifies teacher education institutions as key players enabling young people to socially advocate healthier living, particularly, regarding melanoma and non-melanoma incidence.

Keywords Adolescent health, Schools, Skin cancer, Teacher education

Paper type Research paper

Introduction

Health literacy (HL) is recognised as an empowerment strategy targeting agentic health behaviour, health inequity and sustainable health outcomes (World Health Organization [WHO], 2020c). It refers to an individual's ability to access, understand and use health information to action personal, community and population health goals. Established by Don Nutbeam in the late 1990s and formally defined in 2000, HL is conceptualised as a three-tier hierarchy of competencies (functional, interactive and critical HL) to support, measure and assess cognitive and social ability to impact upon own and other's health (Nutbeam, 2000, 2008). A body of research links low HL to low health outcomes and is relative to social gradient (Aghazadeh *et al.*, 2020; Kickbush, 2001; Paakkari *et al.*, 2015; Park *et al.*, 2017; Sørensen *et al.*, 2015).

Paakkari and Paakkari (2012) describe an individual who is health literate as having theoretical and practical knowledge, critical thinking skills, self-awareness and a sense of citizenship to ethically reflect and advocate, for and about health, in oneself, others and the world beyond. The global response to the Coronavirus (COVID-19) pandemic – stay home, wash hands frequently, cough into elbows and adhere to social distancing – typifies functional HL and cognitive and literacy skills (WHO, 2020a). Downloading and interacting with contract tracing Apps such as those available in Australia and England characterise interactive HL and more advanced cognitive and literacy skills (Australian Government, 2020; National Health Services, 2020). Diarising, critiquing and planning to respond to limitations in personal movement, whilst facilitating essential services to support own and

Health Education
Vol. 121 No. 6, 2021
pp. 584-597

0965-4283
DOI 10.1108/HE-02-2021-0018

others' health can be linked to being critically health literate and where health-related information is analysed, and actions applied.

Paakkari and Paakkari (2012) characterise HL development as an on-going and life-long process, requiring both opportunity and specific learning to progress individuals to think beyond personal interests and apply social responsibility (Peralta *et al.*, 2021). They identify five learning conditions as progressing young people through Nutbeam's competencies (2008). Paakkari and Paakkari's conditions exemplify the types of learning that teachers can actively plan and work with to advance young people to critical HL skills. The five conditions are:

(1) Theoretical knowledge such as the learning of facts, concepts, principles, guidelines, and rules pertaining to health matters;

(2) Practical knowledge such as ways to apply, respond, follow and act in given health situations;

(3) Critical thinking skills to actively question, contemplate, rebut and/or refute, and value health information;

(4) Self-awareness to support a sense of belonging, purpose, and perspective, leading to positioning, priorities and actions relating to health; and

(5) Citizenship such as ethical understandings, rights, and responsibilities for advocating health and ways of participation that move beyond the self to support community and societal health goals.

In Australia, HL is one of five key ideas informing the Health and Physical Education (HPE) curriculum in Australian schools (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2012, 2013, 2015). Collectively, these key ideas provide an interactive framework to guide Australian teachers in their pedagogical practice to enact safer, healthier, and more physically active living. They support twenty-first century learning by focusing on (1) educative purpose, (2) a strength-based approach, (3) the valuing of movement, (4) HL skills and (5) critical inquiry (Alfrey and Brown, 2013). Specific inclusion of HL within the Australian Curriculum for HPE acknowledges the significance of childhood and adolescence as the precursor to health and wellbeing in adulthood, and the WHO's recommendation for school-based curriculum to mobilise HL in learning (WHO, 2014).

Aligning with the assets-focus of the Australian Curriculum for HPE (ACARA, 2015), Paakkari and Paakkari's learning conditions progress in complexity, facilitating students who know, do, question, locate and advocate (2012). They perceive critically health literate adolescents as a resource; a purposeful learning outcome actioned through the promotion of the mutually supportive learning conditions. This paper presents findings from a study that examined the ability of Pre-Service Teachers (PsTs) ($n = 30$) at an Initial Teacher Education Institution (ITEI) in Western Australia (WA) to mobilise HL across three consecutive lesson plans ($n = 90$). Using Nutbeam's (2000, 2008) hierarchy to initially distinguish the complexity and competency of learning activities ($n = 444$), the study critically examined PsTs conceptualisations of HL in learning. Data shows that whilst the PsTs could advance functional and interactive HL, they were constrained in their ability to develop learning for adolescents to reach a critical level of HL (Barwood *et al.*, 2020).

By focusing specifically on the lesson plans of the PsTs ($n = 11$) who had progressed critical HL in learning, the study sought to examine and affirm Paakkari and Paakkari's (2012) learning conditions as a valuable tool assisting ITEIs to prepare PsTs with pedagogical opportunity to develop critical HL in health learning. Data shows that critical HL development was mobilised when the PsTs met the learning conditions described by Paakkari and Paakkari.

As the study is based in WA, an Australian state with high incidences of melanoma and non-melanoma (Barwood *et al.*, 2017; Cancer Council of Western Australia [CCWA], 2014), content of the PsTs lessons focused on sun safety education for adolescents. Therefore, the study also aimed to distinguish pedagogies supporting critical HL particular to safe(r) sun behaviour. The paper presents insights which are relevant to countries similarly impacted by high incidences of melanoma and non-melanoma like Norway, because educational resources for sun safety in Australia were found to privilege functional and interactive HL competencies (Barwood *et al.*, 2020). This is despite the significant focus of sun safety in the teaching and learning of health education and more broadly, within Australian schools. The paper will be of value to those seeking to address health inequities through school-based learning because pedagogies situated within broader societal and cultural health goals are recommended to empower young people to take an active role in socially advocating healthier living. As young people require learning to support such actions, the author believes that ITEIs play a vital role creating learning conditions and/or pedagogies to promote HL development and cultivate critically health literate populations. By preparing PsTs with skills and understandings to be informed HL pedagogues and critical consumers of educational resources, ITEIs can further the conceptualisation of HL in schools and other contexts.

Melanoma, non-melanoma and ultraviolet radiation

Melanoma and non-melanoma of the skin are health concerns significantly contributing to lives lost and the economic burden of disease in global populations. Melanoma is more serious and life threatening than non-melanoma, with approximately 300,000 global cases reported in 2018 (Globocan, 2020). Non-melanoma is less dangerous but records higher incidences; more than 1,000,000 in 2018 (Globocan, 2020), and is more costly. For instance, two in three Australians will develop non-melanoma before the age of 70 (CCWA, 2014), at a cost to the Australian economy in excess of $650 million per annuum (Barwood and Jones, 2019). Melanoma and non-melanoma are collectively referred to as skin cancer and linked to high ambient ultraviolet radiation (UVR).

From a geographical perspective and in the absence of all other factors, countries that have the highest ambient UVR would be expected to show the highest incidences of skin cancer amongst populations (Williams and Dienes, 2014). However, this is not the case. The top ten countries highly impacted by skin cancer include Australia, New Zealand, Norway, Denmark, the Netherlands, Sweden, Germany, Switzerland, Belgium and Slovenia (World Cancer Research Fund, 2020). Countries that have the highest ambient UVR such as those around the equator are typically populated with people who have a greater concentration of melanin in their skin, which contributes to a darker skin tone (Narayanan *et al.*, 2010). In these populations, the high concentration of melanin is an adaptation to the environment which acts as a natural protective factor dissipating UVR. Predictably, global data shows that some of the highest rates of skin cancer are amongst populations with fair-skin and less melanin (Australian Bureau of Statistics, 2016; Carter and Donovan, 2007; Globocan, 2020; Gordon and Rowell, 2015; Perera *et al.*, 2015). The high incidence of skin cancer occurs despite countries in which these populations reside having some of the lowest global recordings of ambient UVR such as in Scandinavian countries (WHO, 2020d).

Australian skin cancer statistics, although high, are improving, validating the significance of ongoing public awareness such as the radio announcements of the daily UV Index and mitigation strategies regarding sun exposure such as education (CCWA, 2019; Cancer Council of Australia [CCA], 2020). The relative success is despite Australia having approximately double or more ambient UVR than countries with a similarly high incidence rate (WHO, 2020b). For instance, research indicates that the Norwegian population have poor

awareness and are delayed in responding to melanoma, leaving diagnosis to an advanced stage (Robsahm *et al.*, 2018). This results in higher mortality rates in the Norwegian population, which in turn questions their ability to make proper decisions regarding sun care and when accessing health care services. Equally, research found that high sales of sunscreen in high income countries in Northern Europe did not appropriately correlate to incidence reduction, suggesting that sunscreen use in these countries provided a "false sense of protection" against melanoma (Williams and Dienes, 2014, p. 4).

Whilst skin cancer can be linked to occupation, the common and compounding factor irrespective of country is over exposure to UVR (Dobbinson *et al.*, 2009; Sandhu *et al.*, 2016; Williams *et al.*, 2011), with functional HL actions like covering up and limiting the time spent in the sun, especially at peak UVR times, significantly reducing harm (Slevin, 2014). This is particularly pertinent during childhood and adolescence where overexposure during this timeframe is associated with increased risk of skin cancer development in later life.

Conceptualising health literacy in schools: programs, resources, curriculum, and initial teacher education

The inclusion of HL as a key idea in the development of the Australian Curriculum for HPE (ACARA, 2012, 2013) reflected growing awareness of the potential of personal and social advocacy to shape and support health outcomes. It recognised the significance of knowledge, skills, values and attitudes like critical analysis, decision making, advocacy and empowerment as capacity building influencers, enabling young people to take greater control of their health destiny (Alfrey and Brown, 2013; Barwood *et al.*, 2020; Nutbeam, 2000; Paakkari and Paakkari, 2012). Peralta *et al.* (2017) report that Australia, like Canada, are more forward-thinking countries progressing the discourse of HL in schools.

Despite the growing interest and realisation that young people make decisions about their health and wellbeing on a daily basis, research indicates that conceptualisations of HL within school programs, educational resources and curriculum remain underdeveloped (Kilgour *et al.*, 2015; McCuaig *et al.*, 2012; Peralta *et al.*, 2017). By way of contrast, a growing body of research outlines the competency of adolescents to be health literate and the ways in which a whole school approach to HL supports health outcomes (Peralta *et al.*, 2021). For example, research in the United States of America (USA) linked the absence of community supports to low levels of HL in adolescents, attributing the inadequacy of HL in parents and/or carers as a causative factor (Brown *et al.*, 2007). Paakkari *et al.* (2020) from a European perspective, found that the level of adolescent HL was critical when developing health interventions, advocating for programs to be specifically tailored to meet the level of HL in this age group. Park *et al.* (2017) connected poor adolescent HL to unfavourable health outcomes such as unhealthy weight and obesity. Finally, Taiwanese researchers (Shih *et al.*, 2016) strongly recommended the inclusion of HL curriculum in schools to mitigate childhood obesity, finding these competencies effective in reducing childhood obesity.

Notwithstanding the contextual differences and difficulties developing HL within and through schools, the call for HL as an early intervention strategy supporting adolescent health and healthier adulthood is consistent across research. As outlined by Aghazadeh *et al.* (2020), this is because schools, at the core, represent opportunities for students to learn and practice HL competencies before and whilst health behaviour is developing.

In Australia, the Australian Professional Standards for Teachers (Australian Institute for Teaching and School Leadership [AITSL], 2011) govern what Australian teachers are expected to demonstrate across three domains: Professional Knowledge, Professional Practice and Professional Engagement. Within these domains it is both overt and implicit that Australian teachers are expected to understand, apply, and progress curriculum, pedagogy and concepts pertaining to learning areas such as HPE. In addition, the guiding principles of the standards

are mapped to four career stages: Graduate, Proficient, Highly Accomplished and Lead Teacher. To achieve registration as a Graduate Teacher in Australia, a PsT must evidence the meeting of all standards. As HL is a key idea underpinning pedagogy in HPE, ITEIs that prepare HPE teachers in Australia are therefore expected to prepare PsTs to integrate HL into their teaching and learning. The need to integrate HL as specific pedagogical and content knowledge has been reported by numerous researchers (Alfrey and Brown, 2013; Barwood and Jones, 2019; Barwood *et al.*, 2020; McCuaig *et al.*, 2012, 2014; Peralta *et al.*, 2017, 2021).

Young people and their health

Adolescents access health information from many sources and are increasingly bombarded daily with complex, confusing and sometimes contradictory health messages. As such, they require knowledge, skills and a disposition to critically navigate their way as global citizens (ACARA, 2015; Paakkari and Paakkari, 2012). At the same time, they experience significant physical and social change impacting upon their ability to problem solve and make decisions (Peralta *et al.*, 2017). For example, in the context of this study and regardless of a high level of knowledge, adolescents have been found to poorly adhere to safe sun practices, at times favouring the look of tanned skin (Eastabrook *et al.*, 2018; Rainous *et al.*, 2018). More particularly and in Australia, adolescents are more prone to significant and repeat sunburn, with incidences of melanoma in this age group on the rise (Barwood *et al.*, 2017; CCWA, 2018, 2019).

In acknowledging the very nature of a captive audience, schools play a significant role improving adolescent health (Paakkari *et al.*, 2015; St Leger, 2001; WHO, 1999). For example, they can provide educative opportunities to support safer sun behaviour. Schools also represent capacity to build HL and in using Nutbeam's (2000) middle level of HL (interactive) as just one example, can provide opportunities for adolescents to interpret, interact and apply knowledge of UVR to attain and remain safe when in the sun. This paper now turns to the study and the focus on initial teacher education as a capacity building institution supporting adolescent HL.

Methods

To distinguish pedagogies to support adolescents to enact critical HL when in the sun and other activities, an exploratory intrinsic case study design (Yin, 2018) investigated the ability of PsTs at an Australian ITEI to conceptualise HL in sun safety education. The case study design was chosen to specifically investigate the unique context of PsTs' pedagogical decision making for learning to support Year 7 students (12–13 years old) (Yin, 2018).

Recognising the potential of the PsTs as future educators supporting and strengthening safer and healthier living in WA, the study sought to examine the capacity of ITEIs to support HL development in school learning. Using Paakkari and Paakkari's learning conditions as insight, the following research question formed the basis of this paper:

(1) How do PsTs pedagogically advance HL competencies in sun safety education?

Participants

The PsTs ($n = 30$) were enrolled in a Post-Graduate teaching degree at an ITEI in WA and on graduation would qualify to teach HPE in Australian secondary schools. The majority of the PsTs identified as female (63%) and the remainder as male (37%). The PsTs ranged in age from early 20s to late 40s, recording an average age of 29 years across the group.

Data and data analysis

Data were collected via three lesson plans from each PsT ($n = 30$). In the first phase of data analysis, the PsTs' lesson plans ($n = 90$) were analysed using Nutbeam's hierarchy of HL

competencies (2000) to qualify the complexity of the lessons' learning activities (n = 444). Using an iterative approach, a research team consisting of three researchers worked independently at first, drawing on and postulating the complexity of each learning activity according to Nutbeam. They then worked collaboratively to attribute an agreed level of complexity and in the third round, confirmed the HL complexity of the learning activities. In total the 444 learning activities were analysed three times (n = 1,332). Following this, the complexity of the learning activity was quantified per HL competency (functional, interactive and critical) and per the lesson plan, to evidence where and the extent to which the PsTs were conceptualising critical HL.

Data analysis in the next phase involved the author independently returning to the PsTs' lesson plans and qualitatively exploring their conceptualisations of sun safety education to distinguish pedagogies with potential to target critical HL. The author drew from Paakkari and Paakkari's (2012) extension of Nutbeam's hierarchy (2000), which described the learning conditions supporting HL development in students in schools. The author examined the data set and specifically, the PsTs' lesson plans progressing to a competency of critical HL (n = 11). She qualitatively explored these PsTs' conceptualisations to identify examples of Paakkari and Paakkari's learning conditions (2012). In doing so, the 33 lessons were similarly reviewed three times (n = 99) as per the first phase. That is, to firstly match a learning condition to a learning activity, secondly to affirm the match and thirdly, to confirm the match.

Creswell (2014, p. 64) characterises qualitative researchers as applying theoretical lenses to support a "call for change". The researcher applied Nutbeam's (2000) hierarchy to access the HL complexity of learning activities and Paakkari and Paakkari's (2012) learning conditions to develop pedagogical insight to further HL discourse in schools and at ITEIs. The author positions the use of Paakkari and Paakkari's (2012) learning conditions as a form of organisational theory to progress the research.

Finding 1: qualifying and quantifying health literacy conceptualisations in PsTs' sun safety education

The PsTs (n = 30) created three consecutive lesson plans (n = 90) containing 444 learning activities. Across these lessons, 155 learning activities were found in lesson one (35%), 150 in lesson two (34%) and 139 in lesson three (31%). Given all things equal, one would expect to find an even amount of activities per HL competency across the three lessons. That is, 148 learning activities per HL competency (functional, interactive and critical). However, this was not the case. The data shows that 62% of the learning activities were positioned as functional HL, 33% were interactive HL and 3% were critical HL.

Although the HL competency of the learning activities were not evenly distributed across the three lessons, the distribution was not unexpected. The distribution corresponded with the PsTs' pedagogically advancing health concepts, understandings of sun safety and HL across the three lessons. For example, lesson one could provide students with simple, foundational knowledge to support understandings of the UVR (functional HL). Lesson two could progress the students' actions to "be" and "remain" safe when in the sun (interactive HL). Lesson three could progress and apply more complex sun safety concepts such as exploring ways to make change in the local community (critical HL).

At this time, it is important to be reminded that 63% of the PsTs were unable to develop learning to support critical HL. Of those who conceptualised critical HL (n = 11), only two conceptualised this competency in the first lesson, with one PsT (of the two) repeating the competency in the final lesson. Two different PsTs' conceptualised critical HL in the second lesson with only one of these repeating the competency in the final lesson. Of the 11 PsTs, 10 conceptualised critical HL learning within the third lesson but only five provided more than one opportunity to develop critical HL.

Finding 2: the learning conditions supporting health literacy conceptualisations

Qualitative data presented here shows the ways that 11 PsTs targeted critical HL. It describes the types of pedagogical activity that Paakkari and Paakkari refer to as learning conditions (2012).

Conditions to promote the learning of theoretical knowledge

Paakkari and Paakkari (2012) define theoretical knowledge as foundational knowledge, typifying the lowest levels of Bloom's taxonomy of cognitive skills (1956) and that is, to remember and understand facts. In facilitating this learning condition, teacher's act as the expert and students are passive recipients of information. For example, by providing opportunities to build theoretical knowledge the PsTs expected their students to be able to remember and recall sun safety facts. In doing so, the PsTs utilised teacher-directed learning activities such as teacher talk, PowerPoint presentations, class discussions, brainstorms, the viewing of digital media and web-based learning. The foci of these learning activities included: UVR and the UV Index; temperature and relationship to UVR; sun safety measures to prevent and reduce harm when in the sun (slip slop, slap, seek and slide); harm from UVR and the effect on the body; Sun Protection Factor (SPF) labels on sunscreen products; skin type and risk; skin cancer statistics; skin cancer treatment; and discussions around what skin cancer looks like. Overall, this learning aimed to increase student factual knowledge of the sun and UVR and prepare them for more interactive and student-centred learning in other activities.

Conditions to promote the learning of practical knowledge

Paakkari and Paakkari (2012) describe the next learning condition as progressing theoretical knowledge into a practical context but without challenging students to be critical or reflective thinkers. For this condition the teacher remains the expert but emerges as more of an organiser than a director, using learning activities to activate the students. The skills-based activity of practicing the correct method to apply and reapply sunscreen is an appropriate example.

The PsTs met this learning condition through a range of pedagogical activities and the foci of these included: selecting attire to be sun safe; using the SunSmart App to calculate a safe amount of time to spend in the sun; finding the UV rating through the UV Index for the day (local); global mapping of the UVR and UV Index through an Internet search; using skin surveillance techniques and the skin App to identify different types of skin moles; categorising skin moles; planning and packing a kit for the school sport day; and choosing sunscreen for different activities. Although some of the PsTs' activities for this learning condition could be considered as progressing the students more toward Bloom's classification of analysing, the students were not required to critically think nor position themselves. Instead, they were required to apply knowledge previously learnt in activities that were skills-based in nature.

Conditions to promote the learning of critical thinking

Paakkari and Paakkari (2012) differentiate this learning condition from the previous, describing it as a combination of knowledge and context that is both problematic and diversified. Learning in this condition requires students to question, contemplate and consider from multiple perspectives rather than just receiving and doing as per the first and second learning conditions. At this point, the teacher is a facilitator, supporting critical thinking but also encouraging the students to find their way and position.

The types of learning activities utilised by the PsTs involved Bloom's (1956) categories of analysing and evaluating such as problem and decision-based scenarios. Examples of the foci for the PsTs activities meeting this learning condition included: world travel planning; what

is needed where, when and why; assessing risk in different contexts and choosing the safest option; rating sun safe strategies and evaluating UVR protection; mapping daily UVR to predict the UV Index; choosing props to respond to a range of scenarios and justifying selections; identity quests; contemplating who is at risk and why; brainstorming where and when sun protection is not required; making a UVR detector with UVR sensitive beads; examining why people repeatedly sun burnt their skin; and evaluating local UV Index reports and selecting the one most useful to them. For this learning condition, Paakkari and Paakkari (2012) advise teachers to employ participatory pedagogies where students, with the support of the teacher, explore differing perspectives.

Conditions to promote the learning of self-awareness

For this learning condition, students situate knowledge and skills with life experience(s), to strengthen positioning, promote critical reflection and build courage. To do so, students make sense of themselves from the health knowledge learnt, to find a sense-of-belonging and autonomy. Paakkari and Paakkari (2012, p. 143) state that learning in this space is "highly personal and relational", where opinions may differ, and process is critical. This type of learning can be located within Bloom's (1956) cognitive category of evaluating.

Using a range of activities to facilitate this learning condition such as journaling, personal statements and reflections, the PsTs moved from facilitatory activity to mentor, coach and trusted advisor. Examples of foci meeting this learning condition included: predicting future photo imaging from sun behaviour; diarising activities that are safe and unsafe; connecting values to actions; journaling ways to remain sun safe with differing people and in different contexts; developing refusal strategies to counteract peer pressure; reflecting on the last time their skin was sun burnt – what did it feel like, why did it happen and where; postulating the conditions where prevention and protection are more and less likely; identifying body parts that are neglected and developing ways to disrupt/interrupt this neglect; developing personal checklists to keep safe in the sun; justification statements as to why being sun safe is important to "me"; and critical reflections around how sun smart one is and can be.

Conditions to promote the learning of citizenship

In meeting this learning condition, the PsTs utilised individual and group work, progressing peer collaborations to move student understandings from a sense of "Me" to "We" to "Us". To achieve the complexity of this type of learning, the PsTs challenged the students to become creators, designers and architects "of" and "for" health change (Bloom, 1956). Speaking metaphorically, the PsTs were no longer holding the hands of their students but empowering them to be agentic and enabling citizens who can advocate health on a range of levels. For example, advocating a peer or family member to reapply sunscreen as opposed to advocating change in the local community which can enhance sun safety awareness. Activities with this foci in the PsTs' lesson plans included: developing recommendations to explain the UV Index to someone who could not use it; constructing recommendations for travellers to Australia and advising how these individuals could assess risk whilst holidaying; creating a sun safe policy for the school and/or community; designing SunSmart school uniforms; assessing sun risk in the workplace and for different occupations; developing recommendations to enhance occupational sun safety; conducting an analysis of a part of the school and redesigning the area to improve sun safety; creating a community UV awareness campaign; plotting the positioning of sunscreen stations around the school and justifying the position; planning sporting events to be sun safe like the school's factional carnival; creating sun safe daily messages for school bulletins; and developing narrative to convince someone to take sun safe action and access health services. Paakkari and Paakkari (2012, p. 146) capture the sensitivity, empathy and mutually supportive condition of this type of learning, by

describing the teacher's expanding role as covering "aspects of being a fellow learner" whilst the student's role expanded "to cover aspects of being a responsible member" of a community.

Discussion: distinguishing pedagogies for sun safety education in schools

The purpose of the paper was to contribute insight to the scholarship of health pedagogies supporting and strengthening adolescent health. The findings of the study qualified and quantified that the majority (63%) of the PsTs were unable to mobilise critical HL in lesson planning, and those that progressed learning to develop critical HL, actioned five learning conditions (Paakkari and Paakkari, 2012). These findings point to the rich potential for ITEIs, irrespective of country and context, to appropriately prepare PsTs with the tools to conceptualise functional, interactive and critical HL in learning. In Australia, the findings are supported by policy governing the professional knowledge, practice and engagement of Graduate Teachers (AITSL, 2011). As research also points to the shortcomings of HL in populations, leading to poor health outcomes and health inequity (Aghazadeh *et al.*, 2020; Kickbush, 2001; Paakkari *et al.*, 2015; Park *et al.*, 2017), the study affirms the significance of ITEIs as critical players in enabling HL within adolescent populations. Moreover, and in agreeing with the recent work of Aghazadeh *et al.* (2020), the study points to ITEIs as supporting a population that has largely been overlooked.

The PsTs in this study mobilised a range of pedagogies, which Paakkari and Paakkari (2012) refer to as conditions to promote learning. The first two conditions, learning that promotes theoretical knowledge and practical knowledge, were clearly established by the PsTs. This success can partly be explained by the provision of an intensive UVR training workshop by the CCWA. The third condition, to promote critical thinking, was also established across the lessons and this condition is particularly critical to the context of sun safety education because previous research found that adolescents have high knowledge but are prone to making poor decisions when in the sun (Barwood *et al.*, 2017; Williams *et al.*, 2011). By providing learning that encouraged students to question knowledge amidst personal and societal beliefs, and values and behaviour such as the incidence of repeat sunburn in adolescents, the PsTs were supporting transformational thinking, which in turn could broaden student capacity to enhance health.

Paakkari and Paakkari's (2012) fourth condition to develop HL was a strength of the PsTs and can perhaps be attributed to the ITEI's strong pedagogical focus on meaning-making in health and in promoting a sense of self, sense of others and a sense of belonging through learning activity. As this learning condition was both clearly and repeatedly evident across the PsTs' lesson plans, despite positioning toward the top of Bloom's taxonomy (1956) of cognitive activity, it emphasises the positive pedagogical alignment between the work of Paakkari and Paakkari and the ITEI. Such a view is also in alignment with the pedagogical tenets of the Australian Curriculum for HPE (ACARA, 2015) and, in some ways, to the goals but not necessarily the outcomes of curricula in other countries like Finland and the USA (Aghazadeh *et al.*, 2020; Brown *et al.*, 2007; Paakkari *et al.*, 2015).

Although the PsTs advanced learning to encompass a range of social advocacy activity, this learning did not appropriately build cultural and ethnic capital as per Paakkari and Paakkari's (2012) condition. It did explore local, community and societal contexts, promoting ethical responsibility and a sense of citizenship on different levels such as with peers and the world beyond. However, greater awareness and emphasis of culture and ethnicity in relation to health and health practices were needed. This was particularly pertinent to sun safety as persons with darker skin may not necessarily employ the same protection strategies as persons with fair skin (Narayanan *et al.*, 2010). In addition, different groups within society may require different types of support to access health care services.

Thus, in complying with the policy framework of the Australian Professional Standards for Teachers (AITSL, 2011) and in recognising the limitation and/or weakness of the PsTs at

her ITEI, the author of this paper recommends other ITEIs' place greater emphasis on building cultural and ethnic capacity when preparing PsTs to create learning to support HL. This does not mean that the PsTs in the study were culturally/ethnically unaware or insensitive, it means that these PsTs were not appropriately accommodating the diversity of culture and ethnicity in their learning activities. Therefore, and to support this capacity in future PsTs at her ITEI, the author has redeveloped Paakkari and Paakkari's learning conditions to the moniker of the *Health Literacy Enabling Framework for School Curriculum* (see Table 1). This framework has not progressed Paakkari and Paakkari's work but serves to simplify it especially for use with the author's PsTs.

Concluding comments

In mobilising a framework to conceptualise HL in learning, the author agrees that schools are rich with potential to support mindsets in adolescents to not only make decisions and take actions, but to bounce back from challenges and adversity, grasp opportunities when they arise, and to understand that some mistakes can be resolved whilst others are life changing (Paakkari *et al.*, 2015; St Leger, 2001; WHO, 1999). This potential can prepare adolescent populations with knowledge and skills to critically engage and deal with the health

Pedagogy	Teacher activity	Teaching method and learning activity
To know	Teacher is the expert sharing factual (theoretical) knowledge	Teacher directed learning with students who are passive recipients of facts and knowledge such as through teacher talk, brainstorms, class discussions, digital media, PowerPoint presentations and web quests
To do	Teacher is the organiser, guiding the application of knowledge in practice	Teacher and student collaborative learning, where students apply factual knowledge in practice through participatory and skills-based activity such as hands on practices, trial runs, puzzles, and role plays
To question	Teacher is the facilitator, encouraging critical thinking and questioning	Teacher facilitates individual and group-based learning, where students participate in activities that require them to question, problem solve and make decisions such as through scenarios, concept mapping, predictions, debates, justifications, and data analysis
To locate	Teacher is the trusted advisor, advancing self-awareness	Teacher promotes meaning making in relation to health of oneself and others by creating learning that contemplates the "why' factors. Activities build a sense-of-self and sense-of-belonging such as through critical reflections, journaling, future planning, and position statements
To advocate	Teacher is the enabler, building sense of citizenship through individual, social and cultural capital	Teacher mentors' students to progress micro and macro health such as refusal statements, narrative to support peer change, designing local health messages, strategic planning, recommendations for the accessing of health care services and the creation of public awareness campaigns. Students explore advocacy of safer, healthier, and more physical active living for themselves, peers, family, community, cultural and ethnic groups, and society and the world beyond

Source(s): Adapted from Paakkari and Paakkari (2012)

Table 1. Health literacy enabling framework for school curriculum

challenges they face now and in the future. This paper has specifically responded to the research question underpinning the study, providing pedagogical examples as to how the PsTs at the author's ITEI progressed HL competencies. The examples shared in this paper were to promote greater clarity of HL pedagogical development with other ITEIs. This in turn, aimed to support the creation of learning in schools to lead to dispositions whereby adolescents feel confident to communicate health concerns, question health information, position themselves and others as healthy or unhealthy, benefit from accessing of health care services and feel empowered to act ethically and responsibly to enhance personal, social, community and societal health.

In the specific context of sun safety education, this study has shared pedagogical insight as to what could work to support change, both within Australia and in other countries. This is especially pertinent to those countries where education appears to be a limiting rather than an enabling factor. To do so the paper highlighted the significance of initial teacher education as a capacity building institution with potential to support a downward trend in melanoma and non-melanoma incidence, specifically with adolescents. The work discussed here, could be applied to other health contexts and settings, especially those that are school based like early childhood settings where the fore mentioned response to COVID 19 to social distance remains critical. Moreover, the *Health Literacy Enabling Framework for School Curriculum* could be applied universally as a pedagogical tool supporting PsTs and experienced teachers to prepare HL learning "for" and "about" health as per AITSL's policy framework (2011).

In concluding, the author would like to address a limitation of the study. The scope of the study is not enough to qualify the good work of Paakkari and Paakkari (2012) with schools and at other ITEIs. As such, she reaches out to likeminded scholars, especially those in countries with high incidences of skin cancer, to join her in furthering pedagogical insight by conducting research to qualify the capacity of schools and ITEIs as enablers of HL in adolescents. The author also encourages everyone to participate in ongoing and life-long self-efficacy toward sun behaviour, especially those who care, take charge and are role models for our young.

References

Aghazadeh, S.A., Aldoory, L. and Mills, T. (2020), "Integrating health literacy into core curriculum: a teacher-driven pilot initiative for second graders", *Journal of School Health*, Vol. 90, pp. 585-593, doi: 10.1111/josh.12907.

Alfrey, L. and Brown, T. (2013), "Health literacy and the Australian Curriculum for Health and Physical Education: a marriage of convenience or a process of empowerment", *Asia-Pacific Journal of Health, Sport and Physical Education*, Vol. 4, pp. 159-173, doi: 10.1080/18377122.2013.805480.

Australian Bureau of Statistics (2016), "3303.0 – causes of death, Australia 2015", available at: https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/3303.0~2015~Media%20Release~Dementia%20deaths%20continue%20to%20rise%20as%20population%20ages%20(Media%20Release)~10#:~:text=Heart%20disease%20remains%20the%20leading,of%20all%20deaths%20in%202015 (accessed 5 February 2021).

Australian Curriculum, Assessment and Reporting Authority (2012), "Draft shape of the Australian curriculum: health and physical education consultation report", available at: https://docs.acara.edu.au/resources/HPE_Consultation_report_-_04022013.pdf (accessed 5 February 2021).

Australian Curriculum, Assessment and Reporting Authority (2013), *Draft F-10 Australian Curriculum: Health and Physical Education Consultation Report*, Australian Curriculum, Assessment and Reporting Authority, Sydney.

Australian Curriculum, Assessment and Reporting Authority (2015), "The Australian curriculum: health and physical education 8.3", available at: https://www.australiancurriculum.edu.au/f-10-curriculum/health-and-physical-education/ (accessed 5 February 2021).

Australian Government (2020), "COVIDSafe app", available at: https://www.health.gov.au/resources/apps-and-tools/covidsafe-app#:~:text=The%20COVIDSafe%20app%20helps%20state,been%20in%20close%20contact%20with (accessed 5 Feruary 2021).

Australian Institute for Teaching and School Leadership (2011), "Australian professional standards for teachers", available at: http://www.aitsl.edu.au/australian-professional-standards-for-teachers (accessed 15 April 2021).

Barwood, D., Brady, D. and Jones, A. (2017), "Creating an understanding of the UV Index amongst pre-service teachers", *30th ACHPER International Conference*, Canberra, Australia, pp. 45-53.

Barwood, D. and Jones, A. (2019), "Pre-service teachers, co-creating sun safety education for adolescents", *Curriculum Studies in Health and Physical Education*, Vol. 10, pp. 277-290, doi: 10.1080/25742981.2019.1627669.

Barwood, D., Jones, A. and O'Hara, E. (2020), "Pre-service teachers' mobilising health literacy in sun safety education", *Australian Journal of Teacher Education*, Vol. 45, pp. 62-73, doi: 10.14221/ajte.2020v45n5.4.

Bloom, B. (1956), *Taxonomy of Learning objectives: The Classification of Educational Goals*, D. McKay Co, New York, New York.

Brown, S.L., Teufel, J.A. and Birch, D.A. (2007), "Early adolescent perceptions of health and health literacy", *Journal of School Health*, Vol. 77, pp. 7-15.

Cancer Council of Australia (2020), "Skin cancer", available at: https://www.cancer.org.au/about-cancer/types-of-cancer/skin-cancer.html.

Cancer Council of Western Australia (2014), "Western Australia cancer statistics 2014", available at: https://www.cancerwa.asn.au/resources/2017-06-28-skin-cancer-statistics-fact-sheet.pdf (accessed 5 February 2021).

Cancer Council of Western Australia (2018), "Protection is better than the cure", available at: https://www.cancerwa.asn.au/resources/2020-03-03-Protection-is-better-than-cure-2.pdf (accessed 5 February 2021).

Cancer Council of Western Australia (2019), "Cancer statistics", available at: https://www.cancerwa.asn.au/resources/statistics/ (accessed 5 February 2021).

Carter, O.B.J. and Donovan, R.J. (2007), "Public (mis)understanding of the UV index", *Journal of Health Communication*, Vol. 12, pp. 41-52.

Creswell, J.W. (2014), *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, SAGE Publications, Thousands Oaks, California.

Dobbinson, S.J., White, V., Wakefield, M.A., Livingston, P.M., English, D.R. and Simpson, J.A. (2009), "Adolescents' use of purpose built shade in secondary schools: cluster randomised controlled trial", *British Medical Journal*, Vol. 338, pp. 1-6, doi: 10.1177/1757975916639871.

Eastabrook, S., Chang, P. and Taylor, M.F. (2018), "Melanoma risk: adolescent females' perspectives on skin protection pre/post-viewing a ultraviolet photoaged photography of their own facial sun damage", *Global Health Promotion*, Vol. 25, pp. 23-32, doi: 10.1177/1757975916639871.

Globocan (2020), "Melanoma of the skin", available at: https://gco.iarc.fr/today/online-analysis-table?v=2018&mode=cancer&mode_population=regions&population=900&populations=900&key=asr&sex=0&cancer=39&type=0&statistic=5&prevalence=0&population_group=0&ages_group%5B%5D=0&ages_group%5B%5D=17&group_cancer=1&include_nmsc=1&include_nmsc_other=1 (accessed 5 February 2021).

Gordon, L. and Rowell, D. (2015), "Health system costs of skin cancer and cost-effectiveness of skin cancer prevention screening: a systematic review", *European Journal of Cancer Prevention*, Vol. 24, pp. 141-149, doi: 10.1097/CEJ.0000000000000056.

Kickbush, I.S. (2001), "Health literacy: addressing the health education divide", *Health Promotion International*, Vol. 16, pp. 289-297, doi: 10.1093/heapro/16.3.289.

Kilgour, L., Matthews, N., Christian, P. and Shire, J. (2015), "Health literacy in schools: prioritising health and well-being issues through the curriculum", *Sport, Education and Society*, Vol. 20, pp. 485-500, doi: 10.1080/13573322.2013.769948.

McCuaig, L., Coore, S., Carroll, K., Macdonald, D., Rossi, A., Bush, R., Ostini, R., Hay, P. and Johnson, R. (2012), *Developing Health Literacy Through School Based Health Education: Can Reality Match Rhetoric?*, The University of Queensland, Brisbane.

McCuaig, L., Carroll, K. and Macdonald, D. (2014), "Enacting critical health literacy in the Australian secondary school curriculum: the possibilities posed by e-health", *Asia-Pacific Journal of Health, Sport and Physical Education*, Vol. 5, pp. 217-231, doi: 10.1080/18377122.2014.940809.

Narayanan, D.L., Saladi, R.N. and Fox, J.L. (2010), "Ultraviolet radiation and skin cancer", *International Journal of Dermatology*, Vol. 49, pp. 978-986, doi: 10.1111/j.1365-4632.2010.04474.x.

National Health Services (2020), "NHS COVID-19 app", available at: https://www.nhsx.nhs.uk/covid-19-response/nhs-covid-19-app/ (accessed 5 February 2021).

Nutbeam, D. (2000), "Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century", *Health Promotion International*, Vol. 15, pp. 59-267, doi: 10.1093/heapro/15.3.259.

Nutbeam, D. (2008), "The evolving concept of health literacy", *Social Science and Medicine*, Vol. 67, pp. 2072-2078, doi: 10.1016/j.socscimed.2008.09.050.

Paakkari, L. and Paakkari, O. (2012), "Health literacy as a learning outcome in schools", *Health Education*, Vol. 112, pp. 133-152.

Paakkari, L., Torppa, M., Mazur, J., Boberova, Z., Sudeck, G., Kalman, M. and Paakkari, O. (2020), "A comparative study on adolescents' health literacy in Europe: findings form the HBSC study", *International Journal of Environmental Research and Public Health*, Vol. 17, pp. 2-12.

Paakkari, L., Tynjälä, P., Torppa, M., Villberg, J. and Kannas, L. (2015), "The development and alignment of pedagogical conceptions of health education", *Teaching and Teacher Education*, Vol. 49, pp. 11-21.

Park, A., Eckert, T.L., Zaso, M.L., Scott-Sheldon, L.A.J., Vanable, P.A., Carey, K.B., Ewart, C.K. and Carey, M.P. (2017), "Associations between health literacy and health behaviours among urban high school students", *Journal of School Health*, Vol. 87, pp. 885-893.

Peralta, L.R., Cinelli, R.L. and Marvell, C.L. (2021), "Health literacy in school-based health programmes: a case study in one Australian school", *Health Education Journal*. doi: 10.1177/00178969211003600.

Peralta, L., Rowling, L., Samdal, O., Hipkins, R. and Dudley, D. (2017), "Conceptualising a new approach to adolescent health literacy", *Health Education Journal*, Vol. 76, pp. 787-801.

Perera, E., Gnaneswaran, N., Staines, C., Win, A.K. and Sinclair, R. (2015), "Incidence and prevalence of non-melanoma skin cancer in Australia: a systematic review", *Australasian Journal of Dermatology*, Vol. 56, pp. 258-267.

Rainous, E., Hermann, E.J. and Abraham, S.P. (2018), "Skin cancer risk-lowering behaviours and skincare habits of youth ages 18–25 years", *International Journal of Studies in Nursing*, Vol. 3, pp. 14-22.

Robsahm, T.E., Helsing, P., Nilssen, Y., Vos, L., Rizvi, S.M.H., Akslen, L.A. and Veierød, M.B. (2018), "High mortality due to cutaneous melanoma in Norway: a study of prognostic factors in a nationwide cancer registry", *Clinical Epidemiology*, Vol. 10, pp. 537-548.

Sandhu, P.K., Elder, R., Patel, M., Saraiya, M., Holman, D.M., Perna, F., Smith, R.A., Buller, D., Sinclair, C., Reeder, A., Makin, J., McNoe, B. and Glanz, K. (2016), "Community-wide interventions to prevent skin cancer", *American Journal of Preventative Education*, Vol. 51, pp. 531-539.

Shih, S.-F., Liu, C.-H., Liao, L.-L. and Osborne, R.H. (2016), "Health literacy and the determinants of obesity: a population-based survey of sixth grade school children in Taiwan", *BMC Public Health*, Vol. 16, pp. 1-8.

Slevin, T. (2014), *Sun, Skin and Health*, CSIRO, Collingwood.

Sørensen, K., Pelikan, J.M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., Fullam, J., Kondilis, B., Agrafiotis, D., Uiters, E., Falcon, M., Mensing, M., Tchamov, K., van den Broucke, S. and Brand, H. (2015), "Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU)", *European Journal of Public Health*, Vol. 25, pp. 1053-1058.

St Leger, L. (2001), "Schools, health literacy and public health: possibilities and challenges", *The Health Promotion International*, Vol. 16, pp. 197-205.

Williams, M., Jones, S.C., Caputi, P. and Iverson, D. (2011), "Australian adolescents' compliance with sun protection behaviours during summer: the importance of the school context", *Health Promotion International*, Vol. 27, pp. 15-22.

Williams, S.N. and Dienes, K.A. (2014), "Sunscreen sales, socio-economic factors, and melanoma incidence in Northern Europe: a population-based ecological study", *SAGE Open*, pp. 1-6, doi: 10.1177/2158244014559023.

World Cancer Research Fund (2020), "Skin cancer statistics", available at: https://www.wcrf.org/dietandcancer/cancer-trends/skin-cancer-statistics (accessed 5 February 2021).

World Health Organization (1999), "Improving health through schools: national and international strategies", available at: https://apps.who.int/iris/bitstream/handle/10665/66314/WHO_NMH_HPS_00.1.pdf?sequence=1 (accessed 5 February 2021).

World Health Organization (2014), "Health for the world's adolescents: a second chance in the second decade", available at: https://www.who.int/maternal_child_adolescent/documents/second-decade/en/ (accessed 15 April 2021).

World Health Organization (2020a), "Coronavirus", available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public (accessed 5 February 2021).

World Health Organization (2020b), "Exposure to solar ultraviolet (UV) radiation: data by country", available at: https://apps.who.int/gho/data/view.main.35300 (accessed 5 February 2021).

World Health Organization (2020c), "Health literacy", available at: https://www.who.int/healthpromotion/health-literacy/en/ (accessed 5 February 2021).

World Health Organization (2020d), "Ultraviolet (UV) index", available at: https://www.who.int/news-room/q-a-detail/ultraviolet-(uv)-index (accessed 5 February 2021).

Yin, R.K. (2018), *Case Study Research and Applications: Design and Methods*, SAGE Publications, Thousand Oaks, California.

Corresponding author
Donna Barwood can be contacted at: d.barwood@ecu.edu.au

Received 20 February 2021
Revised 19 June 2021
Accepted 27 June 2021

Investigation of college student smoking perceptions, behaviors and communication about smoking with smoking friends and family

YoungJu Shin
Hugh Downs School of Human Communication, Arizona State University, Tempe, Arizona, USA, and
Yu Lu
Department of Health and Exercise Science, University of Oklahoma, Norman, Oklahoma, USA

Abstract

Purpose – Communication plays an important role in health decisions and behaviors. Friends and family exert influence through communication and, when considering smoking, this is particularly salient among those friends and family who smoke. Guided by primary socialization theory and integrated behavioral model, the present study examined the effects of having smoking friends and family on smoking beliefs (e.g. negative consequences, positive reinforcement and negative reinforcement), cultural normative beliefs, pro-smoking injunctive norms, smoking intentions and recent smoking behaviors.

Design/methodology/approach – Cross-sectional online survey data were collected from college students ($N = 227$). Multivariate analysis of covariance and path analysis were performed.

Findings – College students who reported having smoking friends were more likely to report higher levels of positive reinforcement, cultural normative beliefs, pro-smoking injunctive norms, positive attitudes, smoking intentions and recent smoking behaviors than those without smoking friends. Frequent communication with smoking friends was significantly related to cultural normative beliefs, pro-smoking injunctive norms, positive attitudes and smoking intentions. The analysis, however, did not yield statistical support for the associations between frequent communication with smoking family and smoking perceptions, norms and behaviors.

Originality/value – The present study highlights the vital roles of friends' influence for college students' smoking behaviors. Communication-based intervention can help better equip college students with communication strategies that prevent tobacco use by promoting more effective conversations with friends.

Keywords Smoking perceptions, Smoking behavior, Communication about smoking, Smoking friends and family, College students

Paper type Research paper

Introduction

Cigarette smoking is a major health concern among college students in that young adults between the ages of 18 and 25 years have the highest rate of tobacco use (22%), compared to other age groups including adolescents and adults above 26 years or older (Substance Abuse and Mental Health Services Administration, 2017). Among young adults, cigarette smoking is highly prevalent in college students (Center for Disease Control [CDC], 2015). Of full-time college students, 16% reported smoking cigarettes in the past year (Schulenberg *et al.*, 2016). Deleterious effects of cigarette smoking are evident (CDC, 2015; Primack *et al.*, 2013). Specifically, studies have demonstrated that college students' smoking behaviors are significantly related to poor health outcomes such as higher levels of anxiety and depression, as well as drinking alcohols and consuming illicit drugs (Guo *et al.*, 2002; Mackenzie *et al.*, 2011; Nichter *et al.*, 2010; Sutfin *et al.*, 2009; Ridner *et al.*, 2005).

During the transition to adulthood, college students have more freedom to make life choices including smoking decisions. Many college students exercise this freedom by

Health Education
Vol. 121 No. 6, 2021
pp. 598-613

0965-4283
DOI 10.1108/HE-02-2021-0024

initiating cigarette smoking often in response to stress and depression (Patterson, 2004). Social smoking also is prevalent among college students because it is considered as a social activity (Moran *et al.*, 2004). Although it is generally believed that social smokers do not intend to smoke after leaving the social environment, such an environment often functions as a transition to regular smokers (Sutfin *et al.*, 2009). To address such a public health issue, prevention researchers investigate the socialization of smoking behavior. Specifically, friends and family provide "socialization" about smoking while engaging in communication about smoking (Kam *et al.*, 2015; Shin *et al.*, 2017). That is, friends and family serve as socialization agents who either protect college students against substance use such as smoking, or negatively shape and reinforce the notion that smoking is normative and acceptable. Past literature suggests that friends and family play vital roles in impacting how college students perceive smoking and decide about their own smoking behaviors (Roupa *et al.*, 2016; Yanovitzky *et al.*, 2006).

Moreover, it is noted that people talk about smoking in different ways, because smokers and non-smokers differ on their beliefs, attitudes and smoking behaviors (Asfar *et al.*, 2005; Lu, 2015). Smokers tend to communicate more with other smokers about their smoking habits (e.g. cigarette brand, cigarette price), whereas nonsmokers tend to communicate with smokers only and communication contents often focus on persuading smokers to quit (Lu, 2015). As a result, communication with friends and family about smoking may vary based on their smoking status. Guided by primary socialization theory, and the integrated behavioral model, the present study aims to extend the research on socialization of smoking behavior by investigating effects of smoking friends and family on college students' beliefs about smoking, norms and behaviors as well as exploring contents of smoking communication with smoking friends and family members.

Socialization of smoking behavior

The importance of friends and family in college students' health choices, such as smoking, cannot be neglected. Primary socialization theory (PST) explains that friends and family members are important sources of socialization agents for adolescents and young adults in the context of substance use research (Cooper and Cooper, 1992; Oetting and Donnermeyer, 1998). Past studies indicate that children of smoking parents and peers model smoking behaviors and experience social pressure to start smoking (Simons-Morton *et al.*, 2001; Vuolo and Staff, 2013). On the contrary, the likelihood of being a lifetime smoker decreases when neither friends nor parents smoke (Hestick *et al.*, 2001).

As one source of socialization agents, friends exert profound influences on individual's behaviors (Fujimoto and Valente, 2012; Kelly *et al.*, 2011). Previous literature supports this claim that people are more likely to engage in a risky behavior as they perceive many of their peers engage in the same risky behavior and as they perceive their peers approve of the risky behavior (Borsari and Carey, 2003; Prentice and Miller, 1993). Empirical evidence show the influence of friends on substance use (Brook *et al.*, 2011; Duan *et al.*, 2009). For example, college students' perception of friends' alcohol use is found to be a stronger predictor of college students' own alcohol use and having smoking friends also predicts adolescents' smoking behaviors (Hall and Valente, 2007; Yanovitzky *et al.*, 2006).

From a developmental perspective, family influence tends to diminish as children grow older. Parents and other family members, however, remain influential when it comes to children's smoking behaviors (Hanewinkel *et al.*, 2008; Henriksen and Jackson, 1998). Research supports that parents as another source of socialization agents play an imperative role in preventing adolescent deviant behaviors including smoking intentions and behaviors (Choi *et al.*, 2017; Miller-Day, 2008; Shin *et al.*, 2020). Yet, it is also important to recognize that parents can socialize with children to perceive that substance use is normative (Komro *et al.*,

2007). Past studies reveal that parents' references to their own past substance use is highly associated with adolescents' positive substance use perceptions and parental smoking increases the likelihood of children's smoking (Kam and Middleton, 2013; Kam *et al.*, 2017; Roupa *et al.*, 2016). Given that previous literature mainly focuses on parent–child interaction and communication, less is known about influences of other family members including siblings in the prevention research. In the current study, a term, family, is broadly used to refer family including parents, siblings and other family members.

Another theory used to guide the present study is integrated behavioral model (IBM), which is an extension of theory of planned behavior (TPB) (Ajzen, 2011; Fishbein and Ajzen, 2010; Kasprzyk *et al.*, 1998; Montaño and Kasprzyk, 2015; Van De Ven *et al.*, 2007). Like TPB, IBM suggests behavioral beliefs (an individual's evaluation of performing behavior or consequences of behavior) influence experiential and instrumental attitude. Experiential attitude refers to an individual emotional response to behavior (i.e. favorable or unfavorable attitude), whereas instrumental attitude represents an individual belief about outcomes of behavior. These attitudes in turn impact behaviors. In IBM, subjective norm is re-conceptualized as two different types: injunctive norm (an individual's perception of approval or disapproval of others when performing behavior) and descriptive norm (an individual's belief about what is done by others). To extend IBM, the current study focuses on the notion of injunctive norm on individual and social levels: that is, pro-smoking injunctive norm and cultural normative beliefs in smoking behavior. Cultural normative beliefs are distinctively different from injunctive norm because the former highlights a collective code of conduct and perceived acceptance of smoking behavior at the social level, whereas the latter emphasizes the perceived approval of others in smoking behavior at the individual level (Lapinski and Rimal, 2005). In this respect, cultural normative beliefs are regarded as a broader concept of the subjective norm.

Lastly, IBM explicates a role of external factors. External factors include personal, attitudinal, demographic factors that may influence an individual's behavior indirectly via other key components of IBM. In this study, having smoking friends and family is regarded as an external factor. Guided by PST and IBM, two hypotheses are posited:

H1. College students who have smoking friends will report higher levels of behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, positive attitudes, smoking intentions, and behaviors than those without smoking friends.

H2. College students who have smoking family will report higher levels of behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, positive attitudes, smoking intentions, and behaviors than those without smoking family.

Friends and family function as socialization agents for substance use via observing smoking behaviors. They also serve as important channels of health information (e. g., pro- or anti-smoking messages). For college students, face-to-face interpersonal communication is one of the most common types of health communication venue, even in comparison to mass media exposure, including web pages, radio or TV and other media sources (Baxter *et al.*, 2008). However, less is known about the contents of communication about smoking. We now turn to discuss the communication about smoking, specifically with smoking friends and family.

Communication about smoking

As stated previously, the overall influence of friends and family on smoking is well documented. However, the specific nature of communication about smoking is crucial in determining this influence. In the drinking context, for example, Neuwirth and Frederick

discover that communication expressing opinions against the prevailing social norms are essential to mitigate drinking (Borsari and Carey, 1999). It is also found that interpersonal communication about risky behavior such as smoking would impact college students' subsequent health practices (Baxter *et al.*, 2008). More specifically, friends and family are identified as the most frequent interaction partners of college students among various interpersonal relationships (e.g. acquaintances, friends, romantic partners or spouses, family members and healthcare professionals) (Baxter *et al.*, 2008).

Friends influence individuals through the perceived common group membership and social pressure arises when the violation of social norms is perceived (Borsari and Carey, 1999; Wechsler *et al.*, 1996, 1999; Werch *et al.*, 2000). Peer communication is found to significantly impact adolescents' perceptions of substance use and college students' substance use behavior (Choi *et al.*, 2017; Kam *et al.*, 2016a, b; López *et al.*, 2001; Real and Rimal, 2007). In the smoking context, communication also influences people's behavioral beliefs about smoking (e.g. cigarette tastes good), attitude toward the behavior (e.g. good or bad) and subjective norms (e.g. whether significant others approve of the smoking) (Neuwirth and Frederick, 2004). Communicating with smoking friends could influence individuals to think more positively of smoking and possibly increase their intention to as well as actual behavior of smoking.

Similarly, a number of studies have highlighted the importance of family communication for substance use prevention. For example, empirical evidence shows protective effects of parent–child communication about substance use on adolescent and college student substance use behavior (Miller-Day, 2008; Kelly *et al.*, 2002; Shin *et al.*, 2019b). While a majority of prior studies focus on family as anti-substance-use socialization agents to prevent drinking and smoking behavior, less attention is given to investigate the relationships between having smoking family member and college students' perceptions of smoking and smoking behaviors (Choi *et al.*, 2017; Shin *et al.*, 2016, 2019a) An exceptional study discovers the direct association between parents' conversation about the negative consequences of their own past substance use and adolescent perceptions of parental approval on substance use (Kam and Middleton, 2013). To extend this line of research, following hypotheses are posited:

H3. Frequent communication about smoking with smoking friends will be positively related to behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, positive attitudes, smoking intentions and behaviors.

H4. Frequent communication about smoking with smoking family will be positively related to behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, positive attitudes, smoking intentions and behaviors.

In addition, the present study further explores what they talk about with smoking friends and family members. A recent study delves into the content of adolescents' conversations with friends about substance use and identifies conversations as informational, persuasive and relational messages (Kam *et al.*, 2016b). Informational messages include adolescents' perception of prevalence in substance use among their peers and clarification on rumors associated with their friends' substance use. Persuasive messages contain in/direct anti-substance-use messages, as well as in/direct pro-substance-use messages, whereas relational messages involve joking about substance use. Furthermore, it is found that the effects of alcohol-specific communication with friends vary depending on the contents (Kam *et al.*, 2016a). Specifically, warning, disapproval and making fun of others for drinking alcohol are inversely related to pro-alcohol beliefs and intentions, while communication with friends including different types of alcohol, experience with alcohol, prevalence of peer drinking, intention to drink alcohol is positively associated with pro-alcohol beliefs and intentions. Similarly, best friend communication against substance use is found to be positively related to adolescents' norms, which in turn led to lesser use of alcohol and cigarette (Kam and Wang, 2015).

Family communication scholars have also investigated the role of substance specific prevention communication on adolescents (Choi *et al.*, 2017; Pettigrew *et al.*, 2017, 2018). Given the majority of studies on communication about substance use highlight the protective role of parents against adolescents' substance use norms, intentions and behaviors, the content of communication among college students remains unanswered (Miller-Day and Kam, 2010; Shin and Miller-Day, 2017). It is evident that communication can vary depending on different substances and the content of communication changes over time for adolescents. The present study extends the previous research by investigating contents of college students' communication with smoking friends and family members (Shin *et al.*, 2019b; Kam and Miller-Day, 2017). Thus, we propose two research questions:

RQ1. What do college students communicate about smoking with smoking friends?

RQ2. What do college students communicate about smoking with smoking family members?

Methods

Participants and procedure

Online survey data were collected in 2015 using a convenient sample of college students ($N = 227$) who enrolled in an introductory communication courses at a large northeastern university with approximately 47,000 student population in the USA. All participants were presented with a university approved informed consent form on the web page prior to their participation. Prior to the data collection, the study was approved by the relevant university Institutional Review Board.

Participants consisted of 50% male and female with an average age of 18.69 years (SD = 1.30). A majority of the participants were freshman (93%, $N = 211$) and self-identified themselves as European American (78%), Asian American (3.1%), Mexican American (1.8%), African American (1.3%), Native American (0.9%) and others (13.7%). A majority of the participants reported themselves as non-smokers (91.2%, $N = 207$), 14 reported as current smokers (6.2%), 4 reported as former smokers (1.8%) and 2 did not report smoking status (0.9%). More than a half of the participants reported having smoking friends (56.4%, $N = 128$) and 110 students reported having smoking family (48.5%).

Measures

Having smoking friends and smoking family. Two single items were created to ask whether the participants had smoking friends or not (1 = yes, 0 = no), and whether the participants had smoking family members or not (1 = yes, 0 = no).

Frequent communication about smoking. Two single items were developed to access the frequency of communication with smoking friends and with smoking family members using a five-point scale (1 = never to 5 = all the time). Items included "How often do you talk about smoking with your smoking friends/your smoking family members?"

Behavioral beliefs about smoking. Short-form smoking consequences questionnaire (S-SCQ) was used to measure three dimensions of behavioral beliefs on smoking such as negative consequences, positive reinforcement and negative reinforcement (Myers *et al.*, 2003). A five-point Likert scale was used for all three dimensions (1 = strongly disagree to 5 = strongly agree). First dimension used four items to ask the participants' perception of negative consequences associated with smoking behavior (e. g. Smoking is hazardous to smokers' health) (Cronbach's = 0.96). Second dimension used five items to assess the participants' positive beliefs about smoking behaviors (e.g. "Cigarettes taste good") (Cronbach's = 0.72). Third dimension included seven items to measure the participants' perception of smoking behavior as negative reinforcement (e. g. Cigarettes help smokers deal with anger) (Cronbach's = 0.93).

Cultural normative beliefs. Lu *et al.*'s (2020) measure was used to access normative beliefs about smoking behavior in American culture. The participants responded to eight items using a five-point scale (1 = completely false to 5 = completely true). Example items include "In American culture, it is socially desirable to smoke at parties" and "In American culture, it is common to smoke at break time" (Cronbach's = 0.80).

Pro-smoking injunctive norms. The Van De Ven *et al.*'s measure (2007) was modified to assess injunctive norms about smoking behavior. The participants responded to five items asking whether they think that others would approve of their smoking behavior (e.g. "Your best friend/friend/parent/romantic partner/important other in your life would approve when you smoke [or would smoke]?"), using a five-point response scale (1 = definitely not to 5 = definitely yes) (Cronbach's = 0.78).

Positive attitudes toward smoking. The modified measure of Hill *et al.* (1997) was used to assess the participants' attitude toward smoking behavior. The participants responded to a statement, "I think smoking is. . ." using seven pairs of semantic differential scales such as disagreeable-agreeable, bad-good, annoying-interesting, unpleasant-pleasant, unhealthy-healthy, disadvantageous-advantageous and useless-useful. Higher scores indicated positive attitude toward smoking behavior (Cronbach's = 0.90).

Smoking intentions. The researchers developed a single measure item, "Do you intend to smoke in the future?" to ask the participants' intention, using a dichotomous scale (1 = yes, 0 = no).

Recent smoking behaviors. Single item was used to measure college students' recent smoking behaviors, derived from the Health Information National Trends Survey (HINTS). Students answered the frequency of smoking in the past 30 days (e.g. "Within the past 30 days, on how many days did you use cigarettes?") using 10 response options (1 = Never used to 10 = all 30 days). Due to the nature of a single item measure, no internal consistency test was available.

Communication about smoking. Items to measure communication about smoking were developed in a previous study based on previous literature (Dunlop *et al.*, 2014; Jeong *et al.*, 2015; Lu, 2015; Thrasher *et al.*, 2016). The participants were asked to report their communication frequency by responding to the question "How often do you talk about smoking?" (1 = never to 5 = all the time) specifically when they were "communicating with smoking friends" and "smoking family." They were also asked to indicate the content of communication (e.g. "What did you talk about?") and to mark all that applied for their conversation among ten possible answer choices. The items included "disease caused by smoking," "harms of secondhand smoke," "benefits of smoking," "physical symptoms associated with smoking," "difficulty in quitting smoking," "smoking policy," "complaint about smoking," "feelings about smoking," "habits of smoking" and "no conversation."

Controlling variables. Participants' gender, year in education and smoking status were included as covariates for the main analyses.

Analysis summary

A series of analyses were performed to answer two research questions and four research hypotheses. First, two sets of multivariate analysis of covariance (MANCOVA) were conducted to test H1 and H2, using SPSS. Second, two sets of path analysis were run to examine H3 and H4, using Mplus (Muthén and Muthén, 2017). Lastly, descriptive statistics analyses were performed to answer RQ1 and RQ2.

Results

Of the total 227 participants, 42.7% of the participants ($N = 97$) reported that they do not have smoking friends and 51% reported that they do not have smoking family members ($N = 115$).

Table 1 shows correlations among key variables. The first hypothesis speculated if college students' behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, attitudes, intentions and behaviors were significantly different depending on their friends' smoking status. The MANCOVA results showed a significant multivariate effect, Pillai's Trace = 0.12, F (8, 213) = 3.75, $p < 0.001$, $\eta^2 = 0.12$, with a significant univariate effect for having smoking friends to positive reinforcement [F (1, 213) = 4.83, $p < 0.05$, $\eta^2 = 0.02$], cultural normative beliefs [F (1, 213) = 6.57, $p < 0.05$, $\eta^2 = 0.03$], pro-smoking injunctive norms [F (1, 213) = 19.57, $p < 0.001$, $\eta^2 = 0.08$], positive attitudes [F (1, 213) = 14.48, $p < 0.001$, $\eta^2 = 0.06$], smoking intentions [F (1, 213) = 7.89, $p < 0.01$, $\eta^2 = 0.04$], and recent smoking behaviors [F (1, 213) = 6.66, $p < 0.05$, $\eta^2 = 0.03$], while controlling for gender, year in education, and the participants' smoking status. However, the analysis did not yield support for the univariate effects of negative consequences and negative reinforcement. That is, among three factors of behavioral beliefs about smoking, positive reinforcement was the only factor that showed a significant difference between those having smoking friends and those having non-smoking friends.

The second hypothesis posited if college students' behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, attitudes, intentions and behaviors were significantly different depending on their family members' smoking status. The MACOVA results did not garner support for significant multivariate effect, Pillai's trace = 0.04, F (8, 213) = 1.22, p = *ns*, $\eta^2 = 0.04$. As a result, no significant univariate effect was detected, depending on the smoking status of family members. Table 2 shows the descriptive statistics and MANCOVA results, based on smoking friends' and family members' smoking status.

The third hypothesis postulated the relationships between frequent communication about smoking with smoking friends and college students' behavioral beliefs about smoking, cultural normative beliefs, pro-smoking injunctive norms, attitudes, intentions and behaviors. The path analysis results revealed significant associations between frequent communication with smoking friends and cultural normative beliefs ($\beta = 0.15$, SE = 0.07, $p < 0.05$, $R^2 = 0.03$), pro-smoking injunctive norms ($\beta = 0.27$, SE = 0.06, $p < 0.001$, $R^2 = 0.21$), positive attitudes ($\beta = 0.28$, SE = 0.06, $p < 0.001$, $R^2 = 0.26$) and smoking intention ($\beta = 0.16$, SE = 0.06, $p < 0.01$, $R^2 = 0.30$), while controlling for gender, year in education and smoking status. Frequent communication with smoking friends, however, was not significantly related to behavioral beliefs about smoking and recent smoking behaviors (see Figure 1).

The fourth hypothesis speculated the relationships between frequent communication about smoking with smoking family members ($N = 110$, $M = 1.60$, SD = 0.96) and college students' behavioral beliefs about smoking, cultural normative beliefs, pro-smoking

	NC	PR	NR	CNB	PSIN	PA	SO	SF
NC	1							
PR	−0.046	1						
NR	0.224**	0.312**	1					
CNB	−0.109	0.267**	0.137*	1				
PSIN	−0.144*	0.203**	0.091	0.322**	1			
PA	−0.179**	0.169*	0.050	0.163*	0.491**	1		
SI	−0.191**	0.144*	−0.025	0.111	0.496**	0.570**	1	
SF	−0.067	0.003	−0.007	0.060	0.103	0.207**	0.269**	1

Table 1. Correlations

Note(s): NC, negative consequences; PR, positive reinforcement; NR, negative reinforcement; CNB, cultural normative beliefs; PSIN, pro-smoking injunctive norms; PA, positive attitude toward smoking; SI, smoking intentions; SF, past 30 days smoking frequency. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

	Having smoking friends ($N = 128$)	Not having smoking friends ($N = 97$)	Having smoking family ($N = 110$)	Not having smoking family ($N = 115$)
NC	$M = 4.74$ (SD = 0.56)	$M = 4.80$ (SD = 0.63)	$M = 4.76$ (SD = 0.58)	$M = 4.78$ (SD = 0.61)
PR	$M = 3.19$ (SD = 0.64)*	$M = 2.98$ (SD = 0.59)*	$M = 3.16$ (SD = 0.62)	$M = 3.05$ (SD = 0.63)
NR	$M = 3.81$ (SD = 0.68)	$M = 3.74$ (SD = 0.92)	$M = 3.83$ (SD = 0.77)	$M = 3.75$ (SD = 0.82)
CNB	$M = 2.60$ (SD = 0.64)*	$M = 2.34$ (SD = 0.71)*	$M = 2.57$ (SD = 0.65)	$M = 2.41$ (SD = 0.71)
PSIN	$M = 1.62$ (SD = 0.65)*	$M = 1.22$ (SD = 0.44)*	$M = 1.48$ (SD = 0.58)	$M = 1.42$ (SD = 0.62)
PA	$M = 1.44$ (SD = 0.66)*	$M = 1.10$ (SD = 0.24)*	$M = 1.39$ (SD = 0.64)	$M = 1.20$ (SD = 0.44)
SI	N/A*	N/A*	N/A	N/A
SF	$M = 1.73$ (SD = 1.39)*	$M = 1.13$ (SD = 0.37)*	$M = 1.58$ (SD = 1.18)	$M = 1.37$ (SD = 1.03)

Note(s): NC, negative consequences; PR, positive reinforcement; NR, negative reinforcement; CNB, cultural normative beliefs; PSIN, pro-smoking injunctive norms; PA, positive attitude toward smoking; SI, smoking intentions; SF, past 30 days smoking frequency

*Represents the significant differences between two groups, based on MANCOVAs. Effect of participants' gender, year in education, and smoking status were controlled for MACOVAs

Table 2. Descriptive statistics and MANCOVA results based on friends' and family' smoking status

injunctive norms, attitudes, intentions and behaviors. The path analysis results did not yield support for any of the hypothesized relationships.

The first research question asked the content of communication about smoking with smoking friends ($N = 118$, $M = 1.77$, SD = 0.99) and the second research question asked the content of communication about smoking family members. Descriptive statistics analyses revealed that 61% of college students engaged in communication about negative consequences associated with cigarette use with their smoking friends (e.g. 23% diseases caused by smoking, 19% harms of second smoke, 19% physical symptoms), whereas 55% reported that they had never talked about smoking. Overall, 38% of college students complained about smoking and shared difficulty in quitting smoking while 7% reported that they talked about benefits of smoking. Fifty-nine percent of college students had conversation about feelings about smoking and habits of smoking. Only 5% talked about smoking policy with smoking friends.

It was also found that 52% of college students engaged in communication about negative consequences associated with cigarette use with their smoking family members (e.g. 18% diseases caused by smoking, 16% harms of secondhand smoke, 18% physical symptoms), whereas 75% reported that they had never talked about smoking. Thirty-three percent of college students complained about smoking and shared difficulty in quitting smoking while 5% reported that they talked about benefits of smoking. Twenty-seven percent of college students had conversation about feelings about smoking and habits of smoking. Only 5% talked about smoking policy with smoking family members. See Table 3 for the content of communication about smoking with smoking friends and smoking family members.

Discussion

Findings support the hypothesized role of smoking status of friends matters as well as communication with smoking friends for college students' beliefs about smoking, norms, attitudes, intentions and behaviors. However, contrary to predictions, communication with smoking family do not yield significant findings suggesting that family socialization effects may be in the past for college students.

Socialization by Smoking Friends

It is found that college students who have smoking friends are more likely to display a wide array of pro-smoking cognitions and behaviors. Exposure to smoking friends leaves them more likely to believe in positive reinforcement of cigarette smoking, perceive pro-smoking cultural practice

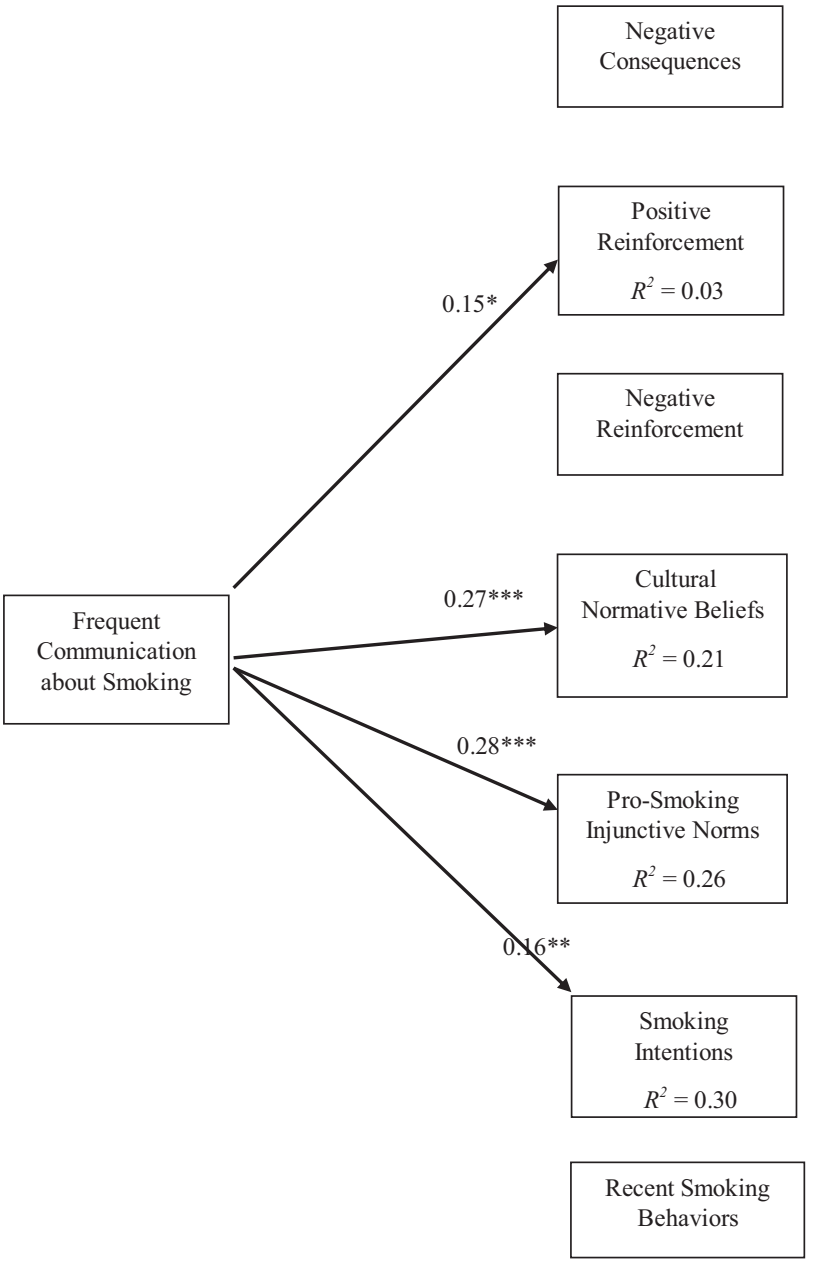


Figure 1.
Multiple regression results for frequent communication with smoking friends

Note(s): *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

and approval of smoking behavior by others, hold positive attitudes, and report smoking intentions and recent behaviors than those who do not have smoking friends. The findings also reveal that communication with smoking friends affects college students' smoking beliefs, norms, attitudes and behaviors. Specifically, frequent communication is significantly related to stronger cultural normative beliefs, pro-smoking injunctive norms, positive attitudes toward smoking and smoking intentions. The present study supports the previous literature indicating the profound peer influence on college students' smoking perceptions and behaviors (Fujimoto *et al.*, 2012; Kelly *et al.*, 2011). These findings suggest the importance of addressing the smoking status of peer and communication with peers for tobacco use prevention research.

The findings also suggest that neither having smoking friends nor communication with smoking friends influence college students' beliefs of negative consequences of smoking (e.g. lung cancer) and the negative reinforcement (e.g. a stress reliever). We assume that the negative smoking consequences are widely known in society and thus not easily influenced by what others think or say about. Another reason is that college students may not talk much about their behavioral beliefs about smoking – only 7% of the participants reported that they talk with their smoking friends about smoking benefits. Since college students who have smoking friends do not receive much input on this aspect of behavioral beliefs about smoking, their beliefs consequently would not differ.

Socialization by Smoking Family Members

The findings reveal that college students' behavioral beliefs about smoking, cultural normative beliefs, norms, attitudes, intentions, and behaviors do not significantly differ, based on the smoking status of family. We speculate that behavioral beliefs about smoking, cultural normative beliefs, and pro-smoking injunctive norms involve socialization that shapes college students' perceptions of smoking consequences and others' approval of their smoking behaviors. The findings of our study imply the diminished socializing roles of family members for college students. From a developmental perspective, it is inevitable for family to become less influential for young adults as they grow older (Kreppner and Lerner, 2013). In this vein, we discover that frequent communication with smoking family member did not significantly affect college students' behavioral beliefs about smoking, cultural normative beliefs, norms, attitudes, intentions, and behaviors. Given that college students usually reside at school, their overall amount of interaction may be much higher with their friends than with family members, which in turn impact how much they may be influenced by either group. In the present study, college students who reported having smoking family indicate "no conversation" (75%) which clearly suggests that a majority of college students do not engage in communication about smoking with family. The findings support the claim that family-based intervention should be implemented earlier in time (e.g. during the period of

	With smoking friends	With smoking family
No talk	$N = 125$ (55%)	$N = 167$ (75%)
Diseases caused by smoking	$N = 53$ (23%)	$N = 40$ (18%)
Harms of secondhand smoke	$N = 43$ (19%)	$N = 35$ (16%)
Benefits of smoking	$N = 16$ (7%)	$N = 5$ (2%)
Physical symptoms	$N = 42$ (19%)	$N = 39$ (18%)
Difficulty in quitting smoking	$N = 34$ (15%)	$N = 38$ (17%)
Smoking policy	$N = 11$ (5%)	$N = 5$ (2%)
Complaints about smoking	$N = 52$ (23%)	$N = 36$ (16%)
Feelings about smoking	$N = 81$ (36%)	$N = 35$ (16%)
Cigarette brand	$N = 51$ (23%)	$N = 24$ (11%)

Table 3. Contents of communication about smoking with smoking friends and smoking family

adolescence) for effective prevention intervention (Choi *et al.*, 2017; Shin and Miller-Day, 2017). Thus, it is more important to take into consideration of friends' influences or utilize friends in health interventions targeting college students smoking problem (An *et al.*, 2006).

Content of Communication

While more than a half of college students reported "no communication" with smoking friends, those who reported having conversations with smoking friends indicate the prevalence of topics as feelings about smoking, followed by complaints about smoking, diseases caused by smoking, cigarette brand, harms of second smoke, physical symptoms, difficulty in quitting smoking, benefits of smoking and smoking policy. These findings resonate with the study by Kam *et al.* (2016b), investigating the contents of communication about substance use in high school students and identifying three types of communication such as informational (e.g. who smokes), persuasive (e.g. to promote or discourage use) and relational messages (e.g. joke about use). Although the present study does not find all of these three message types, it is found that peer-to-peer communication contained informational and relational messages.

With regard to communication with smoking family, three-quarters of college students indicated "no communication." Yet, those who engaged in conversations with smoking family reported the most prevalence topic as disease caused by smoking, followed by physical symptoms, difficulty in quitting smoking, complaints about smoking, feelings about smoking, harms of second hand smoke, cigarette brand, benefits of smoking and smoking policy. Communication with smoking family implies informational and persuasive messages (Kam *et al.*, 2016b). These findings suggest that peer-to-peer communication covers a wide range of topics associated with both positive and negative aspects of smoking behavior, whereas communication with smoking family focuses more on negative health consequences of smoking. The specificity of communication is critical to consider when conducting tobacco prevention intervention (Kam and Middleton, 2013; Miller-Day and Kam, 2010).

The overall findings suggest that health campaign researchers and practitioner should consider the smoking status of friends and family members when designing the communication-based tobacco prevention intervention targeting college students. Not only does the differential effects of friends and family matter for prevention research, but it is also imperative to take into account the status of smoking in promoting anti-smoking perceptions and attitudes, as well as preventing smoking behaviors. The key to success in prevention research should consider "when" and "how" to design and implement intervention.

Future direction and limitations

While these results are promising, findings suggest several areas for future research that should investigate how the content of communication protects or reinforces college students' smoking behaviors. Future research should delve into investigating the effects of specific contents of communication that are identified in the present study on college students' behavioral outcomes, considering that the current study is limited by presenting the descriptive findings of the communication contents. Also, given that this study focuses on the effects of having smoking family members with the term, family members, broadly defined, it does not account for different types of relationships in family. For example, one can argue that influences of smoking family members (e.g. parents, adult relatives, siblings) differ. Further investigation is needed to take account of family structure and relationship in relation to college student smoking study.

Although the present study is guided by two different theoretical frameworks, the findings are limited in mostly comparisons between having smoking friends and family in relation to college students' behavioral beliefs about smoking, cultural normative beliefs, pro-social injunctive norms, attitudes, intentions and smoking behaviors, as well as the associations

between frequent communication about smoking and college students' outcomes. Future research should test the processes of behavioral changes as recommended by IBM. For example, testing all of IBM key constructs including the construct of personal agency (e.g. perceived control and self-efficacy) with longitudinal data would provide casual explanation.

This study is also limited by the convenient sample of college students from one university. Also, the sample consisted of mainly freshmen (average age = 18.69 years), who are more likely to be influenced by friends than older students. Although we controlled for the year in education in the main analyses, research can benefit from more data collection for generalization to the target population. Similarly, the number of smokers is very small which did not allow for further analysis or comparison of the participating smoker and nonsmokers. Future researchers should make more efforts to collect data using the stratified random sampling method to improve the generalization of college student smoking socialization processes and smoking behaviors. Lastly, the current study uses the cross-sectional data. Caution should be taken when interpreting the reported relationships that no causal relationships can be claimed.

Conclusion

Guided by IBM, the present study examined the effects of having smoking friends and family on college student smoking perceptions and behaviors. The present study's findings highlight the vital roles of friends' influence for college students' smoking behaviors. Furthermore, contents of communication with smoking friends and non-smoking friends, as well as smoking family members and non-smoking family members were explored. The formative findings suggest that communication about smoking vary depending on the smoking status of friends and family members. It is recommended that prevention researchers and practitioners should take into account smoking socialization processes in relation to different types of interpersonal relationships when developing tobacco prevention and cessation interventions. Researchers also need to take the specificity of communication into consideration for an effective tobacco prevention intervention. The overall findings suggest that communication-based intervention can help better equip college students with persuasive communication strategies that prevent tobacco use by promoting more effective conversations with friends.

References

Ajzen, I. (2011), "Theory of planned behavior", in Ajzen, I., Van Lange, P., Kruglanski, A. and Higgins, E.T. (Eds), *Handbook of Theories of Social Psychology*, Sage, Thousand Oaks, California, Vol. 1.

An, L.C., Perry, C.L., Lein, E.B., Klatt, C., Farley, D.M., Bliss, R.L., Hennrikus, D.J., Pallonen, U.E., Lando, H.A., Ahluwalia, J.S. and Ehlinger, E.P. (2006), "Strategies for increasing adherence to an online smoking cessation intervention for college students", *Nicotine and Tobacco Research*, Vol. 8 No. Suppl_1, pp. S7-S12.

Asfar, T., Ward, K.D., Eissenberg, T. and Maziak, W. (2005), "Comparison of patterns of use, beliefs, and attitudes related to waterpipe between beginning and established smokers", *BMC Public Health*, Vol. 5 No. 1, pp. 19-27.

Baxter, L., Egbert, N. and Ho, E. (2008), "Everyday health communication experiences of college students", *Journal of American College Health*, Vol. 56 No. 4, pp. 427-436.

Borsari, B.E. and Carey, K.B. (1999), "Understanding fraternity drinking: five recurring themes in the literature, 1980–1998", *Journal of American College Health*, Vol. 48 No. 1, pp. 30-37.

Borsari, B.E. and Carey, K.B. (2003), "Descriptive and injunctive norms in college drinking: a meta-analytic integration", *Journal of Studies on Alcohol*, Vol. 64 No. 3, pp. 331-341.

Brook, D.W., Brook, J.S., Rubenstone, E., Zhang, C. and Saar, N.S. (2011), "Developmental associations between externalizing behaviors, peer delinquency, drug use, perceived neighborhood crime, and violent behavior in urban communities", *Aggressive Behavior*, Vol. 37 No. 4, pp. 349-361.

Center for Disease Control (2015), *Current Cigarette Smoking Among Adults in the United States*, available at: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm (accessed 5 February 2020).

Choi, H.J., Hecht, M.L. and Smith, R.A. (2017), "Investigating the potential impact of social talk on prevention through social networks: the relationships between social talk and refusal self-efficacy and norms", *Prevention Science*, Vol. 18 No. 4, pp. 459-468.

Cooper, C.R. and Cooper, R.G. (1992), "Links between adolescents' relationships with their parents and peers: models, evidence, and mechanisms", in Parke, R.D. and Ladd, G.W. (Eds), *Family-Peer Relationships: Modes of Linkage*, Routledge, New York, NY, pp. 135-158.

Duan, L., Chou, C., Andreeva, V.A. and Pentz, M.A. (2009), "Trajectories of peer social influences as long-term predictors of drug use from early through late adolescence", *Journal of Youth and Adolescence*, Vol. 38 No. 3, pp. 454-465.

Dunlop, S.M., Cotter, T. and Perez, D. (2014), "When your smoking is not just about you: antismoking advertising, interpersonal pressure, and quitting outcomes", *Journal of Health Communication*, Vol. 19 No. 1, pp. 41-56.

Fishbein, M. and Ajzen, I. (2010), *Predicting and Changing Behavior: The Reasoned Action Approach*, Taylor and Francis, New York, NY.

Fujimoto, K. and Valente, T.W. (2012), "Decomposing the components of friendship and friends' influence on adolescent drinking and smoking", *Journal of Adolescent Health*, Vol. 51 No. 2, pp. 136-143.

Guo, J., Chung, I.J., Hill, K.G., Hawkins, J.D., Catalano, R.F. and Abbott, R.D. (2002), "Developmental relationships between adolescent substance use and risky sexual behavior in young adulthood", *Journal of Adolescent Health*, Vol. 31 No. 4, pp. 354-362.

Hall, J.A. and Valente, T.W. (2007), "Adolescent smoking networks: the effects of influence and selection on future smoking", *Addictive Behaviors*, Vol. 32 No. 12, pp. 3054-3059.

Hanewinkel, R., Morgenstern, M., Tanski, S.E. and Sargent, J.D. (2008), "Longitudinal study of parental movie restriction on teen smoking and drinking in Germany", *Addiction*, Vol. 103 No. 10, pp. 722-1730.

Henriksen, L. and Jackson, C. (1998), "Anti-smoking socialization: relationship to parent and child smoking status", *Health Communication*, Vol. 10 No. 1, pp. 87-101.

Hestick, H., Perrino, S.C., Rhodes, W.A. and Sydnor, K.D. (2001), "Trial and lifetime smoking risks among African American college students", *Journal of American College Health*, Vol. 49 No. 5, pp. 213-219.

Hill, A.J., Boudreau, F., Amyot, É., Déry, D. and Godin, G. (1997), "Predicting the stages of smoking acquisition according to the theory of planned behavior", *Journal of Adolescent Health*, Vol. 21 No. 2, pp. 107-115.

Jeong, M., Tan, A.S., Brennan, E., Gibson, L. and Hornik, R.C. (2015), "Talking about quitting: interpersonal communication as a mediator of campaign effects on smokers' quit behaviors", *Journal of Health Communication*, Vol. 20 No. 10, pp. 1196-1205.

Kam, J.A. and Middleton, A.V. (2013), "The associations between parents' references to their own past substance use and youth's substance use beliefs and behaviors: a comparison of Latino and European American youth", *Human Communication Research*, Vol. 39 No. 2, pp. 208-229.

Kam, J.A. and Miller-Day, M. (2017), "Introduction to special issue", *Journal of Family Communication*, Vol. 17 No. 1, pp. 1-14.

Kam, J.A. and Wang, N. (2015), "Longitudinal effects of best-friend communication against substance use for Latino and non-Latino White early adolescents", *Journal of Research on Adolescence*, Vol. 25 No. 3, pp. 534-550.

Kam, J.A., Basinger, E. and Abendschein, B. (2017), "Do adolescent perceptions of parents' alcohol consumption undermine or enhance what parents say about alcohol? The interaction between verbal and nonverbal messages", *Communication Research*, Vol. 44 No. 3, pp. 319-347.

Kam, J.A., Figueroa-Caballero, A. and Basinger, E.D. (2016a), "Measuring alcohol-specific communication with friends: conceptualizing and operationalizing communication as multidimensional", *Health Communication*, Vol. 31 No. 6, pp. 695-706.

Kam, J.A., Krieger, J.L., Basinger, E.D. and Figueroa-Caballero, A. (2016b), "What do high school students say when they talk to their friends about substance use? Exploring the content of substance-use-specific communication with friends", *Health Communication*, Vol. 31 No. 5, pp. 522-535.

Kasprzyk, D., Montaño, D.E. and Fishbein, M. (1998), "Application of an integrated behavioral model to predict condom use: a prospective study among high HIV risk groups 1", *Journal of Applied Social Psychology*, Vol. 28 No. 17, pp. 1557-1583.

Kelly, A.B., O'flaherty, M., Connor, J.P., Homel, R., Toumbourou, J.W., Patton, G.C. and Williams, J. (2011), "The influence of parents, siblings and peers on pre-and early-teen smoking: a multilevel model", *Drug and Alcohol Review*, Vol. 30 No. 4, pp. 381-387.

Kelly, K.J., Comello, M.L.G. and Hunn, L.C. (2002), "Parent-child communication, perceived sanctions against drugs use, and youth drug involvement", *Adolescence*, Vol. 37 No. 148, pp. 775-787.

Komro, K.A., Maldonado-Molina, M.M., Tobler, A.L., Bonds, J.R. and Muller, K.E. (2007), "Effects of home access and availability of alcohol on young adolescents' alcohol use", *Addiction*, Vol. 102 No. 10, pp. 1597-1608.

Kreppner, K. and Lerner, R.M. (2013), *Family Systems and Life-Span Development*, Psychology Press, London.

Lapinski, M.K. and Rimal, R.N. (2005), "An explication of social norms", *Communication Theory*, Vol. 15 No. 2, pp. 127-147.

Lopez, J.S., Martínez, J.M., Martín, A., Martín, J.M., Martín, M.J. and Scandroglio, B. (2001), "An exploratory multivariate approach to drug consumption patterns in young people based on primary socialization theory", *Substance Use and Misuse*, Vol. 36 No. 12, pp. 1611-1649.

Lu, Y. (2015), "The roles of communication, risk perceptions, and emotions in Chinese Americans' smoking decisions", Unpublished dissertation, Pennsylvania State University, University Park, Pennsylvania, available at: https://etda.libraries.psu.edu/catalog/26192 (accessed 6 February 2020).

Lu, Y., Shin, Y., Gitau, M.W., Njoroge, M.W., Gitau, P. and Temple, J.R. (2020), "Application of the theory of planned behavior to predict smoking intentions: cross-cultural comparison of Kenyan and American young adults", *Health Education Research*, Vol. 36 No. 1, pp. 140-150.

Mackenzie, S., Wiegel, J.R., Mundt, M., Brown, D., Saewyc, E., Heiligenstein, E., Harahan, B. and Fleming, M. (2011), "Depression and suicide ideation among students accessing campus health care", *American Journal of Orthopsychiatry*, Vol. 81 No. 1, pp. 101-107.

Miller-Day, M. (2008), "Talking to youth about drugs: what do youth say about parental strategies?", *Family Relations*, Vol. 57 No. 1, pp. 1-12.

Miller-Day, M. and Kam, J.A. (2010), "More than just openness: developing and validating a measure of targeted parent–child communication about alcohol", *Health Communication*, Vol. 25 No. 4, pp. 293-302.

Montaño, D.E. and Kasprzyk, D. (2015), "Theory of reasoned action, theory of planned behavior, and the integrated behavioral model", in Glanz, K., Rimer, B.K. and Viswanath, K. (Eds), *Health Behavior: Theory, Research and Practice*, Wiley, Hoboken, New Jersey, pp. 67-96.

Moran, S., Wechsler, H. and Rigotti, N.A. (2004), "Social smoking among US college students", *Pediatrics*, Vol. 114 No. 4, pp. 1028-1034.

Muthén, L.K. and Muthén, B.O. (1998–2017), *Mplus User's Guide*, 8th ed., Muthén and Muthén, Los Angeles, California.

Myers, M.G., MacPherson, L., McCarthy, D.M. and Brown, S.A. (2003), "Constructing a short form of the smoking consequences questionnaire with adolescents and young adults", *Psychological Assessment*, Vol. 15 No. 2, pp. 163-172.

Neuwirth, K. and Frederick, E. (2004), "Peer and social influence on opinion expression: combining the theories of planned behavior and the spiral of silence", *Communication Research*, Vol. 31 No. 6, pp. 669-703.

Nichter, M., Nichter, M., Carkoglu, A. and Lloyd-Richardson, E. and Tobacco Etiology Research Network (2010), "Smoking and drinking among college students: 'it's a package deal'", *Drug and Alcohol Dependence*, Vol. 106 No. 1, pp. 16-20.

Oetting, E.R. and Donnermeyer, J.F. (1998), "Primary socialization theory: the etiology of drug use and deviance: I", *Substance Use and Misuse*, Vol. 33 No. 4, pp. 995-1026.

Patterson, F., Lerman, C., Kaufmann, V.G., Neuner, G.A. and Audrain-McGovern, J. (2004), "Cigarette smoking practices among American college students: review and future directions", *Journal of American College Health*, Vol. 52 No. 5, pp. 203-212.

Pettigrew, J., Miller-Day, M., Shin, Y., Krieger, J.L., Hecht, M.L. and Graham, J.W. (2018), "Parental messages about substance use in early adolescence: extending a model of drug-talk styles", *Health Communication*, Vol. 33 No. 3, pp. 349-358.

Pettigrew, J., Shin, Y., Stein, J.B. and Van Raalte, L.J. (2017), "Family communication and adolescent alcohol use in Nicaragua, Central America: a test of primary socialization theory", *Journal of Family Communication*, Vol. 17 No. 1, pp. 33-48.

Prentice, D.A. and Miller, D.T. (1993), "Pluralistic ignorance and alcohol use on campus: some consequences of misperceiving the social norm", *Journal of Personality and Social Psychology*, Vol. 64 No. 2, pp. 243-256.

Primack, B.A., Shensa, A., Kim, K.H., Carroll, M.V., Hoban, M.T., Leino, E.V., Eissengberg, T., Dachille, K.H. and Fine, M.J. (2013), "Waterpipe smoking among US university students", *Nicotine and Tobacco Research*, Vol. 15 No. 1, pp. 29-35.

Real, K. and Rimal, R.N. (2007), "Friends talk to friends about drinking: exploring the role of peer communication in the theory of normative social behavior", *Health Communication*, Vol. 22 No. 2, pp. 169-180.

Ridner, S.L., Staten, R.R. and Danner, F.W. (2005), "Smoking and depressive symptoms in a college population", *The Journal of School Nursing*, Vol. 21 No. 4, pp. 229-235.

Roupa, Z., Vasilopoulos, A., Hatzoglou, C., Gourgoulianis, K., Kefaliakos, A., Mechili, E.A., Archangelidi, O., Mentzakis, E. and Diomidous, M. (2016), "The effect of family and social environment on smoking behaviour in adolescence", *European Scientific Journal*, Vol. 12 No. 2, pp. 62-80.

Schulenberg, J.E., Johnston, L.D., O'Malley, P.M., Bachman, J.G., Miech, R.A. and Patrick, M.E. (2016), *Monitoring the Future National Survey Results on Drug Use, 1975–2018: Volume II, College Students and Adults Ages 19–60*, Institute for Social Research, The University of Michigan, Ann Arbor, Michigan, available at: http://www.monitoringthefuture.org//pubs/monographs/mtf-vol2_2018.pdf (accessed 6 February 2020).

Shin, Y. and Miller-Day, M. (2017), "A longitudinal study of parental anti-substance-use socialization for early adolescents' substance-use behaviors", *Communication Monographs*, Vol. 84 No. 3, pp. 277-297.

Shin, Y., Lee, J.K., Lu, Y. and Hecht, M.L. (2016), "Exploring parental influence on the progression of alcohol use in Mexican-heritage youth: a latent transition analysis", *Prevention Science*, Vol. 17 No. 2, pp. 188-198.

Shin, Y., Lu, Y. and Pettigrew, J. (2020), "Is parent-adolescent drug talk always protective? Testing a new scale of drug talk styles in relation to adolescent personal norms, parental injunctive norms, substance use intentions, and behaviors", *Health Communication*, Vol. 35 No. 1, pp. 18-25.

Shin, Y., Miller-Day, M. and Hecht, M.L. (2019a), "Differential effects of parental 'drug talk' styles and family communication environments on adolescent substance use", *Health Communication*, Vol. 34 No. 8, pp. 872-880.

Shin, Y., Pettigrew, J., Miller-Day, M., Hecht, M.L. and Krieger, J.L. (2019b), "Trends of parent– adolescent drug talk styles in early adolescence", *Health Communication*, Vol. 34 No. 8, pp. 801-810.

Simons-Morton, B., Haynie, D.L., Crump, A.D., Eitel, P. and Saylor, K.E. (2001), "Peer and parent influences on smoking and drinking among early adolescents", *Health Education and Behavior*, Vol. 28 No. 1, pp. 95-107.

Substance Abuse and Mental Health Services Administration (2017), *Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*, (HHS Publication No. SMA 18-5068, NSDUH Series H-53), Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Rockville, Maryland, available at: https://www.samhsa.gov/data/report/key-substance-use-and-mental-health-indicators-united-states-results-2016-national-survey (accessed 5 February 2020).

Sutfin, E.L., Reboussin, B.A., McCoy, T.P. and Wolfson, M. (2009), "Are college student smokers really a homogeneous group? A latent class analysis of college student smokers", *Nicotine and Tobacco Research*, Vol. 11 No. 4, pp. 444-454.

Thrasher, J.F., Abad-Vivero, E.N., Huang, L., O'Connor, R.J., Hammond, D., Bansal-Travers, M., Yong, H.H., Borland, R., Markovsky, B. and Hardin, J. (2016), "Interpersonal communication about pictorial health warnings on cigarette packages: policy-related influences and relationships with smoking cessation attempts", *Social Science and Medicine*, Vol. 164 No. 1, pp. 141-149.

Van De Ven, M.O.M., Engels, R.C.M.E., Otten, R. and Van Den Eijnden, R.J.J.M. (2007), "A longitudinal test of the theory of planned behavior predicting smoking onset among asthmatic and non-asthmatic adolescents", *Journal of Behavioral Medicine*, Vol. 30 No. 5, pp. 435-445.

Vuolo, M. and Staff, J. (2013), "Parent and child cigarette use: a longitudinal, multigenerational Study", *Pediatrics*, Vol. 132 No. 3, pp. 568-577.

Wechsler, H., Kuh, G. and Davenport, A.E. (1996), "Fraternities, sororities and binge drinking", *NASPA Journal*, Vol. 33 No. 4, pp. 260-279.

Wechsler, H., Molnar, B.E., Davenport, A.E. and Baer, J.S. (1999), "College alcohol use: a full or empty glass?", *Journal of American College Health*, Vol. 47 No. 6, pp. 247-252.

Werch, C.E., Pappas, D.M., Carlson, J.M., DiClemente, C.C., Chally, P.S. and Sinder, J.A. (2000), "Results of a social norm intervention to prevent binge drinking among first-year residential college student", *Journal of American College Health*, Vol. 49 No. 2, pp. 85-92.

Yanovitzky, I., Stewart, L.P. and Lederman, L.C. (2006), "Social distance, perceived drinking by peers, and alcohol use by college students", *Health Communication*, Vol. 19 No. 1, pp. 1-10.

Corresponding author
YoungJu Shin can be contacted at: Youngju.Shin@asu.edu

Received 25 October 2020
Revised 8 March 2021
29 April 2021
Accepted 21 July 2021

Exploring the social-ecological factors related to physical activity participation among Black, Asian and minority ethnic immigrants

Godi Katito and Emma Davies
Psychology, Oxford Brookes University, Oxford, UK

Abstract

Purpose – Despite the health benefits of physical activity (PA), participation rates Black, Asian and minority ethnic (BAME) adults in the United Kingdom (UK) are low in comparison to the general population. This study aimed to explore the social-ecological factors related to PA participation among BAME immigrants.

Design/methodology/approach – Semi-structured interviews were carried out with 12 purposively selected adults from the BAME populace residing in one postcode district of a city in southern England.

Findings – The three main themes that developed from this study demonstrated that the barriers to PA participation among BAME were perceived to exist at intrapersonal, and environmental (social and physical) levels.

Research limitations/implications – Understanding these unique social-ecological factors may assist in intervention development.

Originality/value – Prominent barriers included intrapersonal factors such as deportation fear and cultural beliefs; and environmental factors such as the cost of accessing PA facilities. Length of residency appeared to be related to increased PA.

Keywords Social-ecological model, Black and ethnic minorities, Barriers, Physical activity participation, Culture

Paper type Research paper

Introduction

It is widely acknowledged that physical activity (PA) participation has numerous psychological and physical benefits (McKinney *et al.*, 2016). For example, PA has positive impacts on the reduction and prevention of some cancers, coronary heart disease, stroke and diabetes (Gąsiewski, 2017; McKinney *et al.*, 2016), the prevention and management of obesity (Friedrich, 2017), reduction in falls amongst older individuals, decrease of osteoporosis and management of arthritis (Nelson *et al.*, 2007). PA has numerous psychological benefits such as increased self-esteem, improved confidence, enhanced wellbeing and reductions in stress, anxiety and depression (Pate, 1995; Warburton, 2006). The UK chief medical officer's guidelines recommend that an adult should at least engage in moderate-to-vigorous PA activity for not less than 150 min per week for positive physical and mental health (Gov.uk, 2021).

Inactive lifestyles have contributed to increasing rates of obesity, heart disease, stroke, diabetes, depression, cancer, and poor mental health in the UK, especially among Black, Asian and minority ethnic groups (BAME) (Stapelberg *et al.*, 2011; Warburton, 2006). For example, coronary heart disease prevalence is 6 and 8%, respectively higher in men from Indian and Pakistani ethnic groups in comparison to the majority population (Bhf.org.uk, 2010; Chaturvedi, 2003), hypertension is three to four times higher in the Black African population, and the highest prevalence of stroke is in the Black Caribbean men, Bangladeshi women and Pakistani women (Bhf.org.uk, 2010; Chaturvedi, 2003). Bangladeshi and Black Caribbean women are over three times more likely than the general population to get Type 2 diabetes (Bhf.org.uk, 2010; Chaturvedi, 2003).

Health Education
Vol. 121 No. 6, 2021
pp. 614-631

0965-4283
DOI 10.1108/HE-01-2021-0014

There is an inverse relationship between the levels of PA and health status, and it has been observed that individuals who regularly engage in PA face fewer health risks than those who are physically inactive (McPhee *et al.*, 2016). Despite the critical health benefits, one can experience from regular exercise such as the reduced risk of cardiovascular-related morbidity and prevention of chronic diseases, PA participation levels among BAME populations remains low in comparison to the general population (Durstine *et al.*, 2013; Kokkinos, 2012). For example, in 2017/18 the proportion of physically active BAME people in the UK was found to range from between 55 and 60%, which is comparatively lower than the national average of 62% (Gov.uk, 2019). The UK government have increased its commitment towards undertakings aimed at improving health and PA participation. (For example, "Uniting the Movement") (Sportengland.org, 2021). However, Results from latest surveys in the UK show that the percentage of BAME individuals engage in PA is still lower than the national average (gov.uk, 2021), and it appears that these endeavours have had no significant impact on shifting BAME PA participation trends despite the evident relationship between the high levels of health disparities and the low PA participation rates in these groups (Durstine *et al.*, 2013).

Understanding of PA participation barriers among BAME adults can serve as an invaluable tool for facilitating effective strategies to increase PA participation. One particular BAME group that may be participating in PA at even lower rates are those who have immigrated to the UK (Bhatnagar *et al.*, 2015). There are numerous reasons why immigrants' PA participation rates are low compared to the general population. Delavari *et al.* (2013) suggest that the differences may be possibly linked to acculturation, that is the process of cultural, psychological, and social changes that occur during their adaptation into a new culture. Acculturation has been identified as a significant construct in addressing the needs of diverse populations and explaining differences in health experiences between ethnic groups (Abraído-Lanza *et al.*, 2006; Schutt and Mejía, 2016).

Previous studies investigating the relationship between acculturation and PA participation have mainly been carried out on ethnic minority immigrant groups outside the UK, mainly in the United States of America (Evenson *et al.*, 2004; Liu *et al.*, 2009). However, studies investigating the barriers of PA among BAME immigrants, including the relationship between acculturation indicators such as length of residency and PA participation, are currently missing in the UK. Therefore, it is essential to investigate if there is a relationship between the PA activity disparities and the health inequalities among the BAME immigrants and the process of cultural, psychological, and social changes that occur during their adaptation into a new culture. Understanding this relationship can be a critical strategy of stimulating an increase in PA participation and addressing the health inequalities among the BAME immigrants.

Theoretical framework

There is a complex reciprocal interaction between multiple factors from different domains that influence an individual's PA behaviour (Bolívar *et al.*, 2010). In order to tailor PA interventions effectively, psychological, socio-cultural and environmental factors should be investigated (Bopp *et al.*, 2006). Factors such as culture, environment and past experiences are critical in the development of an individual's perceptions and characteristics (Iwelunmor, 2013).

This study used The Social-Ecological Model as a theoretical framework (Stokols, 1996) to define barriers to PA participation among adults from BAME immigrants residing in one postcode district of a city in southern England. Social-ecological models consider both the physical and social environment of an individual and do not merely exclusively centre on an individual's characteristics. It, therefore, presents researchers with a comprehensive

structure for distinguishing the barriers to PA. Thus, this study aimed to explore the social-ecological factors related to PA participation among BAME immigrants.

Methodology

Research design

Semi-structured interviews were utilised to understand the experiences of BAME immigrants in the UK and identify the barriers to PA participation.

Participants

Critical purposive sampling, a sampling method that adds validity when the proposed sample is too expansive for the investigator to manage was used in this study to recruit a diverse group of 12 individuals from BAME immigrant backgrounds (Cohen *et al.*, 2013). The constrained timeframe for the research, including the known challenges of recruiting individuals from hard-to-reach groups such as BAME (Creswell, 2005; Leavy, 2015), were additional factors that influenced the sampling method choice. Deliberately drawing participants from diverse cultural backgrounds, nationalities, ages and diverse reasons for migration was intended to minimise the chances of inferring that commonalities among the participants might have been caused by them being part of a cohort (Kukull and Ganguli, 2012; Robinson, 2014).

Participants meeting the recruitment criterion were recruited using both face-to-face interaction and snowballing methods, including non-academic college staff via various departments at the primary researcher's workplace. The inclusion criterion for the study required that a participant was an adult immigrant currently residing in one postcode district of a city in southern England and self-identified as BAME. This particular postcode district was selected as it is a diverse area, where for example, 64% of people classify themselves as white in this postcode district compared to 81.9% as a national average (Postcodearea.co.uk, 2021). Furthermore, there are several immigrant groups from various regions of the world within this community, again with a wider range of nationalities than the national average. Thus, there is a need to provide accessible physical activities to a diverse group of people in this area. Participants had to confirm that they were comfortable and able to communicate adequately well in English to take part in the interviews (see Table 1). The term BAME in this study refers to individuals from mixed, black, Asian and other non-white ethnicities (London.gov.uk, 2021).

Data collection

Semi-structured interviews were conducted in English and lasted between 30 and 60 min.

Procedures

The study was conducted following the British Psychological Society ethical guidelines following the approval of the Psychology Research Ethics committee at Oxford Brookes University. The interviews were conducted in settings that were settled upon by both the researcher and the participants. For example, the participants' homes and workplaces. The interviews were audio-recorded and were then transcribed verbatim by the primary researcher. An interview schedule was used during the interviews (see Table 2).

Analytical method

The data analysis began immediately after the first interview was carried out. The data analysis followed a 6-step deductive thematic analysis framework (Braun and Clarke, 2006).

Name	Country of origin	Age	Gender	Marital status	Number of children	Reason for migration	Education	Religion	Age at migration	Years of residency in the UK
P1	Kenya	50	Female	Married	3	Employment	Primary	Christian	30	20
P2	Kenya	43	Male	Single	4	Employment	Secondary	Christian	22	21
P3	Kenya	42	Male	Single	1	Academic research	Secondary	Christian	32	10
P4	Burundi	40	Male	Married	3	Political asylum	Secondary	Christian	20	20
P5	Rwanda	44	Male	Married	4	Political asylum	Secondary	Christian	23	21
P6	Philippines	28	Female	Married	1	Employment	Secondary	Christian	23	5
P7	Burundi	40	Female	Married	1	Political asylum	University	Christian	20	20
P8	Philippines	29	Female	Single	0	To join parents	University	Christian	17	12
P9	Nepal	44	Female	Single	5	To join spouse	Primary	Christian	37	7
P10	Thailand	38	Female	Married	3	Marriage	Secondary	Buddhist	20	18
P11	Thailand	43	Female	Married	0	Marriage	Primary	None	33	10
P12	Jamaica	33	Male	Married	2	To join parents	Secondary	Christian	19	24

Table 1.
Participants' information

Interview questions
Can you start by briefly telling me about your physical activity participation when you first arrived in the United Kingdom including the type of physical activity you engaged in and how frequently you engaged in physical activity participation then?
How would you describe your physical activity participation in the previous year and is there any contrast between the nature of your physical activity participation when you initially arrived in the United Kingdom and the previous year?
How would you describe your cultural experience in the United Kingdom/England to this point?
How would you describe the influence of your cultural experience in the United Kingdom in the way you feel and behave towards physical activity participation?
Can you describe some of the factors that you think have facilitated or hindered your adaptation into the British society and how these elements have impacted your physical activity participation (how and why)? (E.g. beliefs, looks, character, language knowledge, gender, religion)
Are there any behavioural or attitudinal changes that you have seen in yourself since you began residing in the United Kingdom?
If yes, do you think of the changes as positive or negative and what are the changes? Moreover, how have they impacted your physical activity participation?

Table 2.
Interview questions

The first author listened to the audio-recorded data immediately after each interview and wrote down salient points, in order to familiarise themselves with the data. The first author had the opportunity to listen to the audio-recorded data for the second time during the transcription of the audio-recorded data and read and re-read the transcripts after completing the transcriptions. Two of the twelve interview transcripts were double coded by the two authors to ensure data reliability and that the conclusions were not arbitrary or biased in any way, and the remaining ten transcripts were coded by the first author. The identification of the existence of any similarities between the coded data was then carried out, and the codes were then sorted and gathered into provisional themes. The provisional themes were then reviewed, and once a coherent pattern was established to have developed after reading the codes for each of the provisional themes, provisional themes with similar patterns were then gathered into different categories called sub-themes. The decision of what aspects of the research objective the sub-themes fit under was reached, and the sub-themes were categorised into clearly defined and named themes (see Figure 1 for an illustration of how themes were generated). Consistent comparison of the participants' experiences was carried out to guarantee that all the different viewpoints of the participants were represented in the deductive thematic analysis.

Results

The two main themes demonstrated that the barriers to PA participation among the BAME immigrants in this study were perceived to exist at an intrapersonal and environmental (social and physical) levels. The main sub-themes that were identified as determinants of PA participation were categorised under these the main themes depending on their level of influence within the socio-ecological framework (see Table 3).

Intrapersonal barriers

Intrapersonal barriers of PA included factors that were experienced by the participants at the individual level and included individual characteristics that influenced PA participation.

Perception of physical activity. Perception included the participants' beliefs about PA participation and appeared to play an integral role in influencing attitudes towards PA and, consequently, their PA participation.

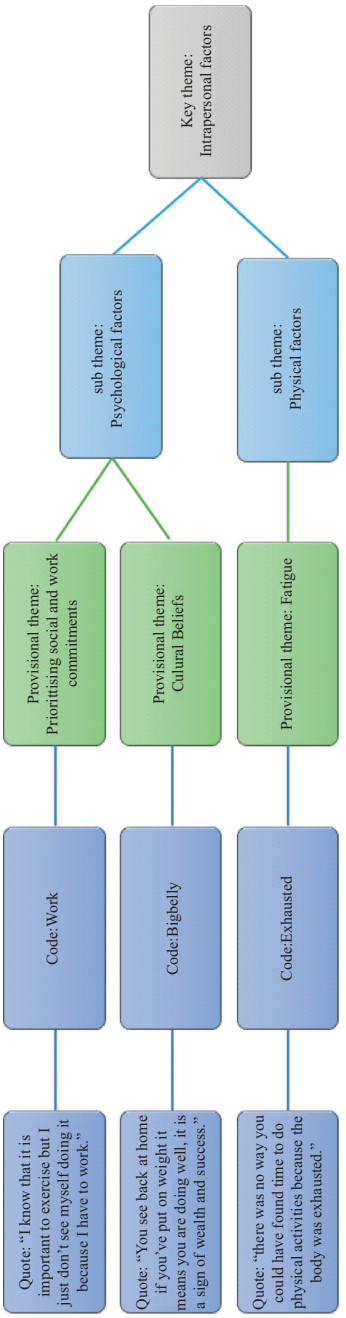


Figure 1.
An illustration of how themes were generated

Table 3.
A summary of themes and sub-themes

Theme	Sub-themes
Intrapersonal PA participation determinants	*Psychological factors* Perception, cultural norms and expectations, prioritising social and work commitments, lack of motivation and fear of deportation *Physical factors* Bodyweight
Environmental PA participation determinants (Social and physical)	*Physical-environmental factors* Weather and subscription cost *Social-environmental factors* Family and friend's support and attitude towards PA. Facilities and neighbourhood safety concerns (Fear and expectation of discrimination), Duration of residency and the behaviour of people in one's neighbourhood

The participants' perceptions of PA were varied and mostly negative. Some participants perceived PA as unnecessary and therefore, did not see any need to engage in PA.

> You are already married so, why train? (P12, 33, M, Jamaica)

P12's statement appears to highlight how the salacious undertones that are occasionally linked to PA participation, portraying PA participation as a strategy for making your body attractive for enticement purposes, might hinder PA participation among married individuals.

Likewise, some of the outcomes related to PA participation, such as weight loss, were viewed as undesirable.

> I do not want to get slimmer because I think I am slim enough (P11, 43, F, Thailand)

Limited exposure to PA participation and the absence of emphasis on PA participation in their countries of origins appeared to influence how the participants conceptualised PA participation. It appeared that most participants conceptualised PA participation as a formal activity that required one to attend unfamiliar environments such as gymnasiums and recreational centres. It appeared that most participants displayed a lack of awareness that PA participation does not need to be a formal activity, and PA participation could occur in familiar environments such as their homes or even their places of work. Conceptualising PA participation as a formal activity and associating it to unfamiliar environments posed a participation barrier for many of BAME participants. PA participation was perceived as western culture, and many participants found it challenging to integrate it into their everyday lives.

> When I came over here, I saw people going to the gym, and it was funny to me, it was kind of strange, I thought these are white people, this is the thing that they do. Right? Because where they live, they do not run out the house and get firewood; this is their lifestyle, you know? And they have to do something to keep them in shape, to keep them looking slimmer like us (P12, 33, M, Jamaica)

> As a new migrant, I did not know about gyms, and back in our country, we do not use gyms and all those things (P7, 40, F, Burundi)

The participants appeared to be aware of the curative benefits of PA participation, and various individuals reported that they only started engaging in PA as a cure for their ailments following their doctors' recommendations. However, it appeared that many participants were

unaware or did not consider PA participation as a critical preventative device for diseases and would not contemplate engaging in PA for its disease-prevention benefits.

> While I was considering my job as part of my exercise, my doctor told me that I do not use all my muscles, and I just used the same muscles every day and it has become a routine, and I am not using other body muscles at all. So, I need to get out there and do some exercises (P1, 50, F, Kenya)

> I went to the doctor and he said I had to exercise to be able to get rid of my problem I had. I think when they told me that, I believe that is what made me think twice like I need to really be physically fit for my health (P7, 40, F, Burundi)

Fear of deportation. Numerous participants described how the distress caused by fear of deportation had caused them to keep to themselves and limit their interactions and activities with people outside their community. Participants described how the perpetual fear of deportation led them to prioritise work and make as much money as they could while awaiting their immigration status application determination, leaving them with no energy or time to engage in PA.

> All these things make you live in fear and you do not feel really settled here. So, you think of investing back at home in case anything happens to you here. Therefore, the focus is not really on physical activity participation (P5, 44, M, Rwanda)

> You do not want to waste time engaging in physical activity, and yet you do not know about tomorrow (P1, 50, F, Kenya)

Cultural beliefs. Some of the beliefs originating from the participants' cultures, mainly the African cultures in this study, were reported to perpetuate the notion that PA participation was harmful or undesirable. For example, the belief that gaining weight is a sign of good health and success in life appeared to reinforce the notion that PA participation is harmful due to the association between regular PA participation and weight loss. Losing weight or having a slim body was viewed as an undesirable outcome and the desire to have a big body over a slim body acted as a barrier to PA participation among the individuals from the African cultures.

> It is true if you have a big belly back at home, it is associated to doing well and an office-based job which pays well. A big belly here is a big deal, but back at home, it is a status symbol that you are doing well in life. And that is why a man with a big belly back at home is more likely to attract attention from females more because he is considered to have a lot of money. Heads will not turn because you have a six-pack, or you are ripped, nobody cares. They will be like, that is a poor man (P4, 40, M, Burundi)

Some cultural beliefs from non-African countries similarly appeared to propagate some stereotypes that negatively influenced PA participation.

> Most of the time the women stay in the house to do household chores and look after the kids. It is more of a cultural thing. It is a bad thing if you do not attend to your family needs first (P8, 29, F, Philippines)

Cultural norms and expectations and prioritising social and work commitments. Some of the cultural norms emanating from some of the participants' cultures, seemed to pose a great PA participation barrier. Many participants revealed that they were now regarded as wealthy individuals back in their countries because the belief that individuals residing and working in Europe are wealthy was a widespread belief embedded in their communities. There was an expectation for them to take care of both their immediate and extended family members, which meant that they had to work additional hours to meet such expectations or risk losing face in their community. Therefore, they found it quite challenging to meet such expectations and likewise engage in PA.

> You know the type of pressure you face when you are told that some of your age mates from your village who live in Africa have bought land and built two or three houses while you the man in Europe have nothing to show. Imagine going back there and telling them that you do not own a piece of land, but at least you are physically fit? People will think that you are mad. That is why the focus is always on working extra jobs in order to buy things like land and build houses (P5, 44, M, Rwanda)

The participants reported observing and fulfilling cultural norms as indispensable and more desirable than PA participation.

> Like with our culture is very family-orientated and then you have to do your responsibilities first before something else (P8, 29, F, Philippines)

> I know that it is important to exercise, but I just do not see myself doing it because I have to work (P2, 43, M, Kenya)

Some of the participants revealed that they construed job-related activities as PA participation substitutes.

> I think my job is okay for exercise for me because we walk a lot and use our body. So, it is like I am exercising when I am working (P11, 43, F, Thailand)

> I thought my job was physical enough, and because I was not doing other physical exercises, I took my job as a physical exercise (P1, 50, F, Kenya)

While most of the participants acknowledged the value of PA participation, they seemingly did not experience the same motivation and commitment towards PA participation as they did towards social and work responsibilities.

> Well, I will say something about myself as much as I do not exercise; it is not because I do not want to. I have got issues with my body or problems which needs exercise, but I do not have the will power (P1, 50, F, Kenya)

It appeared that some of the participants did not regard PA participation as pleasant or essential and consequently were not motivated to engage in PA.

> I would rather drink during my free time than exercise. I do not want to lie; I do not even think of exercising (P2, 43, M, Kenya)

Environmental barriers (physical and social)

Social and physical aspects of the environment were also reported as important determinants of PA participation. Physical-environmental factors such as the weather and the cost related to accessing PA facilities were reported as PA participation constraining factors.

> It is cold, sometimes I think about the cold weather, everyone like warm weather, and I just want to be in the house and keep warm in the house (P11, 43, F, Thailand)

Most of the participants reported that PA participation in their countries was generally free of charge. Thus, the notion of paying for PA participation, for example, paying for a gym membership, was unfamiliar to most of them. Adults' PA participation is not a high priority in their countries, and it is challenging for most of them to embrace the notion of paying to access PA facilities. It appeared that paying for PA participation was viewed as costly and to some extent, wasteful. Some individuals stated that they would only consider PA participation if it was free.

> I think the first thing should be like free gyms. People want to go and try something different, but you have to pay, but I think if it is free people would go (P4, 40, M, Burundi)

Social environmental factors were reported as PA influences that involved relationships with family members, friends, and people in the community where they lived. The PA participation attitudes of family or close friends in the UK was highlighted as a critical determinant of PA participation among these participants.

> When I first came, I was surrounded by people from my community who did not know where the gyms were. Especially the women, they did not even know where the gyms were because they never train. So, I came here, and I was just thinking of making money (P7, 40, F, Burundi)

> We want to meet our own. And you find that our own are also people that do not exercise and that reconfirms the idea of you not willing to exercise. As opposed to a person who met and made friends with people who exercise the first time, they arrived here like I did. Therefore, you find that people from our country arrive here and they just continue with the same culture of drinking and eating roast meat every time they are free as we do back at home. And chances are there will not be any urge to exercise (P4, 40, M, Burundi)

The support from family members and friends, either as a source of motivation or as a strategy of addressing safety concerns, was also highlighted as a key facilitator to PA participation.

> My friends and my family are very supportive of me to do exercise, and nothing can stop me from exercise if I have time. It is a bit difficult if you are married to a difficult man. They will bully you, you are not allowed to leave the house, and you need to cook and stay at home (P10, 38, F, Thailand)

> I have a lot of family here and for at least a few years it made it easy for me to actually settle down (P8, 29, F, Philippines)

Other factors related to the social environment, such as unwelcoming locals, lead to avoiding PA facilities due to perceived fear and expectation of racial discrimination.

> The locals always pick on you for no reason when they are drunk, and it seems that they always have an excuse to abuse you. You are different, and they make you feel you are different. They make you to feel withdrawn, they make you to feel isolated, they make you feel that you are not part of this society. So, you tend to stay indoors a lot. So, for you it is home, work, home, work, and family if you have one (P5, 44, M, Rwanda)

> Sometimes when I go to the gym, I just feel like people are looking at me, I do not know, as a black woman it is in my head that people are looking at me. Um maybe they are not, but that is how I feel. So, it reduces the number of times I go to the gym and sometimes I just do not want to go to the gym. Maybe it is just me, but I am very conscious of my race (P7, 40, F, Burundi)

> My race has been the main issue that has hindered my adaptation and also affected my physical activity participation. Let me tell you how, there is a park near my house, and I am telling you now that I can only go there during the day when it is bright, and everybody can see what I am doing. But there is no way I am going there in the evening or when it is dark. You know why? Whether or not there are other people in the park, if they are white, I will be the first suspect to be taken in by the police in case a crime is committed, or anything terrible happens in the park when it is dark. You know why? Because of my race. Sometimes I would like to exercise after work in the evening, but there is no way I am going to that park in the evening (P3, 43, M, Kenya)

Social-environmental factors such as the duration of residency were likewise reported as vital in influencing how individuals accessed information related to PA participation and similarly vital in influencing change in negative attitudes towards PA participation that most of the participants reportedly carried from their countries. The participants associated their residency in the UK with some factors that appeared to positively affect their attitudes towards PA participation. The UK was described as an environment that encouraged PA participation and increased length of residency in the UK was associated with experiences of positive behavioural and attitudinal changes. For example, the majority of the participants

acknowledged that some of the negative attitudes and beliefs they held towards PA participation before relocating, and when they initially migrated to the UK had diminished over time, and their self-awareness concerning living a healthy lifestyle had increased.

> When I left Jamaica, I was not training but it was always in me. But I think the longer you stay the more likely you are to participate in physical activity. Because we adapt, we are exposed to the news all the time about exercising, we watch the TV and know the things we can do to help ourselves (P12, 33, M, Jamaica)

Other factors, such as the prevalence of positive PA behaviours within a social environment, were reported as vital determinants of PA participation.

> Also seeing people jogging and being surrounded by people talking about going to the gym also makes you feel like I want to like, it motivates you to get some exercise (P7, 40, F, Burundi)

> I think one is likely to exercise the longer you live here. Maybe if they have a friend like me, they will go buy exercise gear and start doing exercise. Maybe they learn more from social media and stuff, they also are more likely to see people exercising, and that will make them want to exercise as well (P10, 38, F, Thailand)

Discussion

The relationship between PA participation barriers among the BAME immigrants in the UK and the process of cultural, psychological, and social changes that occur during their adaptation into a new culture is still underexplored and is not clearly defined. The aim of this study was to explore PA barriers among BAME immigrants living in one postcode district of a city in southern England using the Socio-Ecological Model. It was found that the participants' PA participation were affected by multiple intrapersonal and social-environmental factors. Most of the factors that hindered PA participation in this study were experienced at the intrapersonal level. The participants reported intrapersonal barriers such as perception, cultural beliefs, cultural norms and expectations, social and work commitments and factors emanating from social and work commitments such as time constraints and fatigue, lack of PA motivation and deportation fear. These findings are consistent with studies that have explored the PA participation barriers of minority groups and demonstrated the considerable impact of intrapersonal barriers on BAME's PA engagement (e.g., Farooqi, 2000; Lawton *et al.*, 2005; Williams *et al.*, 2010), This study intended to build on these findings to highlight how intrapersonal factors impact those from BAME immigrant groups, who face unique challenges and experiences.

The findings demonstrate the role of cultural perceptions in constraining PA participation. For example, conceptualising PA participation as western culture discouraged PA participation among the participants. The results corroborate the findings of a great deal of the previous studies that have demonstrated the challenges posed by factors such as cultural perceptions on the health behaviours including PA participation of BAME (Ceria-Ulep *et al.*, 2011; Harley *et al.*, 2009).However, in contrast to the other studies, viewing gym attendance as a strange cultural activity posed significant PA constraints to some participants. This may be because the participants in this study come primarily from low-income countries where PA facilities such as gyms are uncommon. Cultural perceptions of body shape and weight loss were described as substantial barriers to PA participation. For example, the preference for a bigger belly over a skinny body appeared to discourage PA participation among participants from subgroups that believed that being fat was a sign of success. The findings are consistent with studies on minority groups that have shown that physical appearance and body shape preference can be a PA participation barrier

(Im *et al.*, 2012). Similarly, cultural perceptions appeared to have a meaningful influence on the participants' attitudes towards PA participation and their understanding of the benefits of PA participation.

The lack of exposure to PA participation and information about PA before migrating to the UK similarly seemed to profoundly influence the participants' insight about the psychological and physical advantages of PA participation. For example, the participants appeared not to acknowledge the role of PA participation in disease prevention. Participants in this study appeared to believe that their work-related activities were a replacement for PA participation. This finding is consistent with other studies on PA participation in minority groups, which indicate an absence of understanding of the advantages of PA (Pekmezi *et al.*, 2013), and may have an important implication in developing interventions that are needed to address health disparities among BAME immigrants. A novel and an important finding of this study was the influence of the psychological distress resulting from the fear of deportation on some of the participants' behaviour towards PA participation. The finding adds to our knowledge about the impact that this fear has on PA and health and is consistent with findings from other studies that have demonstrated the substantial influence of the fear of deportation on immigrants' lives (Bekteshi and Kang, 2018; Becerra *et al.*, 2015; Orrenius, 2013), Despite these previous research being predominantly on Latino immigrants in the United States, participants in these studies, similar to the current study, reported avoiding certain activities for fear of deportation. It appears that fear of deportation can lead to social isolation and a variety of health and social problems, and further work should address this related specifically to immigrant groups. Further research is also required to gain more understanding of the influences of the fear of deportation on other health-seeking behaviours of BAME immigrants in the UK.

The critical role of social-environmental factors such as the support from family and friends in determining PA participation identified in this study was similar to discoveries from other studies that have identified lack of social support as a barrier to PA participation (Hardy and Grogan, 2009; Im *et al.*, 2012), and adds to this in the context of immigrant groups. The attitude and beliefs of friends and family members in the UK seemed to play an integral part in determining PA participation of new immigrants from BAME in the UK. The participants' narratives suggested that new BAME arrivals in the UK tend to surround themselves with people from their countries of origin when they initially arrive in the UK, as they get accustomed to their environment. However, exclusively restricting their interaction to only individuals from their countries of origin appear to negatively impact their PA participation because they end up embracing similar attitudes and behaviours towards PA as their predecessors in the UK, which are frequently negative. This discovery highlights the meaningful role the attitudes and behaviours of the BAME populace who are already in the UK play in determining the PA participation attitudes and behaviours of new arrivals and future arrivals from their countries. The findings reflect those of Vaughn (2009) on Latin-American minority adults, which demonstrated the constraining effects resulting from the negative attitudes of people who are socially important to an individual on their PA participation. However, the impact of social support on adults' involvement in PA is not limited to minorities; it has been found to be equally significant in other adult populations (Lindsay *et al.*, 2017).

A combination of factors related to the physical environment and the social environment such as the perception of safety within one's neighbourhood and within PA facilities, the weather, PA subscription cost and length of residency, were reported as vital determinants of PA participation. Safety concerns factors such as the expectation of discrimination, were described as PA participation barriers and appeared to mitigate outdoor PA participation among the participants substantially. For example, the reluctance to use the park in the evenings or when it was dark due to the expectation of racial discrimination. Expectation of

discrimination have been shown to negatively impact PA participation rates among some BAME individuals (Bhatnagar *et al.*, 2015). Various studies have demonstrated the significance of the outdoor environment in encouraging or inhibiting PA participation among residents in their neighbourhoods (e.g. Boyes, 2012; Tucker-Seeley *et al.*, 2009). The findings demonstrate the impacts of diminished public park use due to perception of safety on adults' PA participation, and are consistent with findings that demonstrate that perceiving the park as safe is positively associated with adult's park use and PA (Lapham *et al.*, 2016; Han *et al.*, 2018). Another study similarly found that individuals who could access outdoor facilities reported higher PA participation rates than those who could not access such facilities (Choi *et al.*, 2008). Wilcox *et al.* (2003) likewise found that higher perceived safety was a critical environmental factor that elicited an increase in PA engagement. The weather in the UK was also described as a factor that mitigated outdoor PA participation. The findings are consistent with studies that have shown that bad weather can adversely affect an individual's PA participation (Belza *et al.*, 2006; Forkan *et al.*, 2006). Many of the participants had previously lived in countries that are normally hot and humid, and the contrast between the cold weather in the UK and the weather in the countries where they had previously lived may have contributed to this barrier.

The findings suggest that the length of residency in the UK may have a positive impact on PA participation and BAME individuals who had lived in the UK for a considerable amount of time were likely to experience positive attitudinal and behavioural changes towards PA participation. The participants acknowledged that PA participation was highly prioritised in the UK culture in comparison to their countries of origins. They furthermore attributed their experiences of positive behavioural and attitudinal changes towards PA participation to their length of residency in the UK.

Reflexivity and limitations

This study took an approach that has been used frequently in minority group research in the UK and used the term BAME to describe individuals from a diverse range of minority ethnic backgrounds. We acknowledge that using the term BAME to describe our sample is problematic and might suggest that our sample is a homogenous group. It is imperative to state that the term BAME was not used in this study to homogenise our sample. The lack of evidence from the BAME immigrant communities concerning the research question necessitated the requirement to have a diverse sample.

The first author is a black African male, and it is possible that his race and ethnicity might have influenced how the study was carried out. For example, the first author might have shown a bias by prioritising and emphasising the evidence provided by black participants, although steps were taken to bracket off his own personal experiences. Bracketing involved the first researcher discussing and writing down his personal biases and past knowledge and experience about the research topic with the second researcher and his peers during a presentation on the research project before the project began. The study sample likewise appears to demonstrate a bias towards black participants, especially Africans, perhaps reflecting that these participants were more comfortable being interviewed by the researcher. Additionally, the first author has worked as a sports coach for more than a decade, and his convictions and knowledge of the benefits of PA involvement, including his experience as a PA provider may also influence the interpretation of the findings. It is compelling to point out that using multiple coders from diverse backgrounds was a mitigation strategy applied to curb bias emanating from the first author's background. The second author is a White British female and does not identify as BAME. However, as with all qualitative research, the researcher is part of the process and this subjectivity should be viewed as a feature rather than a limitation.

Recommendations

Most of the previous studies on PA participation barriers and facilitators on BAME in the UK have been on Muslims from the South Asian descent (Grace *et al.*, 2008; Williams *et al.*, 2010; Babakus and Thompson, 2012), and it appears that there are gaps in evidence of barriers and facilitators of PA among immigrant groups, and specifically individuals from African descent in the UK. Therefore, a recommendation is made for future studies to identify PA barriers and facilitators among African adults in the UK.

As a strategy of forming a better understanding of the barriers and facilitator of PA participation among BAME and to expose disparities and address more complex trends of disadvantage between the subgroups, future investigators should utilise clearly defined parameters for their targeted samples by recruiting individuals from BAME subgroups that share comparable social, cultural and contextual attributes instead of exploring BAME as a homogenous group comprised of individuals with similar social, cultural and contextual experiences.

Interventions aimed at increasing PA participation among BAME immigrants should seek for assistance and involvement of community leaders from these groups including the involvement of general practitioners and religious leaders. The strategy of involving individuals holding key leadership positions in the community in interventions aimed at promoting PA participation among minority groups have previously been found to be effective (Sbrocco *et al.*, 2005).

The impact of deportation fear on PA participation among BAME immigrants was a novel and an important finding of this study. Therefore, a recommendation is made that local organisations that specialise with immigration cases of individuals from BAME groups such as organisations that deal with asylum seekers and refugees should be engaged in promoting interventions aimed at alleviating deportation fear and promoting PA participation. A further recommendation is also made for future studies to further explore the influences of deportation fear on the health-related choices behaviours of BAME in the UK.

Exercise and health providers should increase their efforts in carrying out both mass media and social media PA participation campaigns explicitly targeting BAME groups. Efforts such as the provision of PA-related information highlighting the preventative benefits of PA can be a strategy of enhancing health literacy and a strategy of increasing PA information access.

Health and exercise providers should increase their efforts towards making the PA facilities more accessible to BAME immigrants. Efforts such as the provision of a free gym membership or low-cost gym membership subscriptions can be used successfully to address PA participation barriers related to gym membership subscription cost.

PA providers in the UK seem to overemphasise PA benefits related to body shape and body appearance in their advertisements. However, such benefits would appear to be unattractive to the BAME immigrants in this study. Therefore, PA providers should instead employ advertisement strategies that target and may appeal to similar populations such as increasing their emphasis in highlighting the non-communicable disease-prevention benefits of PA participation.

Conclusion

An interplay between intrapersonal and environmental factors was found to play an integral role in influencing PA participation of the participants. Therefore, any successful attempt to facilitate an increase in PA participation rates among BAME immigrants should be established on the understanding of the numerous components of the socio-ecological model: intrapersonal social-environmental, and physical-environmental levels. The findings of this study can be used by health and exercise providers to formulate effective strategies for

promoting PA participation among BAME immigrants in the UK and furthermore give more insights into what is currently known about the potential causes of PA barriers among these groups in the UK.

References

Abraído-Lanza, A., Armbrister, A., Flórez, K. and Aguirre, A. (2006), "Toward a theory-driven model of acculturation in public health research", *American Journal of Public Health*, Vol. 96 No. 8, pp. 1342-1346.

Babakus, W. and Thompson, J. (2012), "Physical activity among South Asian women: a systematic, mixed-methods review", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 9 No. 1, p. 150.

Becerra, D., Quijano, L., Wagaman, M., Cimino, A. and Blanchard, K. (2015), "How immigration enforcement affects the lives of older Latinos in the United States", *Journal of Poverty*, Vol. 19 No. 4, pp. 357-376.

Bekteshi, V. and Kang, S. (2018), "Contextualizing acculturative stress among Latino immigrants in the United States: a systematic review", *Ethnicity and Health*, Vol. 25 No. 6, pp. 897-914.

Belza, B., Shumway-Cook, A., Phelan, E., Williams, B., Snyder, S. and LoGerfo, J. (2006), "The effects of a community-based exercise program on function and health in older adults: the enhance fitness program", *Journal of Applied Gerontology*, Vol. 25 No. 4, pp. 291-306.

Bhatnagar, P., Shaw, A. and Foster, C. (2015), "Generational differences in the physical activity of UK South Asians: a systematic review", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 12 No. 1, Article 96.

Bhf.org.uk (2010), "Ethnic differences in cardiovascular disease 2010", available at: https://www.bhf.org.uk/informationsupport/publications/statistics/ethnic-differences-in-cardiovascular-disease-2010 (accessed 1 February 2019).

Bolívar, J., Daponte, A., Rodríguez, M. and Sánchez, J. (2010), "The influence of individual, social and physical environment factors on physical activity in the adult population in Andalusia, Spain", *International Journal of Environmental Research and Public Health*, Vol. 7 No. 1, pp. 60-77.

Bopp, M., Wilcox, S., Laken, M., Butler, K., Carter, R., McClorin, L. and Yancey, A. (2006), "Factors associated with physical activity among African American men and women", *American Journal of Preventive Medicine*, Vol. 30 No. 4, pp. 340-346.

Boyes, M. (2012), "Outdoor adventure and successful ageing", *Ageing and Society*, Vol. 33 No. 4, pp. 644-665.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101.

Ceria-Ulep, C., Serafica, R. and Tse, A. (2011), "Filipino older adults' beliefs about exercise activity", *Nursing Forum*, Vol. 46 No. 4, pp. 240-250.

Chaturvedi, N. (2003), "Ethnic differences in cardiovascular disease", *Heart*, Vol. 89 No. 6, pp. 681-686.

Choi, J., Wilbur, J., Miller, A., Szalacha, L. and McAuley, E. (2008), "Correlates of leisure-time physical activity in Korean immigrant women", *Western Journal of Nursing Research*, Vol. 30 No. 5, pp. 620-638.

Cohen, L., Manion, L. and Morrison, K. (2013), *Research Methods in Education*, 7th ed., Routledge, London.

Creswell, J. (2005), *Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, Pearson Education, Upper Saddle River, New Jersey.

Delavari, M., Sønderlund, A., Swinburn, B., Mellor, D. and Renzaho, A. (2013), "Acculturation and obesity among migrant populations in high-income countries – a systematic review", *BMC Public Health*, Vol. 13 No. 1, pp. 1-11.

Durstine, J., Gordon, B., Wang, Z. and Luo, X. (2013), "Chronic disease and the link to physical activity", *Journal of Sport and Health Science*, Vol. 2 No. 1, pp. 3-11.

Evenson, K., Sarmiento, O. and Ayala, G. (2004), "Acculturation and physical activity among North Carolina Latina immigrants", *Social Science and Medicine*, Vol. 59 No. 12, pp. 2509-2522.

Farooqi, A. (2000), "Attitudes to lifestyle risk factors for coronary heart disease amongst South Asians in Leicester: a focus group study", *Family Practice*, Vol. 17 No. 4, pp. 293-297.

Forkan, R., Smyth, B., Wirkkala, N., Ciol, H. and Shumway-Cook, A. (2006), "Exercise adherence following physical therapy intervention in older adults with impaired balance", *Physical Therapy*, Vol. 86 No. 3, pp. 401-410.

Friedrich, M. (2017), "Global obesity Epidemic worsening", *JAMA*, Vol. 318 No. 7, p. 603.

Gov.uk (2019), "Physical activity", available at: https://www.ethnicity-facts-figures.service.gov.uk/health/diet-and-exercise/physical-activity/latest (accessed 1 February 2019).

Gov.uk (2021), "Physical activity guidelines: UK chief medical officers' report", available at: https://www.gov.uk/government/publications/physical-activity-guidelines-uk-chief-medical-officers-report (accessed 3 March 2021).

Grace, C., Begum, R., Subhani, S., Kopelman, P. and Greenhalgh, T. (2008), "Prevention of type 2 diabetes in British Bangladeshis: qualitative study of community, religious, and professional perspectives", *BMJ*, Vol. 337, p. a1931.

Gąsiewski, T. (2017), "Influence of physical activity and cardiorespiratory fitness on brain structure and functioning: a review", *Physical Activity Review*, Vol. 5, pp. 19-28.

Han, B., Cohen, D., Derose, K., Li, J. and Williamson, S. (2018), "Violent crime and park use in low-income urban neighborhoods", *American Journal of Preventive Medicine*, Vol. 54 No. 3, pp. 352-358.

Hardy, S. and Grogan, S. (2009), "Preventing disability through exercise", *Journal of Health Psychology*, Vol. 14 No. 7, pp. 1036-1046.

Harley, A., Odoms-Young, A., Beard, B., Katz, M. and Heaney, C. (2009), "African American social and cultural contexts and physical activity: strategies for navigating challenges to participation", *Women and Health*, Vol. 49 No. 1, pp. 84-100.

Im, E., Ko, Y., Hwang, H., Yoo, K., Chee, W., Stuifbergen, A., Walker, L., Brown, A., McPeek, C. and Chee, E. (2012), "'Physical activity as a luxury': African American women's attitudes toward physical activity", *Western Journal of Nursing Research*, Vol. 34 No. 3, pp. 317-339.

Iwelunmor, J., Newsome, V. and Airhihenbuwa, C. (2013), "Framing the impact of culture on health: a systematic review of the PEN-3 cultural model and its application in public health research and interventions", *Ethnicity and Health*, Vol. 19 No. 1, pp. 20-46.

Kokkinos, P. (2012), "Physical activity, health benefits, and mortality risk", *ISRN Cardiology*, 2012, pp. 1-14.

Kukull, W. and Ganguli, M. (2012), "Generalizability: the trees, the forest, and the low-hanging fruit", *Neurology*, Vol. 78 No. 23, pp. 1886-1891.

Lapham, S., Cohen, D., Han, B., Williamson, S., Evenson, K., McKenzie, T., Hillier, A. and Ward, P. (2016), "How important is perception of safety to park use? A four-city survey", *Urban Studies*, Vol. 53 No. 12, pp. 2624-2636.

Lawton, J., Ahmad, N., Hanna, L., Douglas, M. and Hallowell, N. (2005), "'I can't do any serious exercise': barriers to physical activity amongst people of Pakistani and Indian origin with Type 2 diabetes", *Health Education Research*, Vol. 21 No. 1, pp. 43-54.

Leavy, P. (2015), *The Oxford Handbook of Qualitative Research*, 1st ed., Oxford University Press, Oxford.

Lindsay, S., Banting, L., Eime, R., O'Sullivan, G. and Van Uffelen, J. (2017), "The association between social support and physical activity in older adults: a systematic review", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 14 No. 1.

Liu, J., Probst, J., Harun, N. and Torres, M. (2009), "Acculturation, physical activity, and obesity among Hispanic adolescents", *Ethnicity and Health*, Vol. 14 No. 5, pp. 509-525.

London.gov.uk (2021), "BAME", available at: https://www.london.gov.uk/questions/2018/0064 (accessed 13 January 2021).

McKinney, J., Lithwick, D., Morrison, B., Nazzari, H., Isserow, S., Heilbron, B. and Krahn, A. (2016), "The health benefits of physical activity and cardiorespiratory fitness", *British Columbia Medical Journal*, Vol. 58 No. 3, pp. 131-137.

McPhee, J., French, D., Jackson, D., Nazroo, J., Pendleton, N. and Degens, H. (2016), "Physical activity in older age: perspectives for healthy ageing and frailty", *Biogerontology*, Vol. 17 No. 3, pp. 567-580.

Nelson, M., Rejeski, W., Blair, S., Duncan, P., Judge, J., King, A., Macera, C. and Castaneda-Sceppa, C. (2007), "Physical activity and public health in older adults", *Medicine and Science in Sports and Exercise*, Vol. 39 No. 8, pp. 1435-1445.

Orrenius, P. (2013), "How do tougher immigration measures affect unauthorized immigrants? Comment", *Demography*, Vol. 50 No. 3, pp. 1101-1103.

Pate, R. (1995), "Physical activity and public health. A recommendation from the centers for disease control and prevention and the American college of sports medicine", *The Journal of the American Medical Association*, Vol. 273 No. 5, pp. 402-407.

Pekmezi, D., Marcus, B., Meneses, K., Baskin, M., Ard, J., Martin, M., Adams, N., Robinson, C. and Denmark-Wahnefried, W. (2013), "Developing an intervention to address physical activity barriers for African American women in the Deep South (USA)", *Women's Health*, Vol. 9 No. 3, pp. 301-312.

Postcodearea.co.uk (2021), "What's in a postcode", available at: https://www.postcodearea.co.uk (accessed 5 March 2021).

Robinson, O. (2014), "Sampling in interview-based qualitative research: a theoretical and practical guide", *Qualitative Research in Psychology*, Vol. 11 No. 1, pp. 25-41.

Sbrocco, T., Carter, M., Lewis, E., Vaughn, N., Kalupa, K. and King, S. (2005), "Church-based obesity treatment for African American women improves adherence", *Ethnicity and Disease*, Vol. 15 No. 1, pp. 246-255.

Schutt, R. and Mejía, C. (2016), "Health care satisfaction: effects of immigration, acculturation, language", *Journal of Immigrant and Minority Health*, Vol. 19 No. 6, pp. 1372-1378.

Sportengland.org (2021), "Uniting the movement | sport England", available at: https://www.sportengland.org/why-were-here/uniting-the-movement (accessed 3 March 2021).

Stapelberg, N., Neumann, D., Shum, D., McConnell, H. and Hamilton-Craig, I. (2011), "A topographical map of the causal network of mechanisms underlying the relationship between major depressive disorder and coronary heart disease", *Australian and New Zealand Journal of Psychiatry*, Vol. 45 No. 5, pp. 351-369.

Stokols, D. (1996), "Translating social ecological theory into guidelines for community health promotion", *American Journal of Health Promotion*, Vol. 10 No. 4, pp. 282-298.

Tucker-Seeley, R., Subramanian, S., Li, Y. and Sorensen, G. (2009), "Neighborhood safety, socioeconomic status, and physical activity in older adults", *American Journal of Preventive Medicine*, Vol. 37 No. 3, pp. 207-213.

Vaughn, S. (2009), "Factors influencing the participation of middle-aged and older Latin-American women in physical activity: a stroke-prevention behavior", *Rehabilitation Nursing*, Vol. 34 No. 1, pp. 17-23.

Warburton, D. (2006), "Health benefits of physical activity: the evidence", *Canadian Medical Association Journal*, Vol. 174 No. 6, pp. 801-809.

Wilcox, S., Bopp, M., Oberrecht, L., Kammermann, S. and McElmurray, C. (2003), "Psychosocial and perceived environmental correlates of physical activity in rural and older African American

and white women", *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, Vol. 58 No. 6, pp. P329-P337.

Williams, E., Stamatakis, E., Chandola, T., *et al.* (2010), "Physical activity behaviour and coronary heart disease mortality among South Asian people in the UK: an observational longitudinal study", *Heart*, Vol. 97 No. 8, pp. 655-659.

Corresponding author
Emma Davies can be contacted at: edavies@brookes.ac.uk

Received 19 May 2021
Revised 21 July 2021
Accepted 4 August 2021

Slum dwellers' occupational activities and health implications

Alexander Preko
University of Professional Studies, Accra, Ghana and
Migration and Tourism, Third Sector Foundation, Accra, Ghana
Anthony Nkrumah Agyabeng
University of Professional Studies, Accra, Ghana, and
James Kwame Mensah
University of Ghana, Accra, Ghana

Abstract

Purpose – The literature has acknowledged that good health is a crucial component of well-being. This study explores the country-specific understanding of slum dwellers' occupational activities and their environmental behavior.

Design/methodology/approach – Using the environmentally responsible behavior model, the study utilized exploratory qualitative approach to purposely sample 35 respondents, who responded to health-related behaviors through in-depth interviews.

Findings – Findings show that respondents are engaged in diverse socio-economic occupational activities such as selling of cooked and uncooked food in polythene bags, selling of sachet water and burning the waste generated from these activities in the slum environment. In addition, the study found specific occupational activities of masons, carpenters, tilers, salon beauticians, scrap dealers and unhygienic waste disposal in the slums. Finally, this study uncovered divided opinions in terms of respondents' environmental responsibility and awareness of environmental ramifications. Therefore, issues such as health hazards, unhealthy environment and soil deterioration are common at the slum dwellings.

Research limitations/implications – The study findings and the conclusion drawn cannot be generalized to represent the entire population of slum dwellers in Ghana due to the qualitative methodology employed.

Practical implications – This study revealed a country-specific understanding of the environmentally responsible behavior of slum dwellers based on their occupational activities, which can inform health policies.

Originality/value – The outcome of this study advanced contextual culturally specific understanding, concerning health-related behavior of slum dwellers, which is important to policymakers and practitioners in contexts.

Keywords Slum occupational activities, Environmentally responsible behavior, Health-related management, Ghana

Paper type Research paper

Introduction

It is health that is the real wealth, and not pieces of gold and silver – Mahatma Gandhi

Health-related issues in slum areas often merit attentions from the needed stakeholders. Particularly, health education on environmental responsible behavior (ERB) has attracted scholars' attention in recent times (Araúz-Ledezma *et al.*, 2020; Amoah and Addoah, 2021; Goldman *et al.*, 2020; Parris *et al.*, 2020). Slums and informal settlements used interchangeably in this study have become an unavoidable reality in many countries of the world, particularly in the developing world (Elrayies, 2016; Mukeku, 2018; Sandoval and Sarmiento, 2020).

The project was privately funded with personal funds. The authors are also extending as a special appreciation to the Assemblyman and interviewees for their support during household selection and other administrative support. The authors would like to thank the proofreader: Veronica Adjei including the Editor and the two anonymous reviewers for their insightful and constructive comments from which the present paper greatly improved. Any remaining errors or deficiencies are solely the authors' responsibility.

Health Education
Vol. 121 No. 6, 2021
pp. 632-648

0965-4283
DOI 10.1108/HE-05-2021-0077

Globally, more than 1 billion people live in slums, which are estimated to double to 2 billion by 2030 and 3 billion by 2050, if the current trends of population growth persist (Connor, 2015). Africa is neither spared of the slum phenomenon as more than half of her population in urban areas representing 61.7% live in slums, according to the 2020 Good Governance Africa. Within context, the population of slums according to the Slum Almanac report (2016) is 5.349 million. The expansion in population of the slums increases the chances of the slum residents undertaking several socio-economic activities. These activities are not limited to trading in products, such as selling of sachet water, or providing services (gathering of scrap metal) that has adverse effects on the health of the dwellers and their environs. The waste generated by these occupations: masons, carpenters, tilers, salon beauticians and scrap dealers in the slum is contextualized as slum occupational activities (SOA) which cause direct health-related diseases like malaria, typhoid, cholera and many more in the dwellings.

Studies have evidenced that the SOA negatively affects health-related matters such as the physical and natural setting of the environment resulting in soil, air and water pollution (Afeadie, 2021; Mahabir *et al.*, 2016; Takyi *et al.*, 2020). Previous studies have evidenced that the dwellers' occupational activities, such as selling of sachet water, processed and unprocessed food, scrap metal works, etc. have direct effect on the environment or health implications (Cherunya *et al.*, 2020; Corburn and Sverdlik, 2019; King and Amponsah, 2012). The purpose of the study is to investigate the SOA in context of the health literature utilizing the ERB model of Hines *et al.* (1986) as the theoretical foundation. ERB refers to actions taken by individuals or organized bodies directed at remediation of the environment, including species (Sivek and Hungerford, 1990). These unhealthy activities undertaken by the slum dwellers emanate huge waste, due to improper management, which tend to affect both human development and the environment (Mahabir *et al.*, 2016; Takyi *et al.*, 2020). In particular, indiscriminate dumping of rubbish, burning of plastics, open defecation, etc. affect the physical and natural setting of the environment. Potentially, the improper management of waste at the dwellings affects sustainable urban development at both macro, micro and meso levels of the economy (Mahabir *et al.*, 2016).

Over the years, many strategies have been used, such as relocation of dwellers, demolishing of unapproved structures, sensitization on sanitation etc. to minimize the impact of unhealthy activities in context. However, the strategies were unsuccessful, thereby, becoming a threat to sustainable urban development, signifying that the development that transcends the present generation to the future ones (Takyi, 2020). Despite the plethora of studies conducted within the domain of environmental activities (Afolabi *et al.*, 2018; Cherunya *et al.*, 2020; Corburn and Sverdlik, 2019; Kumari and Patil, 2019; Mahabir *et al.*, 2016; Ojo-Awo *et al.*, 2018; Takyi *et al.*, 2020). There seems to be very limited knowledge on the SOA and their environmental behavior, thus creating a knowledge gap in the slum health studies literature. In addition, this article responds to calls for studies to advance socio-economic activities and environmental management discourse (see: Takyi *et al.*, 2020; Owusu and Nursey-Bray, 2019). Takyi *et al.* (2020), for example, have emphasized the need for more studies to understand health-related matters or environmental management in slums. The study examines this unexplored area through the following specific objectives: (1) identify the dominant occupations of the slum dwellers affecting the environment in context, (2) explore the environmental behavior of the dwellers and (3) examine the linkage between SOA on the environment behavior.

The study is important and has made some contributions to the health literature. First, given the fact that health challenges like waste management appears to be a key problem in Ghana, a study of this kind cannot be underestimated. Second, given that the achievement of SDG-6: ensuring availability and sustainable management of water and sanitation for all, and SDG-13: action to combat climate change and its impact matter, such a study cannot be ignored. Three, the outcome of this study is intended to help in shaping health policies with focus on slum settlements. Fourth, the outcome of the study will give an indication of Ghana's journey toward achieving the SDGs 6 and 13 by indicating critical areas of importance for

policies thought. Finally, this research contributed by responding to calls for an explicit consideration of the understanding of health management in slums. The remainder of this article is structured as follows: an overview of the literature is next, followed by the methodology employed for data gathering. Then, the results of the study are presented, followed by a discussion of the findings. The final section presents the conclusion and the implications of the study to policy and practice.

Literature review

Theoretical background

Scholars have adopted various terms to describe people's behavior that protects the environment. This study was strengthened by the REB model proposed by Sivek and Hungerford (1990) to understand the SOA on the environment in context. Kollmuss and Agyeman (2002) defined environmental behavior as that exhibited by an individual who engages in actions to minimize any negative impact on the natural and built world. ERB is characterized by a combination of self-interest and concern for other people, species, or ecosystems, including general actions (talking with others about environmental issues and encouraging family and friends to behave in an environmentally responsible manner).

The ERB model is underpinned by two main elements: cognitive and affective variables (Hines *et al.*, 1986). The cognitive variable refers to knowledge, which enables people to be responsible toward the environment. Affective variable denotes feelings or emotions associated with an object or concept including attitude, locus of control and intention to act. This means that when the slum dwellers are aware about the negative effects of their occupational activities on the environment, they will be emotionally concerned to exhibit a responsible behavior toward the environment. Within the study, the ERB model has been adopted and modified to explain SOA. This study maintains that the implications of health hazard jobs undertaken by the slum dwellers will mean a direct negative impact on the environment. The expected negative impact includes waste disposal, biophysical environment, biodiversity, pollution, global warming, Ozone layer depletion, acid rain etc. The slum dwellers are economically vulnerable; to that effect, they are compelled to engage in diverse unregulated activities and jobs (Owusu and Nursey-Bray, 2019; Roberts and Okanya, 2020). In this study, slum dwellers who exhibit ERB are defined as the ones who take action to mitigate a negative environmental impact at home, work, or the environment where they inhabit.

Although the model has been criticized as being too behaviorist, it is simplistic in addressing all the changing variables (Gough and Whitehouse, 2003). However, the application of the ERB model is not far-fetched, as many scholars have utilized it in various disciplines. For instance, Wang *et al.* (2019) examined the environmental background on tourist ERB. Similarly, Ma *et al.* (2018), using ERB established that both intrinsic and extrinsic travel motivations were important to visitors' environmental attitudes and environmentally responsible behaviors. Despite its wider application, its utility within the slum literature appears uncommon. Therefore, the application of the model within the study will expand the frontiers of the model to other jurisdictions.

Slum dwellers dominant occupational activities. The occupational activities engaged by the slum dwellers, such as scrap metal works, communal bathhouses, local restaurants, provision stores, hair salons, dressmaking, etc. fall largely under the scope of informal sector activities (King and Amponsah, 2012). Other scholars have categorized the slum dwellers' activities as domestic service, unregistered family work, workers in small businesses with the size of 5–50 employees Portes (1983), self-providing work and unpaid community work (Williams and Round, 2007). Further study has established that people engage in business activity for opportunity entrepreneurship, where the individuals take advantage of an economic opportunity. Additionally, for reasons of necessity entrepreneurship where the individuals by necessity, are pushed into starting a business for unavoidable reasons (Husted and Allen, 2008).

Significantly, scholars have explored slum dwellers' occupational activities and have varied undertakings from different contexts. For instance, using data from India, Bag (2020) added that a higher proportion of women living in the slum are engaged in self-employment, including family businesses and casual employment such as domestic help. The same continent,Das and Meher (2013) identified slum activities, such as plumbing, electricals, painting, laundering, barbering, hawking, truck pushing, scrap dealing and head porting. Similarly, in Ghana, a study by King and Amponsah (2012) found that the slum dwellers are engaged in scrap metal works, communal bathhouses, local restaurants, provision stores, hair salons, dressmaking and sawmills. In the same vein, Abu-Salia *et al.* (2015) in the Wa Municipality of Ghana found that the dwellers are engaged in autonomous supplementary occupational activities. Equally, in context of South Africa, Mkhize (2018) found that slum dwellers do not rely on one-livelihood activity, but they employ multiple strategies in terms of activities to improve their standard of living.

The above evidence signifies that slum dwellers' activities vary across different cultural settings, all of which might be based on peculiarity of issues confronting them. Importantly, in as much as different reasons may account for such activities, the underlying factor may be the fact that due to their vulnerabilities, the dwellers are engaged in diverse occupational activities for survival. These activities by nature might not properly come under the regulations of the government. This is because as the dwellers migrate into the urban areas, they are constrained to engage in informal activities for survival without formally going through the procedure of business requirements. In all, it can be said that the activities undertaken by the slum dwellers might have a negative influence on the environment due to the unregulated nature of those activities.

Understanding slums environmental behavior. Studies on ERB have produced diverse perspective from various geographical context in recent times (Amoah and Addoah, 2021; Araúz-Ledezma *et al.*, 2020; Goldman *et al.*, 2020; Parris *et al.*, 2020). Environmental behavior refers to the health-conscious conduct by a person in order to minimize the negative impact of their actions on the environment. Analyzing environmental issues at the slum dwellings is significant to understanding the ERB among slum dwellers. This is because studies have evidenced that declining environmental quality is one of the critical issues facing urban residents, particularly the slum dwelling (Tanni *et al.*, 2014; Preko, 2017). Many studies have highlighted the environmental behavior of slum dwellers and its effect on human health and environmental sustainability. For instance, Mustaquim *et al.* (2018) established that slum dwellers face bad unhygienic environmental conditions due to poor sanitation facilities, unsafe drinking water and environmental degradation. The study of Surya *et al.* (2020) established that soil pollution, surface water pollution and disease transmission are linked to environmental practices at the slum dwellings. Similarly, Takyi *et al.* (2020) found that the activities of slum dwellers were associated with river pollution and poor environmental sanitation. In the same vein, another study has uncovered that slum dwellers adopt environmentally intolerable coping and livelihood strategies that undermine the biophysical integrity of land and human settlements (Ajibade and McBean, 2014). The evidence adduced signifies those issues concerning the way the dwellers manage their activities on the environment needs to be deepened in terms of awareness creation.

According to Shoniwa and Thebe (2020), government approach to environmental awareness creation has implications on the slum dwellers' responses to sanitation management processes. In collaboration, Noor *et al.* (2014), low-income status, high dependency rate, illiteracy, poor housing conditions, lack of governance and environmental unawareness are factors of environmental issues at the slums. By implication, creating awareness concerning impacts of improper environmental practices at the slum will drive feelings and emotions of people to be responsible to the environment. In this regard, studies have slum dwellers awareness about environmental issues. For instance,

Khan *et al.* (2015) averred majority respondents have high levels of basic environmental awareness. The study further found significant differences between basic environmental awareness levels among male and female respondents. Equally, Akhter and Malaviya (2015) discovered that urban residents are more aware of environmental issues than rural folks. Contrary, Tanni *et al.*'s (2014) study shows that slum dwellers are unaware of the environment where they live, as it is not their permanent living place.

Importantly, lack of awareness about the ramifications of environmental pollution at the slum dwellings might influence their behavior in terms of how the dwellers dispose of their waste. In this regard, Mukama *et al.* (2016) maintained that remnants of food and plastics have been the biggest proportions of waste generated in slum households, with its disposal being open dumping and burning of plastics. The study of Alam *et al.* (2017) also revealed that inappropriate waste disposal including the use of plastic bags for disposing of children's excreta continues to devastate the slum dwellings. Bamberg and Möser (2007) concluded that knowledge is a condition to environmental attitude and environmental sensitivity, which are direct to intention. They suggest that lack of awareness or knowledge about the implication of improper environmental practices might be some of the attributes of indiscriminate waste disposal at the slum dwellings. Clearly, the phenomenon might not only affect human health or the unsustainable environment, but it could also affect the achievement of SDGs 6 and 13.

Methodology

Study participants

In this study, the exploratory qualitative design was used to explore SOA on the environment in the Mataheko (See: Figure 1) within the Ningo-Prampram District of the Greater Accra Region, Ghana. Mataheko shares boundaries with these major towns: Afienya, Dawhenya and Ashaiman and has a population of 3,749 as at 2010 and expected to grow 5,213 in 2022 (Ghana Statistical Service, 2010). Of the employed population and economic activities of the town, about 24% are in services and sales workers, 32% in elementary occupations (e.g. carpentry, masonry, plumbing and tilling), 21% agricultural forestry and fishery workers, 9.8% are engaged as managers and business owners, and 13.2 are in other economic engagement (Meribole, 2020). The choice of the community is based on its proximity to a wide array of economic activities, which tend to attract large numbers of in-migrants. Particularly,

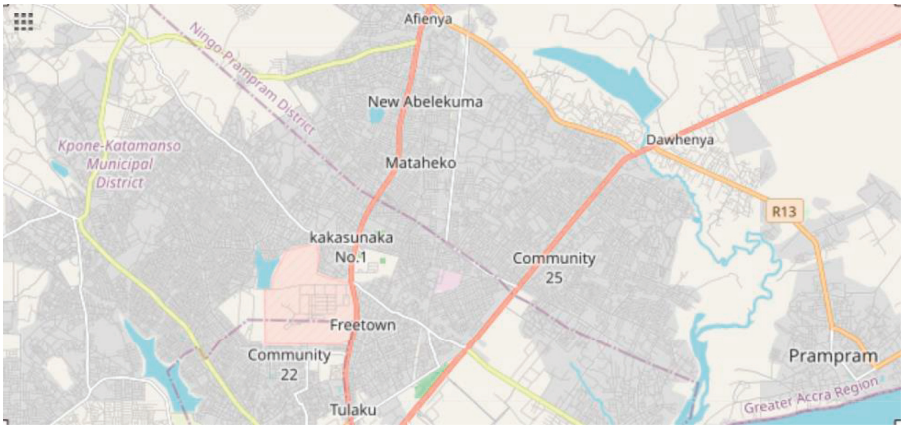


Figure 1.
Study site—Mataheko and its environs

Source(s): Generated from www.openstreetmap.org

the dwellers in the settlement have established their shelters along the new railway lines under construction connecting Tema the national harbor town, to other regions, namely Eastern, Volta, Oti, North East and Northern Regions of Ghana. The targeted slum for this study is categorized by Ghana's Land Services and Citizenships (LSC, 2016) document as an "infant settlement". Infant slums are regarded as slums which are emerging due to the new economic activities which include building of new factories, railways stations, among others. The study was focused on the slum dwellers who were engaged in various activities (food sellers: drinks, cooked and uncooked food in polythene or plastic packages, semi-skilled occupational activities (e.g. carpentry, masonry, plumbing, tilling, etc.) and unskilled labor (scrap dealers). The occupational activities undertaken by the slum dwellers tend to affect their health due to indiscriminate waste disposal coupled with a lack of awareness about the health implications of their waste disposal. The above targeted samples were needed for this study, due to their direct interaction with the environment and other health-related matters (see Plate 1).

An accidental sampling method was used to sample participants who were willing to provide data for this study. Although this sampling technique is statistically biased and not representative of the whole population within the cases, the logic behind its adoption is the ability to produce the thick (detailed) description of participants' feelings, opinions and experiences and to interpret the meanings of their actions (Denzin, 1989). Data were collected

Source(s): Photo taking by the researchers

Plate 1.
Infant slum settlement developing in Mataheko, Ghana

via face-face in-depth interviews with respondents through socially distanced interaction. The social distancing protocol of at least 2 meters apart, use of a facemask, avoidance of handshakes, proper handwashing and use of hand sanitizers as recommended by the World Health Organization (WHO, 2020) were maintained during the entire period of the field research. To ensure that every interviewee adheres to the in-country COVID-19 etiquette, the investigators provided facemasks and hand sanitizers to those respondents who did not have any. To enhance a high response rate, the researchers pre-informed the respondents about the essence of the interview. The process allowed respondents to have adequate information about the interview and schedule their time for the actual interview.

The interviews were conducted at the scheduled venues, which started from between 1st to 30th October 2020. On average, each interview lasted 45 min and were tape-recorded. The interviews were conducted in the English language. This is because the selected slum is regarded as a cosmopolitan area where there are varied dialects. In short, the researchers used the English language to ascertain fairness in the data collection. The demographics of the sampled interviewees included 25 females and 10 males with their occupation distribution comprising food sellers which include both raw and ready-to-eat food, sachet water sellers, semi-skilled and unskilled labor occupational activities. In all, 35 interviewees were considered for this study. Out of the total number of 40 interviewees contacted, 3 participants declined to be interviewed based on anonymous reasons. More so, information provided by 2 of the participants was similar to some of the earlier evidence received, which saturated the data at 35 respondents.

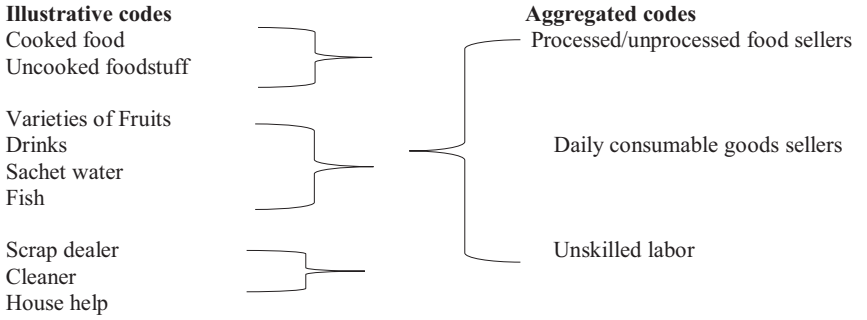
Although 40 participants consented to be interviewed, at the 35th respondent, no new discovery in terms of information was produced by respondents, which marked the saturation of the data. Therefore, sample size used for the study is recommended within the qualitative scholarship as adequate since there was no new data, no new themes and no new coding identified (Guest *et al.*, 2006; O'Reilly and Parker, 2012). The sample of 35 falls within an in-depth interview sample size recommended by (Hagaman and Wutich, 2016). This was due to the homogenous nature of the targeted population.

Instrumentation and data analysis. Through a well-developed interview guide, the researchers used open-ended probing questions to understand the activities engaged in by the dwellers and the socio-economic effects of their activities on the environment. The recorded interviews were duly transcribed, and Nvivo 12 software was useful in identifying the thematic coding. Thematic analysis was used to find, analyze and report patterns from the interviews (Braun and Clarke, 2006). The analysis done firstly by the researchers in becoming familiar with the data, coding the data, searching for themes, recognizing relationships and refining themes. The researchers followed a systematic thematic approach recommended by Braun and Clarke (2006) to recognize and identify common patterns, which became the product of analysis and discussion. In line with Miles and Huberman (1994), themes were recognized in accordance with the objectives of the study. This was done by firstly reading through the transcribed data repeatedly to become conversant with the materials, followed by initial codes generating, where the transcripts were read line by line to segment the information after the analysis. To ensure validation of the data, the researchers swapped their transcripts with each other and reviewed the same data separately in line with Lazaraton (2017) recommendation.

Results

Slum dominant occupational activities

The study's first research objective was aimed at establishing slum dwellers' dominant occupational activities. Findings from the field research underlining the respondents' dominant occupational activities initially produced varied illustrative codes, which were further aggregated into three main themes explained below.



Processed and unprocessed food sellers

The findings revealed menial or low profile occupations, such as consumable food sellers, sachet water sellers, fruit sellers, fishmongers, etc. It is important to indicate that the various activities undertaken by the dwellers generate a lot of waste, which tends to affect their health. This is because of their inability to properly dispose of the waste as well as their lack of education or awareness about health implications concerning the indiscriminate waste disposal. The dwellers explained why they were engaged in these activities. These were some of the extracts to support their reasons:

> I have been doing this business when I was 18 years where I usually assist my late mother in this business. After her passing, I decided to continue since there is no money to further my education. However, it has been three months staying in this community, that is, during the lockdown. Previously, I was selling in a school at Ada, but during the lockdown, schools were closed making life difficult for me. This is why I have moved to settle in this area. *(Kenkey seller, Female, 48).*

> I attended a technical school where I learnt auto mechanics. However, due to poverty, I could not set up a shop after completion. When I moved to Accra to make life better, it rather turned out to be unbearable for me to survive. Therefore, I had to divert into selling banku food made out of maize, rice balls and fufu. Now things are better for me because business is gradually becoming okay. *(Food seller, Female, 32).*

Daily consumable goods.

> I am a beautician by profession but now a fruit seller because there is no money to open my own shop to practice my profession. As you can see I am now selling fruits by the road to help me take care of my child and myself because I have nobody to depend on. I sell pawpaw, orange, pineapple, mango etc., I pray in future I can go back to practice my profession *(Fruit seller, Female, 32).*

> I own a drinking spot where I sell varieties of assorted drinks both alcoholic and non-alcoholic for the past 14 years. I am into this business because my present age will not permit me to do any hard career job. Apart from this job, the alternative work is security, which also does not pay well. *(Drink seller, Male, 58).*

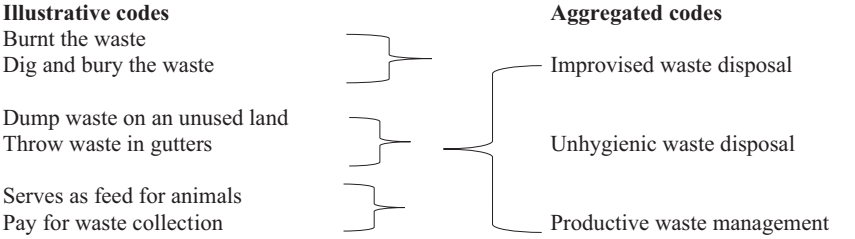
Unskilled labor

> I have been a scrap dealer for the past two years where I go round houses and dumping sites to look for all manner of scraps, extract the good ones and resell to enable me to survive. This has become necessary because staying in Accra is difficult. Unlike the village where nobody cares for the neighbor, over here, man needs to figure out something in order to survive. *(Scrap dealer, Male, 20).*

> I am a tiller and a mason at the same time although I am not licensed to practice because I could not complete the training because of poverty and other social issues at Cape Coast. After moving to Accra, life became difficult for me to continue the profession so I roamed to look for some construction jobs to do. *(Unqualified mason, Male, 42).*

Slum dwellers environmental behavior

The second research objective was meant to investigate the slum dwellers' behavior toward the environment. Particularly, the study was interested in understanding how the dwellers manage their waste that emanates from the various occupational activities being undertaken. Discussed below are the findings depicting the various illustrative codes, which have been consolidated into three major themes.



Next, respondents shared their experiences regarding the various waste management practices at their dwellings. Interestingly, the results depicting waste disposal practices at the dwellings affect the health of the dwellers. This is because of the inability of the slum dwellers to properly dispose of their waste as the results could cause health-related diseases like malaria, typhoid, cholera and many more in the dwellings. Representing their views are the quotes below:

Improvised waste disposal

> In fact, managing waste here is worrisome because dumping and burning of waste behind someone's house is wrong but we have no alternative. I once burnt my rubbish behind a fence and it ended up destroying the fence so I had to look for money to fix the fence. However, since we have no alternative means of keeping the waste, we burn it with caution. *(Fruit seller, Female, 32)*.

> I normally do not generate enough waste; because of that, I am able to gather it nicely and burn without causing problems. Sometimes, if the waste is not dried to be burnt, I tie it in a rubber bag and take it home. *(Kenkey seller, Female, 59)*.

Unhygienic waste disposal

> My brother, you have asked a very good question, as you can see for yourself, we do not have bins in this area so we garbage dump our waste on vacant lands we find in the night. I have asked the price of a bin and it is 250 Ghana cedis, how much do I make from this business? After buying the bin, a monthly subscription of 50 cedis is required for the bin to be emptied. My brother, I simply do not have that money to buy a bin. *(Drinks seller, Male, 58)*.

> I normally gather the waste and burn by applying kerosene in the open space. However, if it is not well burnt, the remains are thrown into the gutters for the erosion to wash it away. This is because when the waste is left unmanaged, it breeds mosquitoes during the rainy season. *(Food seller, Female, 26)*.

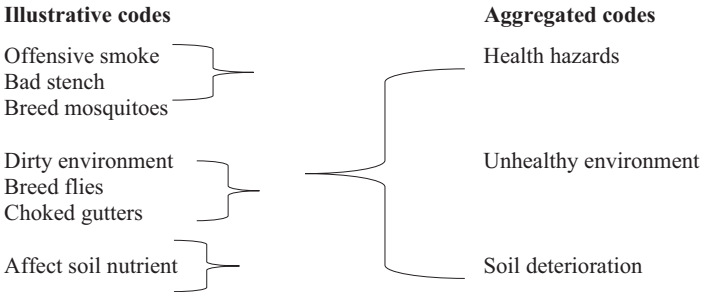
Productive waste management

> The Zoomlion truck always collects my waste on a weekly basis where I baggage them in sacks and keep for it for collection. I know the nature of my business generates a lot of waste where most of the waste is fresh and cannot be burnt as people do in the community that is why I have registered with the company. *(Fruit seller, Female, 32)*.

My waste has become an expensive commodity for people who are into animal farming. As you can see, there are lots of containers and carriers waiting for the waste to feed their animals. I initially did not know that my waste could be useful for others until a farmer came to beg for it and since then, people have been struggling for it. *(Unprocessed food seller, Female, 38)*.

Linkage between slum occupational activities and the environment

The third research objective sought to find answers for SOA on the environment, which is critical to ascertaining how the SOA affect not only the environment but the health of the dwellers as well. Respondents narrated varied perspectives underlying their businesses on the environment, which tended to explain their ERB. The initial findings generated diversity of illustrative codes and further aggregated them into three main themes. The findings below point to the fact that poor environment occasioned by the SOA affects the health of the slum dwellers. For example, the remains of sachet water bags lead to breeding of mosquitoes and choke gutters during the raining seasons. Again, high rates of wasting can result to diarrheal disease among slum-dwelling children.



Health hazards

Some of the people in this community just throw their waste indiscriminately without recourse to the effects it could create. Although burning of the waste sometimes creates offensive smoke that tends to cause headaches. Nevertheless, leaving the rubbish anyhow breeds mosquitoes and causes malaria, especially during the rainy season *(Fruit seller, Female, 29)*.

I dispose of my waste weekly through the waste collector at a fee. However, no matter how I manage my waste, the wind blows plastics from other houses to my area and thereby, making the place very dirty. Particularly, in the night, you dare not try to stay outside because mosquitoes will attack you and infect you with malaria. *(Fruit seller, Female, 38)*.

Unhealthy environment

At times no matter how, I clean and manage my rubbish, the environment does not look neat. This is because the wind blows plastics from every bearing into my compound, and people might think that I do not clean my surroundings. Sometimes, I sweep this place more than four times a day just to keep the environment clean. *(Food seller, Female, 29)*.

Yes, for the plastics if we do not burn, the environment will be very dirty. You can see for yourself, as soon as the wind blows, plastic from the surrounding fly to the wind direction, so no matter how we burn the plastics, you will still find plastics around. *(Drinks seller, Male, 58)*.

Soil deterioration

In fact, we all burn plastics in the open because there are no waste bins around here. The plastic bags, rejected slippers, footwear and others we burn affect the soil to lose its nutrients. I used to have a garden around this land but these days when I sow maize, it does not even germinate. *(Food seller, Female, 42)*.

> In fact, this area used to be a fertile ground for maize and cassava, but this day the story has changed. Sometimes, the crops will germinate but will not grow no matter how I apply cow dung and water. I think the chemicals used for the production of the plastic materials tend to destroy the soil nutrients. *(Unskilled worker, Male 36)*.

Discussion and conclusion

The study focused on understanding the SOA and their ERB in context. The study found activities, such as processed and unprocessed foods, daily consumable and unskilled labor underlying the first objective. Notably, the males were mostly engaged in unskilled activities conceptualized in this study as unfinished skill apprenticeship; such people are not recognized as having completed skill training to enable them to utilize it as an occupational activity. The female dwellers were found to be engaged in food and daily consumable related activities. Ostensibly, such activities do not require huge capital for the startup and not as well regulated by the formal sector, hence, a probable cause of its dominance at the dwellings.

Additionally, the nature of the dwellings might not appeal to state officials to exercise control like the formal sector and that could further account for the dominance of such activities at the dwelling. The findings are consistent with earlier studies in the context of South Africa Mkhize (2018), India Das and Meher (2013); King and Amponsah (2012) in Ghana that slum dwellers undertake diverse occupational activities. The study further evidenced that some of the dwellers have been engaged in various activities for reasons. For instance, while some were into such activities for survival, others were deliberate to make better lives in the city or family inheritance activities. The finding supports Bag (2020) who maintained that slum dwellers are engaged in self-employment businesses, family businesses and casual employment. In all, the various occupational activities emanate waste that could affect the environment and human health when not well-managed. To some extent, the findings thereof validate the ERB theory in that, the lack of cognitive awareness of the dwellers' improper ways of waste disposal may affect their attitudes and intentions to act responsibly toward the environment.

The study further analyzed slum dwellers' environmental behavior in terms of how they dispose of the waste generated from their activities. From the field research, it was discovered that the dwellers manage their waste in three main ways. First is the improvised waste disposal (burning of waste on vacant land, digging the ground to bury the waste and dumping the waste in uncompleted structures). Second is the, unhygienic waste disposal (dumping of waste on unused lands, disposal of waste in open gutters). Third is the productive waste disposal (using the waste to feed animals and engaging the services of the tricycle to dispose of waste). According to the respondents, the forms of waste disposal practices are occasioned by factors, such as the absence of approved dumping sites, poverty, lack of awareness and failure of the Assembly to provide waste bins and community dumping sites. The finding consolidates other studies that waste disposal at the slums has mainly been open dumping and burning Mukama *et al.* (2016) and use of plastic bags for disposal of waste and children's excreta (Alam, 2017).

Interestingly, the above evidence is not far-fetched given the fact that studies have demonstrated that waste management practices are not coping with the growth of urban areas, particularly in the slum areas (Miezah *et al.*, 2015; Samwine, 2017). Importantly, the waste management practices at the dwelling could be based on their environmental awareness and behavior. In this regard, the study established divided opinion, while some respondents lacked the awareness about the consequences of improper waste disposal, others were found to be aware but claimed they have no money to either buy waste bins, or pay the waste to be collected. Theoretically, the ERB model holds that the mindset and awareness of people toward the environment influences their feelings, emotions and attitudes. Therefore,

despite the challenges of waste disposal at the dwellings, the lack of awareness about ramifications of improper waste disposal could negatively influence their environmental behavior.

In terms of the link between SOA on the environment, the study uncovered issues, such as health hazards, unhealthy environment and soil degradation. For instance, concerning health hazards, respondents mentioned health-related issues like (offensive stench, mosquitoes and flies), which according to them tended to cause illness such as malaria and outbreak of cholera among children. Furthermore, the unhygienic environment includes (dirty surroundings, choked gutters, messy community, etc.), to the effect that people usually associate the messy community with their personality. It was further found that some of the farmlands, which were hitherto used for farming, had lost their nutrients and do no longer support farming, due to improper waste disposal. Importantly, Takyi *et al.* (2020) study affirmed the findings to the extent that the activities of slums devastate the environment in the form of river pollution and poor environmental sanitation. Essentially, it can be referenced from the previous objectives that the slum dwellers' awareness of the potential harm of their activities on their health, environment and soil degradation explains their ERB model.

Consistently, this finding affirmed Tanni *et al.* (2014) that lack of environmental pollution awareness has resulted in health-related issues including skin diseases, diarrhea, headache, asthma etc. at the slum dwellings. Similarly, the study of Mustaquim *et al.* (2018) supports the findings that slum dwellers face issues like bad and unhygienic environmental conditions, poor sanitation, unsafe drinking water and environmental degradation. The studies by Surya *et al.* (2020) and Shoniwa and Thebe (2020) have indicated that lack of state support thus have implications on slum environmental behavior. The above empirical findings were confirmed in the field as most of the dwellers blamed their poor environmental practices on the assembly. Additionally, consistent with the ERB model, people's knowledge about the environment causes positive behaviors and attitudes toward it; the inverse leads to negative ERB as revealed by the study. Significantly, it is important to state that the study's unique contribution to literature is the discovery that some of the dwellers, as a strategy to dispose of their waste give it out for animal feeding.

In conclusion, this article set out to investigate the implication of SOA on the environment. The findings of the study have been objectively presented in three ways. One, it shows that the dominant occupational activities of the slum dwellers are mainly processed/unprocessed food, daily consumable goods and unskilled labor. Two, the findings established three improvised waste disposals, and unhygienic waste disposal and productive waste management are the main ways of waste disposal at the dwelling. Three, in terms of the link between slum occupational activities and the environment, the study found health hazards, unhealthy environment and soil deterioration underlying the effects of their activities on humanity and the environment.

Importantly, this study unearths a country-specific understanding of the socio-economic implications of SOA and their environmental behavior. The research findings shed light on a novel scholarship of SOA and their environmental behavior in context, and thereby, igniting light on the teething issues concerning waste management practices in the slum settlements. Critically, the study has expanded the frontiers of literature in the domain. Vitally, the study departs from previous studies (Abu-Salia *et al.*, 2015; Bag, 2020; Mkhize, 2018; Mustaquim *et al.*, 2018; Takyi *et al.*, 2020). For instance, while slum dwellers are found to be engaged in diverse businesses Mkhize (2018), or their activities associated with environmental problems Takyi *et al.* (2020), this study's findings highlighted SOA and their environmental behavior. Therefore, this study has advanced the understanding of SOA and their behavior toward the environment, which has tended to expand the model of ERB.

Implication and recommendations

The outcome of the study has health-related implications and health education for the slum dwellers. The findings illuminate public understanding that the various SOA generates a lot of waste, which was improperly disposed of, thus, the indiscriminate waste disposal at the dwellings affects the health of the dwellers. This is because improper waste disposal causes diseases, such as malaria, cholera, typhoid and many other communicable illnesses among the dwellers. Additionally, the lack of health education on ERB tends to increase improper waste management practices by the dwellers, which more likely to affect the slum environment where the dwellers or resident lives and work. Therefore, bad improper waste management practices and lack of education of ERB have ramifications on health. Specifically, the findings have both practical and policy implications for policymakers and practitioners. From the practical perspective, the findings provide lessons for the MMDAs to expand the scope of waste management to the emerging slums and informal settlements. In this regard, it is the recommendation of the study that the assemblies should provide community dumping sites and waste bins at the slum dwelling to ensure sanity compliance. In addition, the findings also inform MMDAs, DCEs, assemblymen and women about the need to pay attention to health education as a strategy in enhancing environmental or health awareness, health knowledge, health attitude, health behavior among. At a glance, the results reveal that the slum in context is challenged with sanitation-related issues as results of the SOA. It is also important to inform slum stakeholder such as the Ministry of Local Government and Rural Development, MMDA, DCEs and allied institutions that, they should always be up-to-date in looking out for health-related programs such as community health education symposiums, lectures, seminars, communal labor or general cleaning program or exercises that will enhance and shape the slum resident attitude and behavior toward waste generation and management. Early study in the Ghanaian context has acknowledged how government policies on slums guarantee a clean and healthier slum environment (Agyabeng and Preko, 2021). This research supports the viewpoints and further recommends that slum managers and practitioners should consider linking slum policies and health education programs that will support the health well-being of the dwellers.

From the policy standpoint, the following recommendations are provided. First, a policy to employ the slum dwellers as sanitary or waste management inspectors at the dwellings will both create employment for them and illicit good ERB among them. Second, the study recommends a policy option that will implicate the entire household for unhygienic surroundings, to ensure community ERB. Three, the study canvasses for a localized, environmental awareness campaign to ensure adequate understanding and necessary compliance as well as the need for health education for the slum dwellers. This is critical because achieving SDGs 6 and 13 requires a change of attitudes through constant education and public awareness. This will equally ensure that sustainable urban development is observed, in order that future generations suffer not unduly.

Limitations and future studies

First, the study has the inherent limitations of a qualitative study that deter the findings from generalization. This is because the interviewees were not randomly selected and statistically not representative. Second, this study did not aim at comparing demographics of respondents in terms of their environmental awareness levels. Although the above limitation did not affect the robustness and quality of the study, future research should explore environmental awareness levels in terms of demographics using qualitative research techniques.

References

Abu-Salia, R., Osmannu, I. and Ahmed, A. (2015), "Coping with the challenges of urbanization in low income areas: an analysis of the livelihood systems of slum dwellers of the Wa Municipality, Ghana", *Current Urban Studies*, Vol. 3 No. 02, p. 105.

Afeadie, R. (2021), *Rural–urban Drift: Labour Migration, Health-Seeking Behaviour Disparity in the Urban Slum of Madina*, Health Education, Ghana, volume-ahead, page-ahead.

Afolabi, A., Agbabiaka, H., Afon, A., Akinbinu, A. and Adefisoye, E. (2018), "Solid waste management practice in Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Nigeria", *Management of Environmental Quality: An International Journal*, Vol. 29 No. 3, pp. 547-571.

Agyabeng, N.A. and Preko, A. (2021), "A stakeholder analysis of government policy intervention in the Ghanaian slum communities", *Housing, Care and Support*, Vol. ahead-of-print No. ahead-of-print.

Ajibade, I. and McBean, G. (2014), "Climate extremes and housing rights: a political ecology of impacts, early warning and adaptation constraints in Lagos slum communities", *Geoforum*, Vol. 55, pp. 76-86.

Akhter, S. and Malaviya, P. (2015), "Assessment of environmental awareness among rural and urban resident in Bishnah, Jammu and Kashmir, India", *International Journal of Basic and Applied Sciences*, Vol. 4 No. 3, pp. 180-182.

Alam, M., Winch, P., Saxton, R., Nizame, F., Yeasmin, F., Norman, G. and Luby, S. (2017), "Behaviour change intervention to improve shared toilet maintenance and cleanliness in urban slums of Dhaka: a cluster-randomised controlled trial", *Tropical Medicine and International Health*, Vol. 22 No. 8, pp. 1000-1011.

Amoah, A. and Addoah, T. (2021), "Does environmental knowledge drive pro-environmental behaviour in developing countries? Evidence from households in Ghana", *Environment, Development and Sustainability*, Vol. 23 No. 2, pp. 2719-2738.

Araúz-Ledezma, A., Massar, K. and Kok, G. (2020), "Behavioural and environmental influences on adolescent decision making in personal relationships: a qualitative multi-stakeholder exploration in Panama", *Health Education Research*, Vol. 35 No. 1, pp. 1-14.

Bag, S. (2020), "Urban female labor force participation and its correlates: a comparative study of slum dwellers and their urban counterparts of three metro cities in India", *Advances in Women's Empowerment: Critical Insight from Asia, Africa and Latin America*, Emerald Publishing, pp. 95-126, doi: 10.1108/S1529-212620200000029004.

Bamberg, S. and Möser, G. (2007), "Twenty years after Hines, Hungerford, and Tomera: a new meta-analysis of psycho-social determinants of pro-environmental behaviour", *Journal of Environmental Psychology*, Vol. 27 No. 1, pp. 14-25.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101.

Cherunya, P., Ahlborg, H. and Truffer, B. (2020), "Anchoring innovations in oscillating domestic spaces: why sanitation service offerings fail in informal settlements", *Research Policy*, Vol. 49 No. 1, 103841.

Connor, R. (2015), *The United Nations World Water Development Report 2015: Water for a Sustainable World*, Vol. 1, UNESCO Publishing, London.

Corburn, J. and Sverdlik, A. (2019), "Informal settlements and human health", *Integrating Human Health into Urban and Transport Planning*, Springer, Cham, pp. 155-171, doi: 10.1007/978-3-319-74983-9_9.

Das, P. and Meher, K. (2013), "A critical analysis of economic activities of slum dwellers", *International Journal of Management*, Vol. 1 No. 2, pp. 1-16.

Denzin, N.K. (1989), *Interpretive Biography*, Sage Publications, London.

Elrayies, M., G. (2016), "Rethinking slums: an approach for slums development towards sustainability", *Journal of Sustainable Development*, Vol. 9 No. 6, p. 225.

Ghana Statistical Service (2010), *Population & Housing Census*, Sakoa Press, Accra.

Goldman, D., Hansmann, R., Činčera, J., Radović, V., Telešienė, A., Balžekienė, A. and Vávra, J. (2020), *Education for Environmental Citizenship and Responsible Environmental Behaviour. Conceptualizing Environmental Citizenship for 21st Century Education*, Springer, Manhattan.

Gough, A. and Whitehouse, H. (2003), "The 'nature' of environmental education research from a feminist poststructuralist viewpoint", *Canadian Journal of Environmental Education*, Vol. 8 No. 1, pp. 31-43.

Guest, G., Brunce, A. and Johnson, L. (2006), "How many interviews are enough? An experiment with", *Field Methods*, Vol. 18 No. 1, pp. 59-82.

Hagaman, A. and Wutich, A. (2016), "How many interviews are enough to identify metathemes in multisited and cross-cultural research? Another perspective on Guest, Bunce, and Johnson's (2006) landmark stud", *Field Methods*, Vol. 29 No. 1, pp. 23-41.

Hines, J.M., Hungerford, H.R. and Tomera, A.N. (1986), "Analysis and synthesis of research on responsible environmental behaviour: a metaanalysis", *Journal of Environmental Education*, Vol. 18, pp. 1-8.

Husted, B. and Allen, D. (2008), "Toward a model of cross-cultural business ethics: the impact of individualism and collectivism on the ethical decision-making process", *Journal of Business Ethics*, Vol. 82 No. 2, pp. 293-305.

Khan, S., Kumar, A. and Malaviya, P. (2015), "Assessment of environmental behaviour among the urban poor of Panjtirthi slum, Jammu, India", *Current World Environment*, Vol. 10 No. 3, p. 801.

King, R. and Amponsah, O. (2012), "The role of city authorities in contributing to the development of urban slums in Ghana", *Journal of Construction Project Management and Innovation*, Vol. 2 No. 1, pp. 285-313.

Kollmuss, A. and Agyeman, J. (2002), "Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?", *Environmental Education Research*, Vol. 8 No. 3, pp. 239-260.

Kumari, S. and Patil, Y. (2019), "Enablers of sustainable industrial ecosystem: framework and future research directions", *Management of Environmental Quality: An International Journal*, Vol. 30 No. 1, pp. 61-86.

Lazaraton, A. (2017), "Language testing and assessment", in Shohamy, E., Or, I. and May, S. (Eds), *Qualitative Methods of Validation*, Springer, Cham.

LSC (2016), *City Wide Informal Settlement: Putting Accra Metropolitan Assembly's Informal Settlement on the Map*, AMA, Accra.

Ma, A., Chow, A., Cheung, L. and Liu, S. (2018), "Self-determined travel motivation and environmentally responsible behaviour of Chinese visitors to national forest protected areas in South China", *Global Ecology and Conservation*, Vol. 16, e00480.

Mahabir, R., Crooks, A., Croitoru, A. and Agouris, P. (2016), "The study of slums as social and physical constructs: challenges and emerging research opportunities", *Regional Studies, Regional Science*, Vol. 3 No. 1, pp. 399-419.

Meribole, J. (2020), *Slums in Ghana: Challenges with Growth*, The Borgen Project.

Miezah, K., Obiri-Danso, K., Kadar, Z., Fei-Baffoe, B. and Moses, Y.M. (2015), "Municipal solid waste characterization and quantification as a measure towards effective waste management in Ghana", *Waste Management*, Vol. 46, pp. 15-27.

Miles, M. and Huberman, A. (1994), *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd ed., Sage Publications, London.

Mkhize, T. (2018), *Critical Analysis of the Livelihood Strategies of Slum Dwellers: The Case of Jika Joe*, University of Kwazulu Natal, Pietermaritzburg, pp. 1-86, available at: https://researchspace.ukzn.ac.za/handle/10413/17423.

Mukama, T., Ndejjo, R., Musoke, D., Musinguzi, G., Halage, A., Carpenter, D. and Ssempebwa, J. (2016), "Practices, concerns, and willingness to participate in solid waste management in two urban slums in Central Uganda", *Journal of Environmental and Public Health*, Vol. 2016, p. 7.

Mukeku, J. (2018), "Urban slum morphology and socio-economic analogies: a case study of Kibera slum, Nairobi, Kenya", *Urbanisation*, Vol. 3 No. 1, pp. 17-32.

Mustaquim, M., Islam, W. and Roy, U. (2018), "Environmental quality of slums: a case study of Kolkata Municipal Corporation", *Research Journal of Social Sciences*, Vol. 9 No. 9, pp. 1-9.

Noor, S., Fatima, M. and Sehrish, S. (2014), "Unsustainable environment and prevalence of diseases in urban slums", *International Research Journal of Environment Sciences*, Vol. 3 No. 1, pp. 74-82.

Ojo-Awo, N., Agbabiaka, H. and Ilesanmi, A. (2018), "Refuse dumpsite and its associated pollutants spatial variations of the impact of leachates on groundwater quality", *Management of Environmental Quality: An International Journal*, Vol. 29 No. 3, pp. 572-591.

O'Reilly, M. and Parker, N. (2012), "Unsatisfactory saturation: a critical exploration of the notion of saturated sample sizes in qualitative research", *Qualitative Research*, Vol. 13 No. 2, pp. 1-8.

Owusu, M. and Nursey-Bray, M. (2019), "Socio-economic and institutional drivers of vulnerability to climate change in urban slums: the case of Accra, Ghana", *Journal of Climate and Development*, Vol. 11 No. 8, pp. 687-698.

Parris, C., Hegtvedt, K. and Johnson, C. (Eds) (2020), "Assessments of environmental injustice among Black Americans", *Social Currents*, Vol. 8 No. 1, pp. 45-63.

Portes, A. (1983), "The informal sector: definition, controversy, and relation to national development", *Review (Fernand Braudel Center)*, Vol. 7 No. 1, pp. 151-174.

Preko, A. (2017), "Analysis of social cognitive model in the context of green marketing: a study of the Ghanaian environment", *Business Perspective and Research*, Vol. 5 No. 1, pp. 86-99.

Roberts, E.R. and Okanya, O. (2020), "Measuring the socio-economic impact of forced evictions and illegal demolition: a comparative study between displaced and existing informal settlements", *The Social Science Journal*, Vol. 24, pp. 1-20.

Samwine, T. (2017), "Challenges and prospects of solid waste management in Ghana", *International Journal of Environmental Monitoring and Analysis*, Vol. 5 No. 4, pp. 96-101.

Sandoval, V. and Sarmiento, J. (2020), "A neglected issue: informal settlements, urban development, and disaster risk reduction in Latin America and the Caribbean", *Disaster Prevention and Management*, Vol. 29 No. 5, pp. 731-745, doi: 10.1108/DPM-04-2020-0115.

Shoniwa, T. and Thebe, V. (2020), "Informal and unserviceable: the state, informal settlement residents, and sanitation management in Western Tshwane city, South Africa", *Urban Forum*, Vol. 31, pp. 533-547.

Sivek, D. and Hungerford, H. (1990), "Predictors of responsible behavior in members of three Wisconsin conservation organizations", *The Journal of Environmental Education*, Vol. 21 No. 2, pp. 35-40.

Surya, B., Saleh, H. and Abubakar, H. (2020), "Sustainability of slum-based settlement management community socio-economic empowerment (study on slum settlements in Panakkukang district, Makassar city)", *Journal of Engineering and Applied Sciences*, Vol. 15 No. 1, pp. 141-152.

Takyi, S., Amponsah, O., Yeboah, S. and Mante, E. (2020), "Locational analysis of slums and the effects of slum dweller's activities on the social, economic and ecological facets of the city: insights from Kumasi in Ghana", *GeoJournal*, pp. 1-15.

Tanni, T., Hasan, M., Azad, A. and Bakali, B. (2014), "State of the environment in slum area: a case study on Khora slum, Khulna", *Journal of Environmental Science and Natural Resources*, Vol. 7 No. 1, pp. 295-304.

Wang, C., Zhang, J., Cao, J., Hu, H. and Yu, P. (2019), "The influence of environmental background on tourists' environmentally responsible behaviour", *Journal of Environmental Management*, Vol. 231, pp. 804-810.

WHO (2020), "Operational considerations for COVID-19 management in the accommodation sector: interim guidance", pp. 1-8.

Williams, C. and Round, J. (2007), "Entrepreneurship and the informal economy: a study of Ukraine's hidden enterprise culture", *Journal of Developmental Entrepreneurship*, Vol. 12 No. 01, pp. 119-136.

Further reading

Cheung, L., Ma, A., Lam, T. and Chow, A. (2020), "Predictors of the environmentally responsible behaviour of participants: an empiric", *Global Ecology and Conservation*, Vol. 23, e01153.

Creswell, J. (2013), *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, SAGE, Thousand Oaks, CA, p. 54.

Daniels, M. and Marion, J. (2005), "Communicating leave No trace ethics and practices: efficacy of two-day trainer courses", *Journal of Park and Recreation Administration*, Vol. 23 No. 4.

Fien, J. (2000), "Education for the environment: a critique'—an analysis", *Environmental Education Research*, Vol. 6 No. 2, pp. 179-192.

Jordan, J., Hungerford, H. and Tomera, A. (1986), "Effects of two residential environmental workshops on high school students", *The Journal of Environmental Education*, Vol. 18 No. 1, pp. 15-22.

Malik, K. (2014), *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*, United Nations Development Programme, New York.

Marshall, R. and Farahbakhsh, K. (2013), "Systems approaches to integrated solid waste management in developing countries", *Waste Management*, Vol. 33 No. 4, pp. 988-1003.

Paller, K. (2015), "Informal networks and access to power to obtain housing in urban slums in Ghana", *Africa Today*, Vol. 62 No. 1, pp. 31-55.

Patton, M. (2002), "Two decades of developments in qualitative inquiry: a personal, experiential perspective", *Qualitative Social Work*, Vol. 1 No. 3, pp. 261-283.

Schneider, F. (2002), *Size and Measurement of the Informal Economy in 110 Countries in Workshop of Australian National Tax Centre*, ANU. Canberra, Vol. 17, pp. 2-55.

Soura, A., Mberu, B., Elungata, P., Lankoande, B., Millogo, R., Beguy, D. and Compaore, Y. (2015), "Understanding inequities in child vaccination rates among the urban poor: evidence from Nairobi and Ouagadougou health and demographic surveillance systems", *Journal of Urban Health*, Vol. 92 No. 1, pp. 39-54.

Sukholthaman, P., Chanvarasuth, P. and Sharp, A. (2017), "Analysis of waste generation variables and people's attitudes towards waste management system: a case of Bangkok, Thailand", *Journal of Material Cycles and Waste Management*, Vol. 19 No. 2, pp. 645-656.

Tongco, M. (2007), "Purposive sampling as a tool for informant selection", *Ethnobotany Research and Applications*, Vol. 5, pp. 147-158.

UN-Habitat (2010), *Solid Waste Management in the World's Cities*, UN-HABITAT, London.

Un-Habitat (2013), *Financing Urban Shelter: Global Report on Human Settlements 2005*, Routledge, London.

Walsh, K. (2002), "Qualitative research: advancing the science and practice of hospitality", *The Cornell Hotel and Restaurant Administration Quarterly*, Vol. 44 No. 2, pp. 66-74.

Zint, M. (2002), "Comparing three attitude-behavior theories for predicting science teachers' intentions", *Journal of Research in Science Teaching*, Vol. 39 No. 9, pp. 819-844.

Corresponding author
Alexander Preko can be contacted at: alexander.preko@upsamail.edu.gh

Less than human: dehumanisation of people who use heroin

Harry Sumnall and Amanda Atkinson
Public Health Institute, Liverpool John Moores University, Liverpool, UK
Suzanne Gage
Department of Psychological Sciences, University of Liverpool, Liverpool, UK
Ian Hamilton
Department of Health Sciences, University of York, York, UK, and
Catharine Montgomery
School of Psychology, Liverpool John Moores University, Liverpool, UK

Received 5 July 2021
Revised 16 August 2021
Accepted 17 August 2021

Abstract

Purpose – Stigma reduction is an important public health challenge because of the large morbidity and mortality associated with some forms of substance use. Extreme stigma can lead to dehumanisation of target groups, who are ascribed with lesser humanity. The authors examined whether there was blatant and subtle dehumanisation of people who use heroin, and if these were associated with levels of support for non-discriminatory drug policy.

Design/methodology/approach – A cross-sectional online study using a UK convenience sample ($n = 307$ [75.2% female, mean age 28.6 ± 12.2 years]) was conducted. Participants completed assessments of blatant (Ascent of Humans [AoH] scale) and subtle (an emotion attribution task) dehumanisation and a bespoke measure assessing support for non-discriminatory drug policies. Other measures controlled for stigma towards people who use drugs (PWUD) and moral disgust.

Findings – There was greater blatant dehumanisation of people who used heroin compared to the general population and other potentially stigmatised reference groups, including people who use cannabis. The authors also found evidence of subtle dehumanisation, and people who used heroin were rated as being less likely to feel uniquely human emotions, less likely to feel positive emotions and more likely to feel negative emotions. Blatant dehumanisation was associated with significantly lower probability of support for non-discriminatory drug policy.

Social implications – Dehumanisation may present significant challenges for stigma reduction initiatives and in fostering public support for drug policy and treatment. Denial of the humanity of this group could be used to justify discriminatory policies or relative deprioritisation of support services in funding decisions. Activities that seek to "rehumanise" PWUD, including social inclusion, and encouraging compassionate media representations that portray the lived experiences of substance use may be useful areas of future work.

Originality/value – This is the first study to investigate blatant and subtle dehumanisation of people who use heroin, and how this relates to public support for drug policy.

Keywords Discrimination, Substance misuse, Addiction, Stigma, Drugs policy

Paper type Research paper

Introduction

People who use drugs (PWUD) are one of the most stigmatised groups in society and are subject to more negative public attitudes and discrimination than other groups who are labelled by their experiences and conditions, such as mental ill health, smoking or obesity (Room *et al.*, 2001; Phillips and Shaw, 2013; Barry *et al.*, 2019). Public stigma and internalisation of negative attitudes by labelled groups (i.e. self-stigma) is associated with reduced health and social care uptake, poorer quality of care and outcomes, and reduced public support for supportive policies and services (Rivera *et al.*, 2014; Lancaster *et al.*, 2017; Andersen and Kessing, 2019). Negative outcomes can affect others such as family members of out-groups through processes of association (Dyregrov and Selseng, 2021), and this may also be internalised as affiliate stigma (Mak and Cheung, 2008), leading to concealment, isolation

Health Education
Vol. 121 No. 6, 2021
pp. 649-669

0965-4283
DOI 10.1108/HE-07-2021-0099

and reductions in quality of life (Marshall, 2013). Considering the large mortality and morbidity burden associated with substance use (Degenhardt *et al.*, 2018; Lewer *et al.*, 2019), addressing stigma is an important public health challenge (McGinty and Barry, 2020).

Models of stigma describe processes whereby an out-group is first identified by labelling on the basis of identifiable or perceived characteristics; subjected to stereotypes and prejudices; and then exposed to prejudice, discrimination and/or social distancing (Kilian *et al.*, 2021). Stigma exists across the socio-ecological spectrum, and outcomes, experiences, practices and drivers exist from individual to societal levels (Stangl *et al.*, 2019). There is an emerging body of research that has identified determinants of public stigma towards PWUD, including media representations (e.g. Atkinson and Sumnall, 2021) and the language used to describe affected groups (e.g. pejorative terms; Ashford *et al.*, 2019); perceptions of blame, controllability and culpability (e.g. substance use as a controllable choice; Sattler *et al.*, 2017); personal characteristics of labelled groups (e.g. age, gender and parental status; Kulesza *et al.*, 2016); and the use of biogenetic explanations for underlying conditions (e.g. chronic relapsing condition; Kelly *et al.*, 2021). Conversely, studies that have presented sympathetic and humanising narratives of PWUD (Bachhuber *et al.*, 2015; Sumnall *et al.*, 2020a, 2021a) are associated with reduced public stigma and increased support for policies benefiting PWUD, but only when associated with groups of higher socio-economic status (Kennedy-Hendricks *et al.*, 2016).

There has been relatively less research undertaken on the processes of stigmatisation of PWUD and how this may lead to discrimination and inequity in practice and policy responses (Kilian *et al.*, 2021). One route may be through the dehumanisation of PWUD. Dehumanisation is a distinct concept from stigmatisation, but is often applied to the most highly stigmatised groups and refers to the absence of explicit attribution of human traits to out-groups (i.e. PWUD) compared to in-group members (i.e. the general public) (Kteily and Bruneau, 2017). This may lead to reduction of inter-group pro-social behaviours and increased social distancing from out-group members (Martínez *et al.*, 2017). The infrahumanisation theory of dehumanisation suggests that rather than blatant dehumanisation, subtle judgements made on the basis of perceptions of the relative differences in humanness between groups may be more common (Leyens *et al.*, 2007). This is expressed through relative attribution of basic, primary emotions that both humans and animals share and secondary emotions that are seen as unique indicators of humanity. Similarly, the two-dimensional model of humanness focuses on interpersonal and intergroup relations and proposes that dehumanised out-groups are denied unique traits and attributes of humanness, such as emotional responsiveness, interpersonal warmth (prosociality) and depth (Haslam and Loughnan, 2014). This may also include a perceived lack of agency and human experience, such as consciousness and personality in out-groups relative to in-groups and non-human animals (Waytz *et al.*, 2010). Neuroimaging studies suggest that there may even be neuronal correlates to dehumanising perceptions, with exposure to pictorial representations of groups perceived to be low in warmth and competence, such as PWUD or people who are homeless less likely to activate parts of the brain important in positive social cognitions (medial prefrontal cortex), and more likely to activate parts associated with emotional disgust (insula, amygdala) (Harris and Fiske, 2006, 2009).

Previous research has shown blatant and subtle dehumanisation towards a number of stigmatised groups, including people with severe alcohol use disorders (Fontesse *et al.*, 2021), those with obesity (Kersbergen and Robinson, 2019), those who have experienced homelessness (Bruneau *et al.*, 2018a, b), refugees (Bruneau *et al.*, 2018b) and ethnic minority groups (Kteily and Bruneau, 2017). Blatant dehumanisation has been shown towards a range of people described as mentally ill, including those described as having "drug addiction" (Boysen *et al.*, 2020). Whereas dehumanisation may be functional in some care-giving situations where high levels of emotional attachment to patients has been

associated with staff burnout (Vaes and Muratore, 2013; Fontesse *et al.*, 2021), in general, dehumanising attitudes are reflected in a higher desire for social distancing, perceptions of dangerousness, violence and victimisation and higher levels of support for discriminatory and aggressive policies targeting out-groups (Rudman and Mescher, 2012; Kteily *et al.*, 2015; Kersbergen and Robinson, 2019; Parker *et al.*, 2020).

Dehumanisation of PWUD is apparent in popular media representations, particularly in visual imagery of "contaminated" and "polluted" bodies (Ayres and Jewkes, 2012), criminal "mugshots" (Fitzgerald, 2020; Atkinson and Sumnall, 2021) and drug consumption practices (e.g. a focus on injection) (Weimer, 2004), and in text narratives that omit pity and grieving for victims of drug-related deaths (Fraser *et al.*, 2018) or emphasise the dangerousness of PWUD and make comparison with fictional characters, such as zombies (Alexandrescu, 2018; Atkinson and Sumnall, 2021). As with the internalisation of public stigmatising attitudes, the subjective perception of being dehumanised by others (metadehumanisation) has also been observed in people with alcohol use disorders, and this is associated with dysfunctional coping strategies and the use of alcohol to cope (Fontesse *et al.*, 2020).

In this study, we investigated dehumanising attitudes towards people who use heroin in the general public. Whilst a large number of studies have examined the experiences and consequences of stigma in PWUD (for useful reviews see Lloyd, 2013; Lancaster *et al.*, 2017), few have specifically examined dehumanisation. Of those, and as described above, Fontesse and colleagues examined internalised dehumanisation in people with alcohol use disorders (2020) or attitudes of healthcare professionals towards this group (Fontesse *et al.*, 2021), whilst Harris and Fiske (2006, 2009) primarily examined neural responses to visual stimuli of dehumanised groups. Based upon infrahumanisation theory and previous work undertaken with other highly stigmatised populations, we hypothesised that there would be both greater blatant and subtle dehumanisation towards people who use heroin compared with other stigmatised groups (e.g. people with serious mental health problems and obesity) and with people who use cannabis. We specifically chose heroin because this is a highly stigmatised drug associated with high mortality and morbidity, and within the general population, including within groups of PWUD, there are "hierarchies" of substance use, in which people using heroin are viewed more negatively than those using drugs, such as cannabis (McElrath and McEvoy, 2001; Palamar *et al.*, 2012; Brown, 2015). We also undertook an exploratory analysis to examine whether dehumanising attitudes were associated with stigma towards people who use heroin and support for non-discriminatory policies for PWUD.

Methods

Design

Online cross-sectional survey was conducted, and participants completed an anonymous online questionnaire.

Participants

A convenience sample was recruited from the UK general public. Inclusion criteria were people who were UK residents and aged over 18 years, and the questionnaire included screening checks. Participants were recruited through a number of methods, including students recruited internally for course credit, social media and snowball sampling. To reduce bias, recruitment materials mentioned that this was a study investigating the decisions people make about substance use policy, but not that it was investigating dehumanisation or stigmatising attitudes, and this was only revealed in the survey debriefing. *A priori* power calculations were undertaken to estimate minimum sample sizes required for the two main analyses (see below) (G*Power 3.1; Faul *et al.* (2007)). To detect a

medium effect size for the analysis of blatant dehumanisation (Friedman's test), ($f = 0.25$, power 0.95; 10 measurements) an estimated minimum sample size of 20 was required. Analysis of subtle dehumanisation was undertaken using a $2 \times 2 \times 4$ repeated measures ANOVA, and to detect a medium effect size ($f = 0.25$, power 0.95), an estimated minimum sample size of 279 was required.

Overall, 363 survey attempts were recorded, but only those participants providing complete data on both primary outcomes (blatant and subtle dehumanisation) were retained. The final sample comprised 307 participants (84.6% of attempts; $n = 231$ (75.2%) female; mean age 28.6 $\pm$ 12.2 years). Of relevance to study outcomes, 177 participants (57.7%) reported a lifetime use of a controlled drug (37.5% cannabis; 3.3% heroin); 7 (2.3%) had received structured drug treatment and 59 (19.2%) had a family member of close friend who they believed had received support.

Materials and procedure

Participants completed a single online questionnaire hosted on the Qualtrics platform (Qualtrics, Provo, UT, USA), and this took approximately ten minutes to complete. All measures are described, but not all were included in the analyses reported here as our group utilises similar measures across different studies (e.g. media use, detailed patterns of substance use and demographics).

After reading the study information and providing consent, participants completed two screening questions (UK resident; aged >18 years) before proceeding. Participants completed questions on demographics (age, gender, education, ethnicity and employment); substance use history (lifetime and last year use of a number of substances) and voting preference to assess political orientation (main UK political parties; recoded into *left*; *right* and *centre* parties for analysis).

Primary outcome measures. Blatant dehumanisation was assessed using the Ascent of Humans (AoH) scale (Kteily *et al.*, 2015). This is a 100-point slider underneath a pictorial representation of five evolutionary stages between non-human primates and humans. Instructional text read "*People can vary in how human-like they seem. Some people seem highly evolved, whereas others seem no different than lower animals. Using the image as a guide, indicate using the sliders how evolved you consider the average member of each group to be. Note: 'Brits' refers to citizens of the United Kingdom.*" Participants were asked to rate on the scale how evolved they thought each of 11 groups was (including an attention check requesting the slider was moved all the way to the right). The target group for our study was *Brits who use heroin* (hereafter *heroin*), and comparison groups were *Brits*; *Arabs*; *Brits who use cannabis*; *Brits with cancer*; *mixed race Brits*; *Brits who are homeless*; *Brits with schizophrenia*; *Brits who are unemployed*; *Brits who are employed* and *obese Brits*. This measure has previously been used to investigate explicit dehumanisation of population groups such as people who have mental health problems; those with experiences of homelessness; people involved in criminality; minority ethnic, cultural and religious groups and predict both hostility towards targets and support for punitive polices (Kteily and Bruneau, 2017; Bruneau *et al.*, 2018a, b; Boysen *et al.*, 2020). Comparison groups were chosen on the basis of representing groups that are less or similarly stigmatised compared to people who use heroin (e.g. Kersbergen and Robinson, 2019; Ktiely *et al.*, 2015; Sattler *et al.*, 2017).

Subtle dehumanisation was assessed using an adapted version of the emotion attribution task used by Kersenberger and Robinson (2019) in their study of attitudes towards obesity. Participants were asked to indicate on a 100-point slider (*Not well at all* to *Very well*) how well each of 16 emotions (presented at random) characterised *UK citizens who use heroin* and three comparison groups, *UK citizens*; *UK citizens who use cannabis* and *UK citizens who are homeless* (presented at random). Included emotions were classed as primary or secondary and

as positive or negative. Primary emotions are considered universal to all humans and non-human animals, and those included were anger; disgust; euphoria; fear; happiness; joy; pleasure and sadness. Secondary emotions are considered uniquely human, and those included were admiration, guilt, hope, love, remorse, resentment, shame and tenderness. Lower endorsement of secondary emotions represents greater subtle dehumanisation. An advantage of this measure is that participants are less aware that choice of attributes is an indicator of target group dehumanisation (Haslam and Loughnan, 2014).

Additional measures. Moral disgust was assessed using the seven-item subscale of the Three-Domains of Disgust Scale (TDDS), which assesses disgust that motivates the avoidance of social-norm violators (Tybur *et al.*, 2009). Item were scored on a Likert scale (0 – Not disgusting at all to 6 – Extremely disgusting) with higher scores representing greater disgust. Cronbach's $\alpha = 0.84$, indicating a good level of internal consistency.

The Disgust Scale Revised (DS-R) was used to measure individual differences in sensitivity to general disgust (Olatunji *et al.*, 2007). It comprises 25 items, with items 1 to 13 scored True (1) or False (0) and the remainder as Not (0), Slightly (0.5) or Very (1) disgusting. Disgust sensitivity is scored by summing the responses to all 25 items, with higher scores representing greater disgust sensitivity. Cronbach's $\alpha = 0.80$, indicating an acceptable level of internal consistency.

We assessed participant support for five non-discriminatory drug policies (*Making people pay extra for their own National Health Service (NHS) treatment where their illness is caused by their illegal drug use*; *prescribing heroin on the NHS to people who are addicted to the drug*; *making payment of benefits to people who are addicted to drugs dependent on them attending drug treatment services*; *provide all people who have problems with drugs access to free drug treatment*; *provision of a facility where people can inject illegal drugs under the supervision of a doctor, nurse or other healthcare professional*). These items were randomly presented alongside seven other health and social policy filler items. Each item was scored from 1 (No support at all) to 10 (Complete support), with higher total scores (with appropriate reverse scoring) representing greater support. Cronbach's $\alpha = 0.74$, indicating an acceptable level of internal consistency.

Attitudes towards people who are homeless were assessed through three questions taken from the Scottish Social Attitudes Survey General Attitudes to Homeless Module (The Scottish Government, 2006). These were *Most homeless people have just been unlucky in their lives*; *Most homeless people could find somewhere to live if they really tried* (reverse scored) and *Many people say they are homeless just to try and get a house from the council* (reverse scored). Questions were scored on a Likert scale (1 Strongly disagree to 5 Strongly agree), with higher scores representing more positive attitudes. In the present study, Cronbach's $\alpha = 0.81$, indicating a good level of internal consistency.

Attitudes towards people with substance use disorders (hereafter attitudes towards people in recovery) were assessed through 19 questions taken from public attitudes to drug survey (Singleton, 2010), originally adapted from the Attitudes to Mental Illness Survey (Singer *et al.*, 2016), and utilised in the 2016 Scottish Government's Public Attitudes Towards People with Drug Dependence and People in Recovery Survey (The Scottish Government, 2016). Questions were scored on a five-point Likert scale (1 Strongly agree to 5 Strongly disagree) and assessed attitudes towards people with a history of drug dependence (e.g. *Parents should not let their children play with the children of someone with a history of drug dependence* (reversed scored); *People with a history of drug dependence are too often demonised in the media*). Higher total scores represented more negative attitudes. In the present study, Cronbach's $\alpha = 0.89$, indicating a good level of internal consistency.

Stigmatising attitudes towards PWUD was assessed using a version of the nine-item Attribution Questionnaire (AQ-9; Corrigan *et al.*, 2003), previously adapted for use in a study assessing stigma towards PWUD (Sumnall *et al.*, 2020b). The scale was worded to aid

understanding for non-specialists and included items across subdomains of lack of pity (*Do you feel pity for people with drug dependence?*; reversed scored); dangerousness (*How dangerous do you feel people with drug dependence are?*); fear (*How scared of people with drug dependence do you feel?*); blame (*Do you think that it is people with drug dependence's own fault that they are in their present condition?*); segregation (*Do you think it is best for the communities of people with drug dependence if they are confined in a hospital?*); anger (*How angry do you feel at people with drug dependence?*); avoidance (*Would you try to stay away from people with drug dependence?*); coercion (*How much do you agree that people with drug dependence should be forced into drug treatment even if they do not want to?*) and failure to help (*How likely is it that you would want to help someone with drug dependence?*; reversed scored). Individual items are scored on a nine-point Likert scale (1 not at all to 9 very much), and a total stigma score is calculated (range 9–81). Higher scores represent higher total stigmatising attitudes. In this study, Cronbach's $\alpha = 0.80$, indicating a good level of internal consistency.

Participants were also asked to indicate if (1) they and (2) a family member/close friend had ever received drug treatment (coded 0 = no; 1 = yes). Finally, they self-rated their knowledge of the reasons why some people developed problems with substances and others do not (ten-point scale; from 1 = no knowledge to 10 = most knowledge), and if they had seen media reports about people who have experienced problems with substances in the previous six months. Those who positively endorsed this item were asked whether they judged these to be supportive, negative or balanced in their representation of PWUD.

The research was approved by the Liverpool John Moores University Research Ethics Committee.

Analysis

Primary analyses. To assess differences in AOH scores between the heroin, cannabis and reference groups, we used Friedman's test for non-parametrically distributed data, followed by Wilcoxon signed rank test with Bonferroni correction for multiple comparisons.

To assess differences in subtle dehumanisation, we undertook a 2 (Emotional valence: positive, negative) × 2 (Emotion level: primary, secondary) × 2 (group; "Brits", "Brits who use heroin") repeated measure ANOVA, followed by *post hoc* paired samples *t*-tests corrected for multiple comparison. We repeated the analyses to assess differences in subtle dehumanisation between *heroin* and groups who use other substances (*cannabis*) or who are also stigmatised (*homeless*).

Exploratory analyses. We undertook two exploratory analyses. First, to assess the utility of dehumanisation as a predictor of stigmatising attitudes we correlated AOH and subtle dehumanisation with AQ-9 scores. Second, we undertook hierarchical linear regression with score for non-discriminatory drug policy as the dependent variable. For both analyses, we first calculated (unstandardised) residual change scores for (1) AOH ratings for "Brits who use heroin" predicted by ratings for "Brits" and (2) secondary emotion attributions for "Brits who use heroin" predicted by ratings for "Brits". Lower residual scores indicated greater blatant or subtle dehumanisation of *heroin* (i.e. greater dehumanisation compared to the reference group).

For prediction of policy support, residual change scores were entered into block (1); demographics and political orientation were entered into block (2); TDDS and DS-R scores were entered into block (3) and scores for attitudes towards people who are homeless, people in recovery, AQ9, self-rated knowledge about substance use and personal experience of treatment or knowing someone who had received treatment were all entered into block 4.

These covariates were chosen on the basis of previous research showing associations between these views, contact with people who use substances or familiarity with drug-related topics on stigma (Addison and Thorpe, 2004; Corrigan *et al.*, 2009; Brown, 2011; Lloyd, 2013; Sattler *et al.*, 2017; Goodyear *et al.*, 2018). Those holding conservative and right-wing values

have also been shown to dehumanise more than other political orientations (DeLuca-McLean and Castano, 2009; Haslam and Loughnan, 2014). Although dehumanisation, stigmatisation and disgust are distinct concepts (Kteily and Bruneau, 2017), the latter two predict dehumanisation, and so we also included measures of these concepts (Dalsklev and Kunst, 2015).

Alpha was set at 0.05, and all analyses were undertaken with SPSS V27 (IBM Corp, 2020). Our study was not pre-registered and so should be considered exploratory.

Results

Primary analyses

Blatant dehumanisation. There was a statistically significant difference in AOH blatant dehumanisation score depending upon the target group, $\chi^2(10) = 282.247, p = 0.000$. Post hoc analysis with Wilcoxon signed-rank tests (Bonferroni correction for ten comparisons), indicated significant score differences between AOH rating for the *heroin* group and *Brits* ($Z = -7.455, p = 0.000$); *Arabs* ($Z = -6.867, p = 0.000$); *Brits who use cannabis* ($Z = -6.399, p = 0.000$); *Brits with cancer* ($Z = -8.301, p = 0.000$); *mixed race Brits* ($Z = -8.455, p = 0.000$); *Brits who are homeless* ($Z = -7.031, p = 0.000$); *Brits with schizophrenia* ($Z = -5.973, p = 0.000$); *Brits who are unemployed* ($Z = -6.966, p = 0.000$); *Brits who are employed* ($Z = -8.299, p = 0.000$) and *obese Brits* ($Z = -5.802, p = 0.000$). Heroin users were therefore rated as being less evolved than all other reference groups, including the *cannabis* group.

To assess whether this was a *heroin* specific effect, we repeated the post hoc analysis comparing *cannabis* to other reference groups. There were no significant differences in ranks (all $p > 0.05$ after Bonferroni correction applied).

Subtle dehumanisation.

(1) *Brits* vs *heroin*: we found a significant group (*Brits* vs *heroin*) effect ($F(1,306) = 110.89, p < 0.001, \eta^2_p = 0.25$) and significant group × emotion level (primary, secondary) ($F(1,306) = 18.15, p < 0.001, \eta^2_p = 0.06$); group × valence (positive, negative) ($F(1,306) = 244.03, p < 0.001, \eta^2_p = 0.44$) and group × level × emotion ($F(1,198) = 124.22, p < 0.001, \eta^2_p = 0.29$) interactions.

Post hoc paired samples *t*-tests (Figure 1) showed that participants thought that the *heroin* group was significantly less likely to feel secondary emotions ($t(306) = -7.24, p < 0.001, d_z = 0.51$) than *Brits*. Examining emotional valence, they were rated as less likely to feel primary positive ($t(306) = -10.88, p < 0.001, d_z = 0.62$) and secondary positive ($t(306) = -22.69\ p < 0.001, d_z = 1.30$) emotions and more likely to feel primary negative ($t(306) = 2.31, p = 0.02, d_z = 0.13$) and secondary negative emotions ($t(306) = 6.73, p < 0.001, d_z = 0.38$).

(2) *Cannabis vs heroin*: we did not find a significant group (*cannabis* vs *heroin*) effect ($F(1,306) = 0.286, p < 0.593, \eta^2_p = 0.00$), but there were significant group x emotion level (primary and secondary) ($F(1,306) = 15.48, p < 0.001, \eta^2_p = 0.05$) and group × valence (positive and negative) ($F(1,306) = 510.92, p < 0.001, \eta^2_p = 0.63$) interactions. However, there was no group × level × emotion ($F(1,198) = 0.177, p = 0.674, \eta^2_p = 0.00$) interaction. Accordingly, no follow-up *post hoc* tests were performed.

(3) *Homeless vs heroin:* we found a significant group (*homeless* vs *heroin*) effect ($F(1,306) = 4.613, p = 0.03, \eta^2_p = 0.02$) and significant group x emotion level (primary and secondary) ($F(1,306) = 217.70, p < 0.001, \eta^2_p = 0.42$); group × valence (positive and negative) ($F(1,306) = 58.79, p < 0.001, \eta^2_p = 0.16$) and group × level × emotion ($F(1,198) = 490.31, p < 0.001, \eta^2_p = 0.62$) interactions.

Post hoc paired samples *t*-tests showed that participants thought that the *heroin* group was significantly less likely to feel secondary ($t(306) = -5.82, p < 0.001, d_z = 0.33$) emotions than

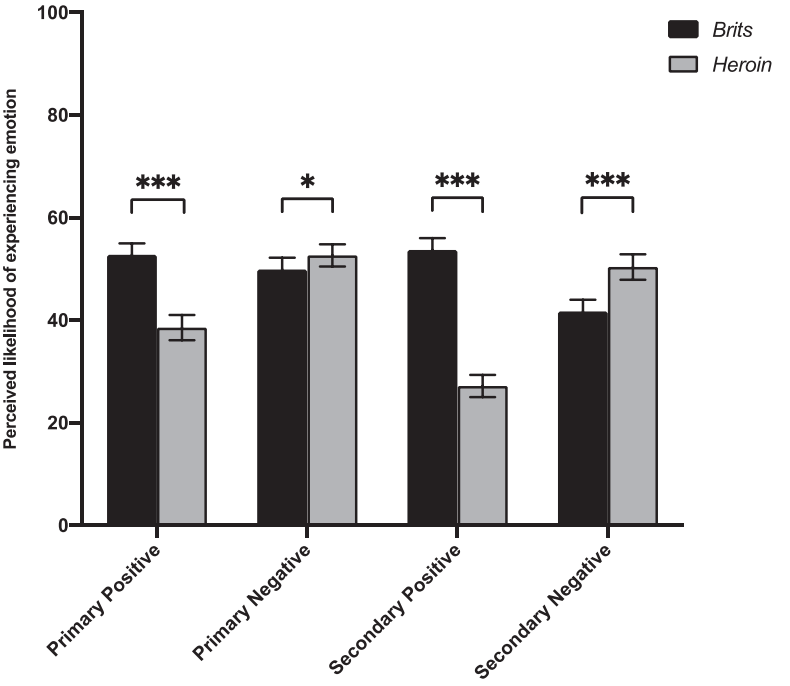


Figure 1.
Extent to which participants attributed primary (universal) and secondary (uniquely human) emotions to the Brits and heroin groups, split by emotional level and valence

Note(s): Bars represent means and 95% CI. ***$p < 0.001$; *$p < 0.05$

homeless. They were rated as more likely to feel primary positive ($t(306) = 18.45$, $p < 0.001$, $d_z = 1.05$) emotions and less likely to feel primary negative ($t(306) = -6.61$, $p < 0.001$, $d_z = 0.38$) and secondary positive emotions ($t(306) = -10.29$, $p < 0.001$, $d_z = 0.59$). There was no difference in ratings for secondary negative emotions ($t(306) = 0.62$ $p = 0.538$, $d_z = 1.30$).

Exploratory analyses. There were significant correlations between residual blatant ($r = -0.323$, $p < 0.001$) and subtle ($r = -0.157$, $p < 0.05$) dehumanisation and AQ-9 score. Higher dehumanisation of people who use heroin relative to the general population was associated with higher stigmatising attitudes. As shown in Table 1, there were significant correlations between blatant dehumanisation and all AQ-9 items and secondary dehumanisation and lack of pity, blame, anger and avoidance.

The regression analysis predicting supportive drug policy support scores and model parameters is presented in Table 2. Model 1 accounted for the largest proportion (17.3%) of the variance in support for drug policy, demonstrating the importance of blatant dehumanisation and emotion. The final model was statistically significant $R^2 = 0.483$; $F(16,115) = 6.726$, $p < 0.001$. Across all steps, younger age, lower blatant dehumanisation and lifetime use of any controlled drug predicted greater support for supportive drug policy ($\beta = 0.38$, $p < 0.001$; $\beta = 0.21$, $p < 0.05$; $\beta = 0.17$, $p < 0.05$ at Step 4, respectively).

Discussion

We investigated whether there was dehumanisation towards people who use heroin in a general population sample. Our main study hypotheses were supported, and we found that

	1	2	3	4	5	6	7	8	9	10
1. Blatant										
2. Subtle	0.18**	–								
3. Lack of pity	0.23***	0.22**	–							
4. Dangerousness	−0.33***	−0.13	0.07	–						
5. Fear	−0.30***	−0.13	0.07	0.74***	–					
6. Blame	−0.32***	−0.27***	0.35***	0.50***	0.51***	–				
7. Segregation	−0.26***	−0.05	0.06	0.48***	0.45***	0.45***	–			
8. Anger	−0.25***	−0.21**	0.22**	0.47***	0.52***	0.56***	0.40***	–		
9. Avoidance	−0.32***	−0.18*	0.08	0.68***	0.58***	0.54***	0.49***	0.56***	–	
10. Coercion	−0.26***	−0.14	0.03	0.40***	0.43***	0.40***	0.29***	0.48***	0.38	
11. Failure to help	−0.23**	−0.12	0.34***	0.24**	0.32***	0.31***	0.19**	0.28***	0.46	−0.10

Note(s): $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

Table 1.
Correlations between residual blatant and subtle dehumanisation scores and AQ-9 items

Variable	*B*	SE	*β*
Step 1			
Intercept	31.04	0.75	
Blatant dehumanisation	0.13	0.03	0.38***
Secondary emotion	0.08	0.05	0.12
Step 2			
Intercept	21.95	2.263	
Blatant dehumanisation	0.09	0.03	0.27***
Secondary emotion	0.08	0.05	0.13
Age	0.29	0.07	0.34**
Participant gender (ref = male)	0.36	1.60	0.02
Education (ref < degree)	3.57	1.56	0.19*
Voting (ref = left wing)			
Right	−3.11	1.96	−0.13
Centre	1.73	3.88	0.03
Step 3			
Intercept	22.39	5.85	
Blatant dehumanisation	0.09	0.03	0.28**
Secondary emotion	0.08	0.05	1.21
Age	0.31	0.07	0.37**
Participant gender (ref = male)	0.56	1.61	0.03
Education (ref < degree)	3.24	1.60	0.17*
Voting (ref = left wing)			
Right	−2.95	1.97	−0.11
Centre	1.73	3.95	0.03
TDDS	−0.11	0.08	−0.10
DSR	0.22	0.34	0.05
Step 4			
Intercept	11.16	12.16	
Blatant dehumanisation	0.07	0.03	0.21*
Secondary emotion	0.05	0.03	0.08
Age	0.32	0.07	0.38***
Participant gender (ref = male)	0.60	1.65	0.03
Education (ref < degree)	2.53	1.58	0.14
Voting (ref = left wing)			
Right	−2.48	1.94	−0.09
Centre	−1.05	3.95	−0.02
TDDS	−0.10	0.08	−0.09
DSR	0.30	0.34	0.07
AQ-9	−0.09	0.07	−0.10
Attitudes to homelessness	−0.39	0.39	−0.08
Attitudes to recovery	0.05	0.13	0.03
Self-reported knowledge	0.57	0.38	0.12
Ever used a controlled substance	10.30	4.65	0.17*
Received drug treatment: family member/close friend	−0.99	1.39	−0.05
Received drug treatment: self	−1.23	5.82	−0.02

Note(s): $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. (R^2 step 1 = 0.173; ΔR^2 step 2 = 0.227, ΔR^2 step 3 = 0.01, ΔR^2 step 4 = 0.07; $p < 0.05$)

Table 2.
Summary of linear regression for variables predicting support for drug policy

there was blatant dehumanisation and that this group was viewed as less human than reference groups, including the general population and other stigmatised groups, such as those who are homeless, have serious mental health problems or who are obese. We also found lower ratings of humanness compared to people who use cannabis, suggesting that

these attitudes may not extend to all PWUD but only to users of certain substances. We also found evidence of subtle dehumanisation (i.e. infrahumanisation). When compared to a general British population reference group, people who use cannabis or people who are homeless, participants rated people who use heroin just as likely to feel primary emotions common to all animals, but less likely to experience uniquely human secondary emotions. Finally, in our exploratory analyses, we found that dehumanisation predicted stigmatising attitudes, and after controlling for a range of relevant demographic, stigma and disgust variables, lower blatant dehumanisation of people who use heroin relative to the general population, younger age and personal use of controlled substances predicted greater support for non-discriminatory drug policy.

There is a large body of research that suggests that dehumanisation of out-groups is prevalent across cultures, population characteristics, social identities and medical diagnoses (Kteily and Bruneau, 2017), but our work is one of the few that has examined this in relation to PWUD and more specifically heroin use. Our findings extend previous research that has consistently found that diverse groups, including the general public and law enforcement, health and social care professionals, stigmatise PWUD (Lloyd, 2013) or blatantly dehumanise them (Harris and Fiske, 2006; Boysen *et al.*, 2020; Fontesse *et al.*, 2021). As we found differences in dehumanisation scores towards heroin and cannabis users compared to reference groups, our study confirms previous research, including survey and qualitative research, that suggests stigmatising attitudes are drug dependent and are not simply a function of the use of controlled substances (e.g. McElrath and McEvoy, 2001; Palamar *et al.*, 2012). For legally regulated and socially normalised substances such as alcohol, stigmatisation is orientated towards people with use disorders or harmful use (Kilian *et al.*, 2021). As more countries establish legal (medical and non-medical) markets for cannabis, within-substance attitudes, including dehumanisation, may similarly shift towards transgressions of newly emerging normative use behaviours rather than use *per se* (Asbridge *et al.*, 2016). We replicated previous findings on blatant dehumanisation and also found evidence of subtle dehumanisation, which was associated with stigmatising attitudes of lack of pity and increased blame, anger and avoidance of PWUD, which might underlie processes of dehumanisation. Across all out-groups, dehumanisation also acts as a barrier to positive social interaction, and target groups are perceived as a threat to the in-group, whether directly through aggression or violence or by challenging in-group integrity and identity, including moral equanimity (Leyens *et al.*, 2007; Haslam and Loughnan, 2014).

While there are many psychological factors that contribute to stigmatising attitudes (Markowitz and Slovic, 2020), one socio-moral factor suggested to have a role dehumanisation is disgust, where neural responses have indicated dehumanised social groups elicit disgust responses in the amygdala and insula (Harris and Fiske, 2006). Disgust has been defined as a defensive mechanism evolved to protect from harm by promoting withdrawal from food contaminants (Vicario *et al.*, 2017), though disgust has also been observed in relation to non-food stimuli suggesting that it has a more wide-ranging protective function that extends to interpersonal and social interactions (Rozin *et al.*, 1993). Moreover, stigma and disgust have been found to be strongly related to each other. In one functional Magnetic Resonance Imaging (fMRI) study, comparing activation to stigmatised faces (obesity, facial piercings, transsexual and unattractive categories) and control faces, control faces were rated as significantly less disgusting than all other categories (Krendl *et al.*, 2006). According to Rozin *et al.* (1999), the law of contagion dictates that stimuli that have been in contact with individuals who are deemed unwell (e.g. individuals with mental health problems and cancer patients) are viewed with disgust for fear that they may make the viewer similarly ill. Disgust propensity (how likely a person is to be disgusted) has also been found to be related to stigma towards homosexuality (Olatunji, 2008), obesity (Vartanian, 2010) and cancer patients (Pryor *et al.*, 2004) while disgust sensitivity (how strong a disgust response is) has been shown to

predict avoidance behaviour to anxiety provoking stimuli (Nicholson and Barnes-Holmes, 2012). Sherman and Haidt (2011) discuss the relationship between animalistic dehumanisation and disgust and the role of mentalising (the processes used to decide if an entity possesses a mind). They propose that elicitors (things which elicit disgust) that remind us of our animal nature (e.g. elicitors related to sex or death) are most likely to elicit a disgust response and inhibit the processes involved in mentalising. Disruption of mentalising therefore leads us to attribute fewer human traits to a group that we perceive as disgusting. This animalistic dehumanisation results in exclusion of the disgust-eliciting and dehumanised group from social interactions, in an attempt to reduce the potential contamination.

Dehumanisation may also be used as a self- or in-group strategy of moral disengagement in order to maintain group self-image (Bandura, 1991; Bandura *et al.*, 2001). Actions that potentially have negative consequence for others may lead to feelings of guilt and regret, and anticipation of these may lead to self-regulation of behaviour (Bandura, 1991). However, psychosocial mechanisms of disengagement, including dehumanisation of affected groups, allow group members to violate moral norms with emotional impunity by providing justification, rationalisation and/or absolvement of personal responsibility. Once out-group members are dehumanised and stripped of common human attributes, even when undertaken subtly and unintentionally, empathy towards them is reduced, opening them to hostility and discrimination (Čehajić *et al.*, 2009; Boysen *et al.*, 2020). Whilst previous research has examined how this might relate to overtly aggressive policies towards groups such as refugees or those states perceived as hostile (e.g. Rai *et al.*, 2017), these types of process may also be relevant to health, criminal justice and social care policy decisions. Subtle dehumanisation of people with mental health problems, for example, predicts increased public social distancing and perceptions of dangerousness (Martinez *et al.*, 2011; Martinez, 2014; Krzyzanowski *et al.*, 2017); blatant dehumanisation of people with obesity predicts public support for discriminatory policies (Kersbergen and Robinson, 2019); whilst dehumanisation of people with alcohol use disorders by healthcare workers has been associated with negative outcomes, such as reduced value paid to patient consent and pain when making a medical decision related to their treatment (Fontesse *et al.*, 2021). Policymakers may take advantage of public perceptions towards out-groups to justify difficult political choices, subsequently reinforcing and maintaining the social contexts that originally shaped those attitudes (Harris, 2014). Recent changes in the objectives of UK drugs policy and reduction in expenditure (Roscoe *et al.*, 2021), for example, have been accompanied by changes in framing of responses to substance use and the people who use them, with suggestions that PWUD are denied human agency in both popular and political discourse (Stevens, 2018; Atkinson and Sumnall, 2021). Some recent UK public opinion surveys commissioned by campaigning groups suggest that public attitudes towards responses to controlled substance use might be changing (YouGov and CDPRG, 2019). However, despite this and the high burden of societal harms associated with substance use, most studies suggest only minority support for public expenditure on drug treatment (Matheson *et al.*, 2014) and high public opposition towards evidence based harm reduction, even during public health events, such as the US opioid overdose crisis (McGinty *et al.*, 2018; McGinty and Barry, 2020). Considering the association we found between blatant dehumanisation and lower support for non-discriminatory drug policy, dehumanisation could be being employed as a moral disengagement strategy to rationalise lack of support or dehumanising attitudes might simply precede lower support. Follow-up work incorporating moral disengagement measures could help to resolve this, as addressing dehumanisation as a moral disengagement strategy would require a different approach to stigma reduction actions (Livingston *et al.*, 2012; Sumnall *et al.*, 2021b).

Indeed, in contrast to stigma research there has been little work examining reduction of dehumanisation of out-groups labelled on the basis of health or social behaviours (*cf* refugees or ethnicity) (Haslam and Loughnan, 2014; Lancaster *et al.*, 2017). However, in keeping with the findings of stigma research, there is a small body of evidence to suggest interventions designed to improve the quality of contact between groups, including those receiving welfare payments, have been shown to be effective in reducing dehumanisation (Vezzali *et al.*, 2012; Corrigan, 2016; Kteily and Bruneau, 2017; Bruneau *et al.*, 2021). Whilst these are approaches that can be relatively easily embedded within professional education or through small structured inter-group contact activities (Couture and Penn, 2003; Corrigan *et al.*, 2014; Bruneau *et al.*, 2021), as with all public health interventions, they may be difficult to implement at scale (World Health Organization, 2009). These types of approach may also face some additional challenges. Rather than particular behaviours or perceived characteristics leading to beliefs that out-groups are simply "less than human", dehumanising attitudes may reflect automatic perceptions that out-groups deserve low social hierarchical status, with foundations in long-standing inter-group interactions, and individual and societal attitudes towards intersecting factors, such as class, ethnicity and gender (Haslam and Loughnan, 2014), and beliefs about the blame and controllability of substance use disorders and the dangerousness of PWUD (Corrigan *et al.*, 2009; Sattler *et al.*, 2017; Ashford *et al.*, 2018; Sumnall *et al.*, 2021a). Furthermore, in accordance with social dominance theory, those who dehumanise may not simply perceive others as threatening, but may value asserting power and support efforts to separate groups through the use of discriminatory policy and other prejudicial actions and are therefore less likely to respond to humanising interventions (Pratto *et al.*, 2006; Markowitz and Slovic, 2020).

Acknowledging these challenges, one approach to humanisation could be through addressing popular media representations of PWUD (Fraser *et al.*, 2016; McGinty *et al.*, 2019). PWUD are typically framed in popular media as dangerous, "contaminated" and lacking human agency (Atkinson and Sumnall, 2018, 2021), but previous work has shown that manipulations such as sympathetic framing and the use of neutral and person first terminology is associated with reduced stigma (Goodyear *et al.*, 2018; Sumnall *et al.*, 2021a). This is an area that requires further research with respect to dehumanisation. Of relevance, when research participants were asked to read a news article depicting a violent crime depicted by a man with a diagnosis of schizophrenia, they were much more likely to select noun-labelled headlines (e.g. "Schizophrenic Snaps") than person-first ones (e.g. "Person with Schizophrenia Snaps"), and this was mediated by dehumanising attitudes (Krzyzanowski *et al.*, 2017). However, another experimental intervention designed to reduce dehumanisation of people with obesity by presenting textual information on its complex causes was unsuccessful, as it may have reinforced existing norms that most people already dehumanise obesity, thus legitimising discriminatory attitudes (Kersbergen and Robinson, 2019). As people process information about in- and out-group members differently (Riek *et al.*, 2006), these researchers suggested that combining explanatory information with humanising imagery that contrasted with typical media representations of obesity (i.e. a focus on headless bodies, comparable to "mugshots" and images of drug overdose or extreme intoxication in relation to substance use) warrant further investigation. Other work in the alcohol and mental health fields suggests that presentation of conditions on a continuum, which suggests that people all experience relevant symptoms at some point in their life, rather than as a binary, where experiences are presented as different from normative human experiences, is associated with reduced stigma (Peter *et al.*, 2021). This type of framing may increase perceived similarities between groups, thus reducing inter-group boundaries. However, whilst all humans may be susceptible to mental health problems and in many countries a majority report recent use of alcohol, only a minority use drugs such as heroin (e.g. approximately 0.5% of the UK population report a lifetime use; ONS, 2020). Therefore, a focus

on other overlapping human characteristics rather than experiences of substance use may be more appropriate.

This study has limitations which should be acknowledged and which also suggest some areas of further work. First, we recruited a convenience sample, and so our findings may not be generalisable to the wider population; our study was also cross-sectional, and so we do not make any claims about causality. Whilst this sampling method led to over-representation of females and participants with at least one lifetime use of a controlled substance, follow-up analysis suggested no differences in blatant and subtle dehumanisation using these grouping variables (data not shown), and they were not significant predictors of policy support. Second, whilst we controlled for moral disgust and stigma towards PWUD in our exploratory analysis, we were unable to control for stigmatising attitudes towards the target and reference groups in our assessments of blatant and subtle dehumanisation. Whilst stigma is considered distinct from dehumanisation (although related concepts) (Bruneau *et al.*, 2018a, b), pre-existing negative attitudes towards depicted groups may have influenced our findings. However, study objectives were only revealed in the debrief, and whilst participants may have guessed that the images used in the AOH meant we were assessing "humanness", thus potentially introducing social desirability biases, the nature of the subtle dehumanisation task would not be immediately clear. Participants would be unlikely to be aware that their ratings of randomly presented emotional attributes indicated dehumanisation of target groups (Eyssel and Ribas, 2012). The heroin group was also rated as feeling significantly more negative primary and secondary emotions, suggesting that subtle dehumanisation can be further distinguished through valence of emotions and does not simply reflect dislike or antipathy. Third, we only presented simple group labels (e.g. heroin user). Work on public stigmatisation of PWUD suggests that substance use intersects with other (perceived) characteristics, including gender, age, ethnicity, deprivation and social class (Ahern *et al.*, 2007; Radcliffe and Stevens, 2008; Järvinen and Demant, 2011; Kulesza *et al.*, 2013; Smith *et al.*, 2016; Sattler *et al.*, 2017). Other research suggests that groups attributed with these characteristic are independently dehumanised across cultures (e.g Rudman and Mescher, 2012; Loughnan *et al.*, 2014; Kteily *et al.*, 2015), and so future work could investigate how representation of additional characteristics of people who use heroin affect dehumanising attitudes. Finally, whilst we included some individual participant predictors (e.g. demographics, social distance to PWUD and personal experiences of substance use), other psychological and social predictors, such as personality (e.g. narcissism), self-perception of social power, status and vulnerability and adverse childhood experiences that lead to lower social connectedness, have been associated with dehumanising attitudes (Markowitz and Slovic, 2020). Better understanding of these factors may assist in framing and targeting actions that aim to reduce stigma and discrimination towards dehumanised groups.

Conclusions

In conclusion, we found evidence that there was blatant and subtle dehumanisation of people who use heroin. In this sample, this was even greater relative to other highly stigmatised groups. Dehumanisation of people who use heroin may present significant challenges for the development of stigma reduction initiatives and subsequently fostering public support for evidence-based drug policy and treatment. As public opinion plays an important role in policy discussions, denial of the humanity of this group could be used to justify discriminatory policies or relative deprioritisation of support services in funding decisions. Person-centred activities that seek to "humanise" PWUD, including social inclusion, and encouraging compassionate media representations that portray the lived experiences of

substance use are likely to be challenging, but may be a useful foundation for intervention development.

References

Addison, S.J. and Thorpe, S.J. (2004), "Factors involved in the formation of attitudes towards those who are mentally ill", *Social Psychiatry and Psychiatric Epidemiology*, Vol. 39 No. 3, pp. 228-234.

Ahern, J., Stuber, J. and Galea, S. (2007), "Stigma, discrimination and the health of illicit drug users", *Drug and Alcohol Dependence*, Vol. 88 No. 2, pp. 188-196.

Alexandrescu, L. (2018), "'Ethnobotanicals' and 'Spice zombies': new psychoactive substances in the mainstream media", *Drugs: Education, Prevention and Policy*, Vol. 25 No. 4, pp. 356-364.

Andersen, D. and Kessing, M.L. (2019), "Stigma, problem drug use, and welfare state encounters: changing contours of stigmatization in the era of social investment", *Addiction Research and Theory*, Vol. 27 No. 4, pp. 277-284.

Asbridge, M., Valleriani, J., Kwok, J. and Erickson, P.G. (2016), "Normalization and denormalization in different legal contexts: comparing cannabis and tobacco", *Drugs: Education, Prevention and Policy*, Vol. 23 No. 3, pp. 212-223.

Ashford, R.D., Brown, A.M. and Curtis, B. (2018), "Substance use, recovery, and linguistics: the impact of word choice on explicit and implicit bias", *Drug and Alcohol Dependence*, Vol. 189, pp. 131-138.

Ashford, R.D., Brown, A.M. and Curtis, B. (2019), "'Abusing addiction': our language still isn't good enough", *Alcoholism Treatment Quarterly*, Vol. 37 No. 2, pp. 257-272.

Atkinson, A.M. and Sumnall, H.R. (2018), "Neo-liberal discourse of substance use in the UK reality TV show, the Jeremy Kyle Show", *Drugs: Education, Prevention and Policy*, pp. 1-12.

Atkinson, A.M. and Sumnall, H.R. (2021), "'Zombies', 'cannibals' and 'super humans': a quantitative and qualitative analysis of UK news media reporting of the cathinone psychostimulants labelled 'monkey dust'", *Drugs: Education Prevention and Policy*, Vol. 28 No. 4, pp. 299-315.

Ayres, T.C. and Jewkes, Y. (2012), "The haunting spectacle of crystal meth: a media-created mythology?", *Crime, Media, Culture*, Vol. 8 No. 3, pp. 315-332.

Bachhuber, M.A., McGinty, E.E., Kennedy-Hendricks, A., Niederdeppe, J. and Barry, C.L. (2015), "Messaging to increase public support for Naloxone distribution policies in the United States: results from a randomized survey experiment", *PLoS ONE*, Vol. 10 No. 7, p. e0130050.

Bandura, A. (1991), "Social cognitive theory of moral thought and action", in Kurtines, W.M. and Gewirtz, J.L. (Eds), *Handbook of Moral Behavior and Development: Theory, Research and Applications*, Erlbaum, Psychology Press, Hillsdale, NJ.

Bandura, A., Caprara, G.V., Barbaranelli, C., Pastorelli, C. and Regalia, C. (2001), "Sociocognitive self-regulatory mechanisms governing transgressive behavior", *Journal Personality and Social Psychology*, Vol. 80 No. 1, p. 125.

Barry, C.L., Sherman, S.G., Stone, E., Kennedy-Hendricks, A., Niederdeppe, J., Linden, S. and McGinty, E.E. (2019), "Arguments supporting and opposing legalization of safe consumption sites in the U.S", *International Journal of Drug Policy*, Vol. 63, pp. 18-22.

Boysen, G.A., Isaacs, R.A., Tretter, L. and Markowski, S. (2020), "Evidence for blatant dehumanization of mental illness and its relation to stigma", *The Journal of Social Psychology*, Vol. 160 No. 3, pp. 346-356.

Brown, S.A. (2011), "Standardized measures for substance use stigma", *Drug Alcohol Depend*, Vol. 116 Nos 1-3, pp. 137-141.

Brown, S.A. (2015), "Stigma towards Marijuana users and heroin users", *Journal of Psychoactive Drugs*, Vol. 47 No. 3, pp. 213-220.

Bruneau, E., Jacoby, N., Kteily, N. and Saxe, R. (2018a), "Denying humanity: the distinct neural correlates of blatant dehumanization", *Journal Experimental Psychology: General*, Vol. 147 No. 7, pp. 1078-1093.

Bruneau, E., Kteily, N. and Laustsen, L. (2018b), "The unique effects of blatant dehumanization on attitudes and behavior towards Muslim refugees during the European 'refugee crisis' across four countries", *European Journal of Social Psychology*, Vol. 48 No. 5, pp. 645-662.

Bruneau, E., Hameiri, B., Moore-Berg, S.L. and Kteily, N. (2021), "Intergroup contact reduces dehumanization and meta-dehumanization: cross-sectional, longitudinal, and Quasi-experimental evidence from 16 samples in five countries", *Personality and Social Psychology Bulletin*, Vol. 47 No. 6, pp. 906-920.

Čehajić, S., Brown, R. and González, R. (2009), "What do I care? Perceived ingroup responsibility and dehumanization as predictors of empathy felt for the victim group", *Group Processes and Intergroup Relations*, Vol. 12 No. 6, pp. 715-729.

Corrigan, P.W. (2016), "Lessons learned from unintended consequences about erasing the stigma of mental illness", *World Psychiatry*, Vol. 15 No. 1, pp. 67-73.

Corrigan, P.W., Markowitz, F.E., Watson, A., Rowan, D. and Kubiak, M.A. (2003), "An attribution model of public discrimination towards persons with mental illness", *Journal of Health and Social Behavior*, Vol. 44 No. 2, pp. 162-179.

Corrigan, P.W., Kuwabara, S.A. and O'Shaughnessy, J. (2009), "The public stigma of mental illness and drug addiction: findings from a stratified random sample", *Journal of Social Work*, Vol. 9 No. 2, pp. 139-147.

Corrigan, P.W., Michaels, P.J., Vega, E., Gause, M., Larson, J., Krzyzanowski, R. and Botcheva, L. (2014), "Key ingredients to contact-based stigma change: a cross-validation", *Psychiatric Rehabilitation Journal*, Vol. 37 No. 1, p. 62.

Couture, S. and Penn, D. (2003), "Interpersonal contact and the stigma of mental illness: a review of the literature", *Journal of Mental Health*, Vol. 12 No. 3, pp. 291-305.

Dalsklev, M. and Kunst, J.R. (2015), "The effect of disgust-eliciting media portrayals on outgroup dehumanization and support of deportation in a Norwegian sample", *International Journal of Intercultural Relations*, Vol. 47, pp. 28-40.

Degenhardt, L., Charlson, F., Ferrari, A., Santomauro, D., Erskine, H., Mantilla-Herrara, A., Whiteford, H., Leung, J., Naghavi, M., Griswold, M., Rehm, J., Hall, W., Sartorius, B., Scott, J., Vollset, S.E., Knudsen, A.K., Haro, J.M., Patton, G., Kopec, J., Carvalho Malta, D., Topor-Madry, R., McGrath, J., Haagsma, J., Allebeck, P., Phillips, M., Salomon, J., Hay, S., Foreman, K., Lim, S., Mokdad, A., Smith, M., Gakidou, E., Murray, C. and Vos, T. (2018), "The global burden of disease attributable to alcohol and drug use in 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2016", *The Lancet Psychiatry*, Vol. 5 No. 12, pp. 987-1012.

DeLuca-McLean, D. and Castano, E. (2009), "Infra-humanization of ethnic minorities: the moderating role of ideology", *Basic and Applied Social Psychology*, Vol. 31 No. 2, pp. 102-108.

Dyregrov, K. and Selseng, L.B. (2021), "'Nothing to mourn, he was just a drug addict' - stigma towards people bereaved by drug-related death", *Addiction Research and Theory*, pp. 1-11, doi: 10.1080/16066359.2021.1912327.

Eyssel, F. and Ribas, X. (2012), "How to be good (or bad): on the fake ability of dehumanization and prejudice against outgroups", *Group Processes and Intergroup Relations*, Vol. 15 No. 6, pp. 804-812.

Faul, F., Erdfelder, E., Lang, A.-G. and Buchner, A. (2007), "G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences", *Behavior Research Methods*, Vol. 39 No. 2, pp. 175-191.

Fitzgerald, J.L. (2020), "Etched in the skin: pain, methamphetamine violence and affect", *Life in Pain: Affective Economy and the Demand for Pain Relief*, Springer Singapore, Singapore, pp. 139-169.

Fontesse, S., Stinglhamber, F., Demoulin, S., Chevallereau, T., de Timary, P., Cappeliez, B., Bon, F., Geus, C., Talent, J., Ayache, L. and Maurage, P. (2020), "Metadehumanization in severe alcohol-use disorders: links with fundamental needs and clinical outcomes", *Addictive Behaviors*, Vol. 107, 106425.

Fontesse, S., Rimez, X. and Maurage, P. (2021), "Stigmatization and dehumanization perceptions towards psychiatric patients among nurses: a path-analysis approach", *Archives of Psychiatric Nursing*, Vol. 35 No. 2, pp. 153-161.

Fraser, S.K.M.P., Dilkes-Frayne, E., Kokanovic, R., D.R., M., Treloar, C. and Dunlop, A. (2016), "Lives of substance: personal stories of alcohol and other drug addiction, dependence or habit", available at: https://www.livesofsubstance.org/.

Fraser, S., Farrugia, A. and Dwyer, R. (2018), "Grievable lives? Death by opioid overdose in Australian newspaper coverage", *International Journal of Drug Policy*, Vol. 59, pp. 28-35.

Goodyear, K., Haass-Koffler, C.L. and Chavanne, D. (2018), "Opioid use and stigma: the role of gender, language and precipitating events", *Drug and Alcohol Dependence*, Vol. 185, pp. 339-346.

Harris, L.T. (2014), "Why economic, health, legal, and immigration policy should consider dehumanization", *Policy Insights from the Behavioral and Brain Sciences*, Vol. 1 No. 1, pp. 144-150.

Harris, L.T. and Fiske, S.T. (2006), "Dehumanizing the lowest of the low:neuroimaging responses to extreme out-groups", *Psychological Science*, Vol. 17 No. 10, pp. 847-853.

Harris, L.T. and Fiske, S.T. (2009), "Social neuroscience evidence for dehumanised perception", *European Review of Social Psychology*, Vol. 20 No. 1, pp. 192-231.

Haslam, N. and Loughnan, S. (2014), "Dehumanization and infrahumanization", *Annual Review of Psychology*, Vol. 65 No. 1, pp. 399-423.

IBM Corp (2020), "IBM SPSS statistics for windows", Version 27.0, available at: https://www.ibm.com/uk-en/products/spss-statistics.

Järvinen, M. and Demant, J. (2011), "The normalisation of cannabis use among young people: symbolic boundary work in focus groups", *Health, Risk and Society*, Vol. 13 No. 2, pp. 165-182.

Kelly, J.F., Greene, M.C. and Abry, A. (2021), "A US national randomized study to guide how best to reduce stigma when describing drug-related impairment in practice and policy", *Addiction*, Vol. 116 No. 7, pp. 1757-1767.

Kennedy-Hendricks, A., Barry, C.L. and McGinty, E.E. (2016), "Effects of competing narratives on public perceptions of opioid pain reliever addiction during pregnancy", *Journal of Health Politics, Policy and Law*, Vol. 41 No. 5, pp. 873-916.

Kersbergen, I. and Robinson, E. (2019), "Blatant dehumanization of people with obesity", *Obesity*, Vol. 27 No. 6, pp. 1005-1012.

Kilian, C., Manthey, J., Carr, S., Hanschmidt, F., Rehm, J., Speerforck, S. and Schomerus, G. (2021), "Stigmatization of people with alcohol use disorders: an updated systematic review of population studies", *Alcoholism: Clinical and Experimental Research*, Vol. 45 No. 5, pp. 899-911.

Krendl, A.C., Macrae, C.N., Kelley, W.M., Fugelsang, J.A. and Heatherton, T.F. (2006), "The good, the bad, and the ugly: an fMRI investigation of the functional anatomic correlates of stigma", *Society of Neuroscience*, Vol. 1 No. 1, pp. 5-15.

Krzyzanowski, D., Howell, A. and Passmore, H.-A. (2017), "Predictors and causes of the use of noun-based mental disorder labels", *Stigma and Health*, Vol. 4.

Kteily, N.S. and Bruneau, E. (2017), "Darker demons of our nature: the need to (re)focus attention on blatant forms of dehumanization", *Current Directions in Psychological Science*, Vol. 26 No. 6, pp. 487-494.

Kteily, N.S., Bruneau, E., Waytz, A. and Cotterill, S. (2015), "The ascent of man: theoretical and empirical evidence for blatant dehumanization", *Journal of Personality and Social and Psychology*, Vol. 109 No. 5, pp. 901-931.

Kulesza, M., Larimer, M.E. and Rao, D. (2013), "Substance use related stigma: what we know and the way forward", *Journal of Addictive Behaviors, Therapy and Rehabilitation*, Vol. 2 No. 2, p. 782.

Kulesza, M., Matsuda, M., Ramirez, J.J., Werntz, A.J., Teachman, B.A. and Lindgren, K.P. (2016), "Towards greater understanding of addiction stigma: intersectionality with race/ethnicity and gender", *Drug Alcohol Depend*, Vol. 169, pp. 85-91.

Lancaster, K., Seear, K. and Ritter, A. (2017), "Reducing stigma and discrimination for people experiencing problematic alcohol and other drug use", available at: https://ndarc.med.unsw.edu.au/project/reducing-stigma-and-discrimination-people-who-use-alcohol-and-other-drugs (accessed 5 July 2021).

Lewer, D., Freer, J., King, E., Larney, S., Degenhardt, L., Tweed, E.J., Hope, V.D., Harris, M., Millar, T., Hayward, A., Ciccarone, D. and Morley, K.I. (2019), "Frequency of health-care utilization by adults who use illicit drugs: a systematic review and meta-analysis", *Addiction*, Vol. 115 No. 6, pp. 1011-1023.

Leyens, J.-P., Demoulin, S., Vaes, J., Gaunt, R. and Paladino, M.P. (2007), "Infra-humanization: the wall of group differences", *Social Issues and Policy Review*, Vol. 1 No. 1, pp. 139-172.

Livingston, J.D., Milne, T., Fang, M.L. and Amari, E. (2012), "The effectiveness of interventions for reducing stigma related to substance use disorders: a systematic review", *Addiction*, Vol. 107 No. 1, pp. 39-50.

Lloyd, C. (2013), "The stigmatization of problem drug users: a narrative literature review", *Drugs: Education, Prevention and Policy*, Vol. 20 No. 2, pp. 85-95.

Loughnan, S., Haslam, N., Sutton, R.M. and Spencer, B. (2014), "Dehumanization and social class: animality in the stereotypes of 'white trash,' 'chavs,' and 'bogans'", *Social Psychology*, Vol. 45 No. 1, pp. 54-61.

Mak, W.W.S. and Cheung, R.Y.M. (2008), "Affiliate stigma among caregivers of people with intellectual disability or mental illness", *Journal of Applied Research in Intellectual Disabilities*, Vol. 21 No. 6, pp. 532-545.

Markowitz, D.M. and Slovic, P. (2020), "Social, psychological, and demographic characteristics of dehumanization toward immigrants", *Proceedings of the National Academy of Sciences*, Vol. 117 No. 17, p. 9260.

Marshall, O. (2013), "Associative stigma among families of alcohol and other drug users", thesis, Edith Cowan University.

Martinez, A.G. (2014), "When 'they' become 'I': ascribing humanity to mental illness influences treatment-seeking for mental/behavioral health conditions", *Journal of Social and Clinical Psychology*, Vol. 33 No. 2, pp. 187-206.

Martinez, A.G., Piff, P.K., Mendoza-Denton, R. and Hinshaw, S.P. (2011), "The power of a label: mental illness diagnoses, ascribed humanity, and social rejection", *Journal of Social and Clinical Psychology*, Vol. 30 No. 1, pp. 1-23.

Martínez, R., Rodriguez-Bailon, R., Moya, M. and Vaes, J. (2017), "How do different humanness measures relate? Confronting the attribution of secondary emotions, human uniqueness, and human nature traits", *The Journal of Social Psychology*, Vol. 157 No. 2, pp. 165-180.

Matheson, C., Jaffray, M., Ryan, M., Bond, C.M., Fraser, K., Kirk, M. and Liddell, D. (2014), "Public opinion of drug treatment policy: exploring the public's attitudes, knowledge, experience and willingness to pay for drug treatment strategies", *International Journal of Drug Policy*, Vol. 25 No. 3, pp. 407-415.

McElrath, K. and McEvoy, K. (2001), "Heroin as evil: ecstasy users' perceptions about heroin", *Drugs: Education, Prevention and Policy*, Vol. 8 No. 2, pp. 177-189.

McGinty, E. and Barry, C.L. (2020), "Stigma reduction to combat the addiction crisis - developing an evidence base", *The New England Journal of Medicine*, Vol. 382 No. 14, pp. 1291-1292.

McGinty, E., Barry, C.L., Stone, E.M., Niederdeppe, J., Kennedy-Hendricks, A., Linden, S. and Sherman, S.G. (2018), "Public support for safe consumption sites and syringe services programs to combat the opioid epidemic", *Preventive Medicine*, Vol. 111, pp. 73-77.

McGinty, E., Kennedy-Hendricks, A. and Barry, C.L. (2019), "Stigma of addiction in the media", in Avery, J.D. and Avery, J.J. (Eds), *The Stigma of Addiction: an Essential Guide*, Springer International Publishing, Cham, pp. 201-214.

Nicholson, E. and Barnes-Holmes, D. (2012), "Developing an implicit measure of disgust propensity and disgust sensitivity: examining the role of implicit disgust propensity and sensitivity in obsessive-compulsive tendencies", *Journal of Behavior Therapy and Experimental Psychiatry*, Vol. 43 No. 3, pp. 922-930.

Olatunji, B.O. (2008), "Disgust, scrupulosity and conservative attitudes about sex: evidence for a mediational model of homophobia", *Journal of Research in Personality*, Vol. 42 No. 5, pp. 1364-1369.

Olatunji, B.O., Williams, N.L., Tolin, D.F., Abramowitz, J.S., Sawchuk, C.N., Lohr, J.M. and Elwood, L.S. (2007), "The disgust scale: item analysis, factor structure, and suggestions for refinement", *Psychological Assessment*, Vol. 19 No. 3, pp. 281-297.

ONS (2020), "Drug misuse in England and Wales: year ending March 2020", available at: https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/drugmisuseinenglandandwales/yearendingmarch2020 (accessed 5 July 2021).

Palamar, J.J., Kiang, M.V. and Halkitis, P.N. (2012), "Predictors of stigmatization towards use of various illicit drugs among emerging adults", *Journal of Psychoactive Drugs*, Vol. 44 No. 3, pp. 243-251.

Parker, L.R., Monteith, M.J. and South, S.C. (2020), "Dehumanization, prejudice, and social policy beliefs concerning people with developmental disabilities", *Group Processes and Intergroup Relations*, Vol. 23 No. 2, pp. 262-284.

Peter, L.-J., Schindler, S., Sander, C., Schmidt, S., Muehlan, H., McLaren, T., Tomczyk, S., Speerforck, S. and Schomerus, G. (2021), "Continuum beliefs and mental illness stigma: a systematic review and meta-analysis of correlation and intervention studies", *Psychological Medicine*, Vol. 51 No. 5, pp. 716-726.

Phillips, L.A. and Shaw, A. (2013), "Substance use more stigmatized than smoking and obesity", *Journal of Substance Use*, Vol. 18 No. 4, pp. 247-253.

Pratto, F., Sidanius, J. and Levin, S. (2006), "Social dominance theory and the dynamics of intergroup relations: taking stock and looking forward", *European Review of Social Psychology*, Vol. 17 No. 1, pp. 271-320.

Pryor, J.B., Reeder, G.D., Yeadon, C. and Hesson-McLnnis, M. (2004), "A dual-process model of reactions to perceived stigma", *Journal of Personality and Social Psychology*, Vol. 87 No. 4, pp. 436-452.

Radcliffe, P. and Stevens, A. (2008), "Are drug treatment services only for 'thieving junkie scumbags'? Drug users and the management of stigmatised identities", *Social Science and Medicine*, Vol. 67 No. 7, pp. 1065-1073.

Rai, T.S., Valdesolo, P. and Graham, J. (2017), "Dehumanization increases instrumental violence, but not moral violence", *Proceedings of the National Academy of Sciences*, Vol. 114 No. 32, pp. 8511-8516.

Riek, B.M., Mania, E.W. and Gaertner, S.L. (2006), "Intergroup threat and outgroup attitudes: a meta-analytic review", *Personality and Social Psychology Review*, Vol. 10 No. 4, pp. 336-353.

Rivera, A.V., DeCuir, J., Crawford, N.D., Amesty, S. and Lewis, C.F. (2014), "Internalized stigma and sterile syringe use among people who inject drugs in New York City, 2010-2012", *Drug and Alcohol Dependence*, Vol. 144, pp. 259-264.

Room, R., Rehm, J., Trotter Ii, R., Paglia, A. and Üstün, T.B. (2001), "Cross-cultural views on stigma, valuation, parity and societal values towards disability", Üstün, T.B., Chatterji, S., Bickenbach, J.E., Trotter II, R.T., Room, R., Rehm, J. and Saxena, S. (Eds), *Disability and Culture: Universalism and Diversity*, Hogrefe & Huber Publishers, Seattle, pp. 247-297.

Roscoe, S., Pryce, R., Buykx, P., Gavens, L. and Meier, P.S. (2021), "Is disinvestment from alcohol and drug treatment services associated with treatment access, completions and related harm?

An analysis of English expenditure and outcomes data", *Drug and Alcohol Review*, Online first, doi: 10.1111/dar.13307.

Rozin, P., Haidt, J. and McCauley, C.R. (1993), "Disgust", *Handbook of Emotions*, The Guilford Press, New York, NY, pp. 575-594.

Roznin, P., Haidt, J., McCauley, C., Dunlop, L. and Ashmore, M. (1999), "Individual differences in disgust sensitivity: comparisons and evaluations of paper-and-pencil versus behavioral measures", *Journal of Research in Personality*, Vol. 33 No. 3, pp. 330-351.

Rudman, L.A. and Mescher, K. (2012), "Of animals and objects:men's implicit dehumanization of women and likelihood of sexual aggression", *Personality and Social Psychology Bulletin*, Vol. 38 No. 6, pp. 734-746.

Sattler, S., Escande, A., Racine, E. and Goritz, A.S. (2017), "Public stigma toward people with drug addiction: a factorial survey", *Journal of Studies on Alcohol and Drugs*, Vol. 78 No. 3, pp. 415-425.

Sherman, G.D. and Haidt, J. (2011), "Cuteness and disgust: the humanizing and dehumanizing effects of emotion", *Emotion Review*, Vol. 3 No. 3, pp. 245-251.

Singer, L.T., Moore, D.G., Min, M.O., Goodwin, J., Turner, J.J., Fulton, S. and Parrott, A.C. (2016), "Motor delays in MDMA (ecstasy) exposed infants persist to 2years", *Neurotoxicology and Teratology*, Vol. 54, pp. 22-28.

Singleton, N. (2010), "Attitudes to drug dependence. Results form a survey of people living in private households in the UK", available at: https://www.bl.uk/collection-items/attitudes-to-drug-dependence-results-from-a-survey-of-people-living-in-private-households-in-the-uk# (accessed 5 July 2021).

Smith, L.R., Earnshaw, V.A., Copenhaver, M.M. and Cunningham, C.O. (2016), "Substance use stigma: reliability and validity of a theory-based scale for substance-using populations", *Drug and Alcohol Dependence*, Vol. 162, pp. 34-43.

Stangl, A.L., Earnshaw, V.A., Logie, C.H., van Brakel, W., Simbayi, C.L., Barré, I. and Dovidio, J.F. (2019), "The health stigma and discrimination framework: a global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas", *Bmc Medicine*, Vol. 17 No. 1, p. 31.

Stevens, A. (2018), "'Being human' and the 'moral sidestep' in drug policy: explaining government inaction on opioid-related deaths in the UK", *Addictive Behaviors*, Vol. 90, pp. 444-450.

Sumnall, H.R., Atkinson, A.M., Trayner, K.M.A., Gage, S.H. and McAuley, A. (2020a), "Effects of messaging on public support for drug consumption rooms in Scotland, UK", *International Journal of Drug Policy*, Vol. 83, 102855.

Sumnall, H.R., Hamilton, I., Atkinson, A.M., Montgomery, C. and Gage, S.H. (2020b), "Representation of adverse childhood experiences is associated with lower public stigma towards people who use drugs: an exploratory experimental study", *Drugs: Education, Prevention and Policy*, Vol. 28 No. 3, pp. 1-13.

Sumnall, H.R., Hamilton, I., Atkinson, A.M., Montgomery, C. and Gage, S.H. (2021a), "Representation of adverse childhood experiences is associated with lower public stigma towards people who use drugs: an exploratory experimental study", *Drugs: Education, Prevention and Policy*, Vol. 28 No. 3, pp. 227-239.

Sumnall, H.R., Montgomery, C., Atkinson, A.M., Gage, S.H. and Boardley, I.D. (2021b), "Moral disengagement and the harms of cocaine use", *Drugs: Education, Prevention and Policy*, pp. 1-11, doi: 10.1080/09687637.2021.1950126.

The Scottish Government (2006), "Scottish social attitudes survey 2006: public attitudes to homelessness", available at: https://www.gov.scot/publications/scottish-social-attitudes-survey-2006-public-attitudes-to-homelessness/ (accessed 5 July 2021).

The Scottish Government (2016), "2016 scottish public attitudes towards people with drug dependence and people in recovery", available at: https://www.gov.scot/publications/public-attitudes-towards-people-drug-dependence-people-recovery-research-findings/ (accessed 5 July 2021).

Tybur, J.M., Lieberman, D. and Griskevicius, V. (2009), "Microbes, mating, and morality: individual differences in three functional domains of disgust", *Journal of Personality and Social Psychology*, Vol. 97 No. 1, pp. 103-122.

Vaes, J. and Muratore, M. (2013), "Defensive dehumanization in the medical practice: a cross-sectional study from a health care worker's perspective", *British Journal of Social Psychology*, Vol. 52 No. 1, pp. 180-190.

Vartanian, L.R. (2010), "Disgust and perceived control in attitudes toward obese people", *International Journal of Obesity*, Vol. 34 No. 8, pp. 1302-1307.

Vezzali, L., Capozza, D., Stathi, S. and Giovannini, D. (2012), "Increasing outgroup trust, reducing infrahumanization, and enhancing future contact intentions via imagined intergroup contact", *Journal of Experimental Social Psychology*, Vol. 48 No. 1, pp. 437-440.

Vicario, C.M., Rafal, R.D., Martino, D. and Avenanti, A. (2017), "Core, social and moral disgust are bounded: a review on behavioral and neural bases of repugnance in clinical disorders", *Neuroscience and Biobehavioral Review*, Vol. 80, pp. 185-200.

Waytz, A., Gray, K., Epley, N. and Wegner, D.M. (2010), "Causes and consequences of mind perception", *Trends in Cognitive Sciences*, Vol. 14 No. 8, pp. 383-388.

Weimer, D. (2004), "Drugs-as-a-disease: heroin, metaphors, and identity in Nixon's drug war", *Janus Head*, Vol. 6 No. 2, pp. 260-281.

World Health Organization (2009), *ExpandNet. Practical Guidance for Scaling up Health Service Innovations*, World Health Organization, Geneva Switzerland.

YouGov and CDPRG (2019), "Public attitudes to drugs in the UK", available at: https://www.drugsandalcohol.ie/31080/ (accessed 5 July 2021).

Corresponding author
Harry Sumnall can be contacted at: h.sumnall@ljmu.ac.uk

Received 1 June 2021
Revised 1 July 2021
Accepted 13 July 2021

Knowledge, attitudes and practices towards the spread of COVID-19: a health counseling initiative among potential entrepreneurs of FUUAST

Bahadur Ali Soomro and Ghulam Rasool Lakhan
Department of Economics, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan, and
Naimatullah Shah
Department of Public Administration, University of Sindh, Jamshoro, Pakistan

Abstract

Purpose – The present study examines the knowledge, attitude and practice towards the reduction of COVID-19 spread among entrepreneurs of the Federal Urdu University of Arts, Sciences and Technology (FUUAST), Karachi Pakistan.

Design/methodology/approach – The authors employed cross-sectional data to infer the results. The data are collected through an online survey questionnaire. To target the respondents; a convenience sampling technique is adopted. In total, 222 usable answers proceed with final results. The structural equation model (SEM) is applied for the data analysis.

Findings – The study outcomes found a significant and positive role of knowledge about COVID-19, attitudes towards a stay at home and practices against COVID-19 in reducing the spread of the pandemic.

Practical implications – The study provides coherent knowledge about the factors that fight against the pandemic's further spread. The findings would provide the guidelines to policymakers to think about such factors and boost them enormously. Further, the results would contribute to the literature of COVID-19.

Originality/value – This study is original, which empirically confirmed the effect of knowledge about COVID-19, attitudes towards a stay at home and practices against COVID-19 in an academic institute.

Keywords Knowledge about COVID-19, Attitudes towards a stay at home, Practices against COVID-19, Spread of COVID-19, FUUAST

Paper type Research paper

Introduction

In the present time, COVID-19 hugely spread almost worldwide up to 213 countries of the globe (Worldmeters, 2020; WHO, 2020). This pandemic has brought enormous miseries, poverty, unemployment, business downturn and pushed several lives into the mouth of death. It is (COVID-19 pandemic) a significant challenge to the health, business and education sectors (Shah *et al.*, 2020). It is a transmissible infection that significantly increased its transmission and enhanced victim nations' ratio (Worldmeters, 2020). Unavailability of proper vaccination and curable medicine further creates the worst asymptomatic carrier situation (WHO, 2020). In this regard, to limit the pandemic's spread, positive attitudes, knowledge and awareness regarding the COVID-19 are the significant measures to fight against the pandemic (Shah *et al.*, 2020; WHO, 2020).

In the COVID-19 early outbreak, an immense knowledge about the pandemic develops the attitudes to take necessary measures against the battle of COVID-19 (Shah *et al.*, 2020). Updated knowledge carried out by healthcare authorities significantly enhances preventive practices throughout the pandemic outbreak (Rahman and Sathi, 2020). Alzoubi *et al.* (2020) strongly recommend attitudes and knowledge of individuals towards preventive procedures

Health Education
Vol. 121 No. 6, 2021
pp. 670-682

0965-4283
DOI 10.1108/HE-06-2021-0086

halts the pandemic's spread. Furthermore, the development of intentions and attitudes towards adopting preventive measures are essential to counterattack against the spread of COVID-19 (Shah *et al.*, 2020). According to Ahmed *et al.* (2020), social distancing practices, mask-wearing attitudes and usage of sanitizer are the significant preclusions against the pandemic.

Consequently, in the literature, numerous initiatives are taken to resist the issue. A stay at home measure; physical and social distancing; washing of hands; frequent usage of the sanitizers; and health oriented-behavior can decrease the chances of an expanse of COVID-19 (Wibowo, 2020a, c; Sumaedi *et al.*, 2021; Ahmed *et al.*, 2020). Like other nations, Pakistan is confronting severe challenges of the speedy spread of COVID-19 (Shah *et al.*, 2020). The Pakistani government is taking adequate measures, i.e. social distancing, sanitizers' practice and stringent enactment of the standard operating procedure (SOP) to mitigate the COVID-19 (National Action Plan for Corona virus disease (COVID-19) Pakistan, 2019).

In this way, the present study is proposed to investigate the role of knowledge, attitude and practice towards COVID-19' spread among potential FUUAST entrepreneurs. Many students use social media, the Internet and mass media as responsible sources of evidence about the pandemic (Olaimat *et al.*, 2020). More specifically, in Pakistan, particularly in Karachi, the awareness level of COVID-19 enormously exists among the students due to government and awareness campaigns (Mubeen *et al.*, 2020). The study's findings would provide the government and university authority guidelines to take further initiatives regarding the provision of immense knowledge, developing the attitudes and doing practices to diminish the spread of the dangerous COVID-19.

Literature review and conceptual framework

The spread of the COVID-19 pandemic brought severe problems in terms of economic, health and social issues. The governments of the globe take significant initiatives to overcome such issues. However, some economies triggered unprecedented measures which ultimately failed to control such a problem (Olaimat *et al.*, 2020). In this regard, various studies are conducted to gauge the different angles of the pandemic. Amongst young individuals of Karachi, Pakistan, the cross-sectional survey of Mubeen *et al.* (2020) found a tremendous knowledge of females than males about the pandemic. The respondents showed their concern about the adverse and deadly consequences of COVID-19. Besides, most individuals warned that they could control the spread of the virus through awareness campaigns using different media channels and preventive measures. According to Sumaedi *et al.* (2021), an adaptation of a stay at home through developing attitudes, subjective norms and perceived behavioral control would save people's lives. In the perception of Algahtani *et al.* (2020), a horrific manifestation of the virus at the community level meaningfully disturbs several segments of the quality of life, including the psychological and physical health of all entities. Therefore, community-based interferences are required to alleviate the pandemic's negative impacts and improve the standard population's quality of life and health. In Saudi Arabia, the analysis values are depicted as high for knowledge about the pandemic and preventive behavior. Noticeably, the medical students' exposed sufficient knowledge and preventive actions about pandemic with an average level of risk perception. In their opinion, risk perception and COVID-19 understanding are potential sources of health information in their societies (Alsoghair *et al.*, 2020). In many USA states, the factors such as humidity, maximum temperature, the columnar density of total atmospheric ozone and cloud coverage percentage are strongly related COVID-19 pandemic (Rui *et al.*, 2020). Besides, a tendency analysis demonstrates the mitigation of community-level transmission in the USA. Henceforth, the government authorities suggest adopting the stay-at-home strategy to prevent another outbreak. In Oman, Fattah *et al.* (2021) conducted among the public to observe the awareness about the

threat of COVID-19. The study's findings showed that the public's awareness about the COVID-19 disease significantly affects the information source, health-associated knowledge and people's perceived risk. Besides, the study confirmed that preventive behavior during the pandemic also spread, directly and indirectly, affects the individuals' awareness. In the insight of Khozaei *et al.* (2021), peoples' awareness of COVID 19 significantly affects the disease prevention efficiency and perceived risk. In Rwanda, students are found with awareness of their vulnerability to the virus. Due to COVID-19 education and knowledge, they are comfortable and not see themselves at the risk of upcoming waves of the pandemic (Obaje *et al.*, 2021). Likewise, Iraqi healthcare professionals have sufficient knowledge about the origin of the COVID-19. Such knowledge they have attained through social media, the Internet and other sources of information about the virus (Aladul *et al.*, 2020). An investigation of Siramaneerat (2021) claims knowledge about COVID-19, the perceived risk and severity of COVID-19 had a statistical and significant effect on self-defense behaviors from COVID-19. Among the dental students, knowledge about COVID-19 prevents and ensures a safer return to individuals' activities (Aragão *et al.*, 2021). A cross-sectional study by Raza *et al.* (2021) offers a positive relationship of intention to avoid COVID-19 with risk aversion. The analysis further reveals that individuals demand the government to provide them with preventive medical items, i.e. sanitizers and surgical masks, to prevent the public from the pandemic. It is also suggested to make aware the individuals through print and electronic media in the local language to resist the virus's transmission. Similarly, an inspiring work of Shah *et al.* (2020) underlines a substantial positive influence of knowledge, health consciousness and attitudes on mask attitudes and purchase intentions.

As a result, the domain literature demonstrates that the adaptation of knowledge, positive attitudes, precautionary measures, intention to stay at home, mask attitudes, awareness programs regarding the COVID-19 found as the robust measures to prevent the virus (Shah *et al.*, 2020; Raza *et al.*, 2021; Rui *et al.*, 2020; Sumaedi *et al.*, 2021). However, these constructs, i.e. knowledge, attitudes and practices about the COVID-19, have not been confirmed towards a spread of COVID-19, particularly among the university students in Pakistan (Mubeen *et al.*, 2020; Algahtani *et al.*, 2020; Shah *et al.*, 2020; Ahmed *et al.*, 2020). So, we projected Figure 1 for investigation among the students.

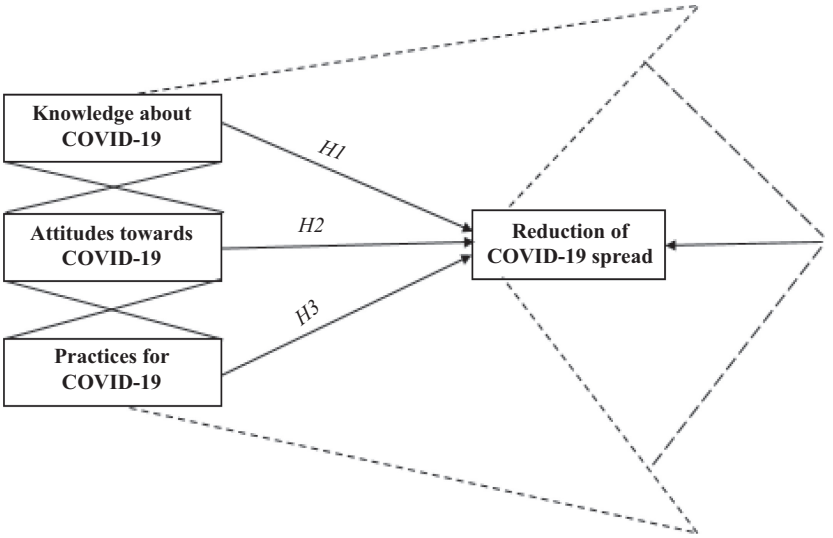


Figure 1.
Conceptual model of the study

In marketing, consumer knowledge is a multifaceted aspect where the diverse classes of product-oriented knowledge lead to different knowledge surfaces (Alba and Hutchinson, 1987). However, the effect of the knowledge depends upon the product evaluation as well as choice behavior. The related investigations demonstrate a substantial impact on consumers' knowledge of their food consumption attitude (Chryssochoidis, 2000; Padel and Foster, 2005). The knowledge of individuals about food enhances their inclination and attitudes towards consuming such particular food (Stobbelaar *et al.*, 2007). On the other hand, individuals with negative attitudes towards food in earlier knowledge are unsafe in consuming food (Redmond and Griffith, 2005). In COVID-19 early outbreak, knowledge about the complications of COVID-19 is significantly predicting mask purchase attitudes and intentions (Shah *et al.*, 2020). In a similar vein, Rahman and Sathi (2020) praise Bangladeshi Internet users for delivering knowledge and preventive practices about COVID-19.

Furthermore, it proposed that an updated knowledge conveyed by healthcare authorizes significantly enhances preventive practices throughout the pandemic outbreak. The participants of the investigation of Zaid *et al.* (2020) show great satisfaction about knowledge as a means of transmitting disease. Common symptoms of COVID-19 have confirmed a transmission through coughing, contaminated surfaces and droplets from sneezing. Besides, a majority of respondents believed that mask-wearing attitudes help defend them from gaining COVID-19. According to Alzoubi *et al.* (2020), attitudes and knowledge of individuals towards preventive practices halts the pandemic's spread. Henceforth, more care is required for taking further measures and awareness promotions to expand the knowledge, attitude and practice to combat the pandemic. Olaimat *et al.* (2020) noticed expressively higher knowledge values than undergraduate individuals in the same direction. Many students use social media, the Internet and mass media as liable sources of information about the pandemic. However, postgraduate and medical students utilize articles and scientific websites to be aware of the COVID-19. A lack of awareness and knowledge about COVID-19 creates a lot of uncertainties in their lives. COVID-19 is the utmost dangerous virus on the globe. Many participants correctly recognized the transmission sources, measures and safety measures to be taken for a pandemic. Furthermore, in Pakistan, particularly in Karachi, the level of awareness of COVID-19 among young individuals exists because of public knowledge from concerned authorities, which assist them in improving more active and successful awareness movements using preferred channels (Mubeen *et al.*, 2020).

In the existing situation of COVID-19, attitudes and intentions are indispensable in imitating the behavior (Shah *et al.*, 2020). In this regard, developing attitudes and intentions towards preventing COVID-19 through a stay at home or avoid to come out aimlessly from home is the need of the day. These measures can be used as a massive weapon against pandemic battle (Maheshwari *et al.*, 2020). An intention is an individuals' willingness to accomplish a particular behavior (Ajzen, 1991; Liu *et al.*, 2018). Thus, stay at home during COVID-19 intention among individuals is a robust initiative of citizens to overcome the pandemic's lethal effect (Sumaedi *et al.*, 2021). Chen and Chen (2020) try to determine the difference in behavioral intentions, knowledge about preventive behaviors and subjective norms among rural/urban individuals.

Consequently, rural residents were less aware of adopting suitable preventive measure as compared to urban individuals. Urban was updated through the acceptability of media. Similarly, empirical evidence of Alsoghair *et al.* (2020) demonstrates a self-reported preventive behavior among medical students. Such positive behavior has been developed through sufficient knowledge and preventive actions concerning the pandemic and ordinary risk perception levels. The preventive e-guideline such as knowledge, behavioral control and the intention to prevent COVID-19 by the government significantly affect risk aversion (Raza *et al.*, 2021).

A seminal work of Ahmed *et al.* (2020) showed the awareness of males and females about the origin of the COVID-19 pandemic. Individuals believe that a virus is contagious and which swiftly transmits. Nearly all respondents are practicing social distancing. In a simple sense, Karachi, Pakistan, has sufficient knowledge about the pandemic, but it needs further improvements. To fight against the COVID-19, the different communities perform better cooperation, coordination and strong solidarity to stop the spread of the dangerous pandemic (Qian *et al.*, 2020). In the study of Tripathi *et al.* (2020), many participants presented awareness of COVID-19 as a contagious, deadly and life-threatening virus that can be transmitted through human-to-human interaction. Recently, Soomro and Shah (2021) found a significant and positive effect of attitudes to stay-at-home behavior, fear of COVID-19 and knowledge about COVID-19 on the intention to stay at home. According to Alhwamdih *et al.* (2021), the knowledge factor is high compared to nurses' attitudes towards the fight of COVID-19 in Jordan. Further, the knowledge and attitudes are positively and significantly associated with each other in the existing situation of the pandemic. Empirical evidence of Alves *et al.* (2021) claims that sufficient knowledge about COVID-19 is responsible for developing the positive and favorable attitude towards preventive behaviors.

Consequently, the emergence of COVID-19 is proved to a significant global threat (Tripathi *et al.*, 2020). Therefore, it is necessary to take precautionary measures to prevent the spread of such a lethal pandemic. In this regard, numerous studies have found out different constructs, i.e. knowledge, mask purchase attitudes and intentions (Shah *et al.*, 2020), preventive practices (Rahman and Sathi, 2020), the transmission of disease (Zaid *et al.*, 2020), awareness through social media, Internet and mass media (Olaimat *et al.*, 2020), safety measures (Mubeen *et al.*, 2020) which resist the spread of the pandemic. However, in Pakistan, the factors such as knowledge about COVID-19, attitudes towards a stay at home during COVID-19 and reasonable practices for COVID-19 are not considered towards the spread of the COVID-19 (Shah *et al.*, 2020; Mubeen *et al.*, 2020; Ahmed *et al.*, 2020; Soomro and Shah, 2021) particularly among the university students. Based on such deficiency of empirical evidence, we proposed:

H1. Knowledge about COVID-19 significantly reduces the spread of the COVID-19.

H2. Attitudes towards a stay at home during COVID-19 significantly reduce the spread of the COVID-19.

H3. Practices for COVID-19 significantly reduce the spread of the COVID-19.

Methods

Participants and data collection

This study employed a quantitative approach where an online survey was conducted due to Pakistan's social distancing policy. We followed the prior literature on human behavior and used the same technique in a pandemic (Brooks–Pollock *et al.*, 2011; Sumaedi *et al.*, 2021). Besides, this method is frequent and more common in testing behavioral models (i.e. Sumaedi *et al.*, 2016, 2021; Shah *et al.*, 2020). We targeted the students of the faculty of business administration, commerce and economics of FUUAST, Karachi, Pakistan, where many students use social media, the Internet and mass media as responsible sources about the pandemic (Olaimat *et al.*, 2020). Specifically, in Karachi, the awareness level of COVID-19 enormously exists among the students because of tacking valuable initiatives of government through awareness campaigns (Mubeen *et al.*, 2020). We applied Survey Monkey as an effective tool to attain the responses. We adopted a convenience sampling technique properly. We shared the link of the online questionnaire with WhatsApp groups developed for conducting the online classes. Consequently, we collected 224 samples in a raw shape. Out of them, we detected one case of missing data and replaced it with the mean score of the

remaining data in the corresponding cell (Tabachnick and Fidell, 2007). Similarly, we traced one case of multivariate outlier through the multiple imputation method (MIM), which effectively detects the possible outliers (Cousin and Chartier, 2010). Consequently, these two cases were excluded. Lastly, we proceeded 222 useable responses for the final analysis. This number of samples fulfills the criterion of SEM analysis (Hair *et al.*, 2010).

Reliability of survey and guidelines to students

Before sending the surveys to the WhatsApp groups, the instrument's validity was assured by the university professors who were expert in quantitative research and aware of a cross-sectional survey's behavioral issues. We also requested them to give their valuable feedback regarding the format and design of the survey. Concerning measuring the internal consistency among the items, we conducted Cronbach's alpha to ensure the internal constancy (α) (Hair *et al.*, 2017) among the scale items after getting the full-scale data. Consequently, a reliable and valid survey was conducted by ensuring the instrument's assumptions of reliability and validity. We provided guidelines to the students by informing them about the study's details for filling the questionnaire and privacy at the start of the survey and attained knowledgeable consent from each student. We also made known to all the study respondents that their identity would be kept confidential. Furthermore, the outcome of their responses would utilize only for research purposes.

Measurement scales

We adopted all the items from the related literature. The independent variable, such as knowledge about the COVID-19, attitudes a stay at home and practices about COVID-19, were measured on eleven, four and eight items, respectively. We adopted these items from the studies of Zhong *et al.* (2020), Huynh *et al.* (2020) as measured by Maheshwari *et al.* (2020). Besides, the dependent variable (COVID-19 spread) was measured on seven items adapted from Gomez *et al.* (2020). All the items were assessed using a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

Data analysis

Demography

The respondents' demography shows that most male students (n = 152 or 68.47%) contributed to the study compared to females (n = 70 or 31.53%). Likewise, we noticed many students (76.58% or n = 170) less than twenty years of age. 21.17% (n = 47) were in between 20 and 25 years of age. On the other hand, we found a minimum percentage (00.45%, n = 01) of thirty-one years above (Table 1). Regarding the students' semester, many students from the seventh semester (12.6% or n = 28); 11.71% or n = 26 were enrolled in the sixth semester. Likewise, we found minimum participation (08.11 or n = 18) of fourth, eighth and MA/MSC-II students each (Table 1).

We observed descriptive statistics to delineate the entire population's representation of data (Hair *et al.*, 1998). The mean highest mean values appeared for attitudes towards a stay at home (3.928) and lowest for practices for COVID-19 (3.002). Likewise, the maximum values of standard deviation were found for practices for COVID-19 (1.238) although, minimum vales were noticed for knowledge about COVID-19 (0.882) (Table 2). Moreover, the relationship's strength also confirmed was also confirmed through a correlation matrix (Hair *et al.*, 1998). Subsequently, all constructs (independent) were appeared to be correlated with the dependent variable (Table 2).

Measurement and structural model

The factor loadings were conducted for observing individual item's reliability. We found all the items with >0.70 of the loading values (Hair *et al.*, 2017). Likewise, the values of composite

	Category	Frequency	Percentage
Gender	Male	152	68.47
	Female	70	31.53
	Total	*222*	*100.0*
Age	<20 years	170	76.58
	20–25 years	47	21.17
	26–30 years	04	01.80
	31 and > years	01	00.45
	Total	*222*	*100.0*
Semester	1st	25	11.26
	2nd	23	10.36
	3rd	22	09.91
	4th	18	08.11
	5th	21	9.46
	6th	26	11.71
	7th	28	12.61
	8th	18	8.11
	MA/MSC-I	23	10.36
	MA/MSC-II	18	8.11
	Total	*222*	*100.0*

Table 1.
Demography

Variables	Mean	Std. deviation	1	2	3	4
1. Reduction of COVID-19 spread	3.823	0.992	–			
2. Knowledge about COVID-19	3.234	0.882	0.330**	–		
3. Attitudes towards a stay at home	3.928	1.001	0.415**	0.298*	–	
4. Practices for COVID-19	3.002	1.238	0.399**	0.473**	0.149*	–

Note(s): **,*Correlations are significant at 0.01 and 0.05 levels, respectively (two-tailed)

Table 2.
Descriptive statistics and correlation matrix

reliability (CR) were seemed to be in-between 0.706–0.898 (Table 3) or > the suggested values (0.70) (Gefen *et al.*, 2000; Kline, 2010). Likewise, to measure construct's identity, we noticed average variance extracted (AVE) values which found to be in-between 0.872–0.892 for all variables (>0.50) (Hair *et al.*, 2010). Lastly, Cronbach's alpha (α) for all the factors was confirmed to be in-between 0.836–0.868 (within excellent ranges) (>0.70) (Nunnally and Bernstein, 1994) (Table 3).

Before estimation of hypothesized paths, we confirm the fitness of the model. As a result, the CMIN = χ^2/chi-square occurred to be 2.229. Likewise, other model fit indices, for instance, the goodness-of-fit index (GFI = 0.969); adjusted goodness-of-fit index (AGFI = 0.971); normed fit index (NFI = 0.918); comparative fit index (CFI = 0.933) and root mean square error of approximation (RMSEA = 0.027) seemed within the ranges of required values (Table 4 and Figure 2).

In addition, to explore hypothesized effects, the results witnessed a significant positive effect of knowledge about COVID-19 on the reduction of spread of pandemic (SE = 0.040, CR = 5.889***; $p < 0.01$) (Figure 2 and Table 5). Thus, H1 was accepted. Further, the study also supported the predictive power of attitudes towards a stay at home on the reduction of spread of pandemic (SE = 0.062, CR = 6.551***; $p < 0.01$) (Figure 2 and Table 5). Thus, H2 was supported. Lastly, SEM outcomes proved to be the significant and positive path of practices for COVID-19 on the reduction of spread of pandemic (SE = 0.051, CR = 6.001***; $p < 0.01$) (Figure 2 and Table 5). As a result, H3 was also accepted by the data.

Construct	Item code	Factor loadings	CR	AVE	α
Reduction of COVID-19 pandemic spread	cps1	0.884	0.898	0.879	0.836
	cps 2	0.879			
	cps 3	0.859			
	cps 4	0.840			
	cps6	0.781			
	cps5	0.726			
	cps7	0.706			
Knowledge about COVID-19	kac2	0.898	0.873	0.890	0.868
	kac1	0.870			
	kac3	0.861			
	kac4	0.843			
	kac5	0.786			
	kac7	0.764			
	kac6	0.736			
Attitudes towards a stay at home	atsah1	0.889	0.840	0.892	0.860
	atsah2	0.878			
	atsah3	0.830			
	atsah4	0.800			
Practices for COVID-19	pfc2	0.896	0.876	0.872	0.838
	pfc1	0.883			
	pfc3	0.871			
	pfc4	0.850			
	pfc6	0.824			
	pfc5	0.798			
	pfc7	0.784			
	pfc8	0.742			

Note(s): AVE = summation of the square of the factor loadings
CR = square of the summation of the factor loadings
α = Cronbach's alpha

Table 3.
Measurement model

	CMIN/df	GFI	AGFI	NFI	CFI	RMSEA
Model fit indicators	2.229	0.969	0.971	0.918	0.933	0.027
Suggested values	<3	>0.90	>0.90	>0.90	>0.90	<0.05

Note(s): CMIN = χ^2/Chi-square/df; df = degree of freedom; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation

Table 4.
Model fit indices

Discussion and conclusion

Currently, the COVID-19 pandemic not only straining public health systems but also destroys the global economy. The present study aimed to investigate knowledge, attitude and practice towards the reduction of COVID-19 spread among budding entrepreneurs of FUUAST. The study was conceptualized based on related literature keeping in view the existing situations of the COVID-19 pandemic.

About H1, our results found a significant effect of knowledge about the COVID-19 on reducing the spread of the pandemic. These results are in line with the different studies like Shah *et al.* (2020), Rahman and Sathi (2020) and Zaid *et al.* (2020) by highlighting the same outcomes. The positive association may occur that the students are made aware of the lethal consequences of the COVID-19. Their significant knowledge about the pandemic resists them

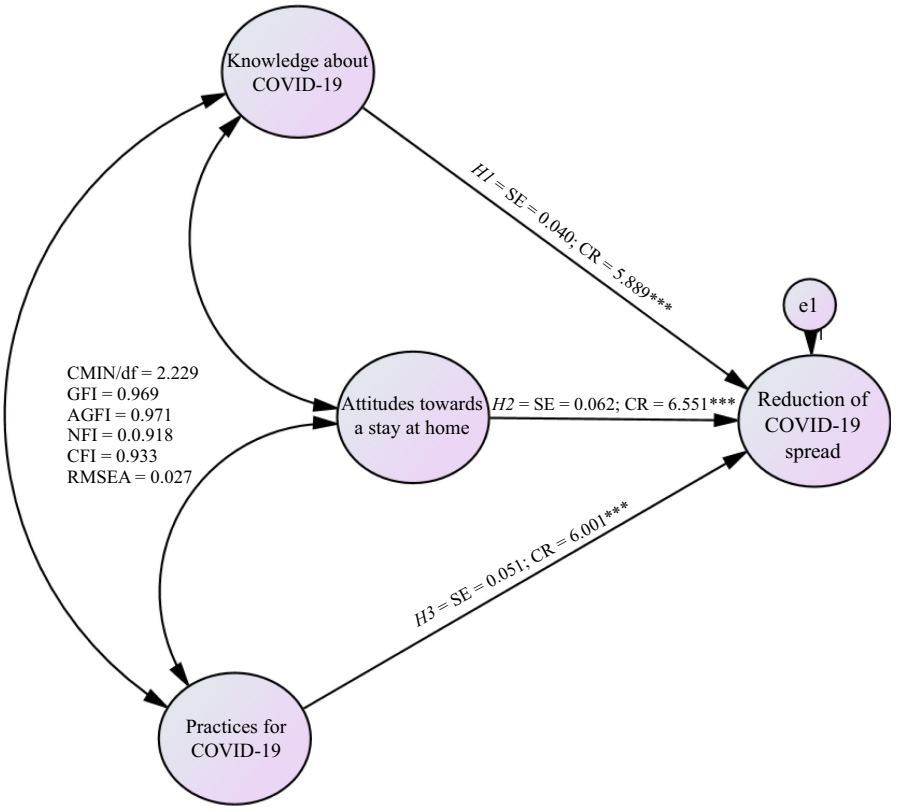


Figure 2.
Path model

H. No.	Independent variables	Path	Dependent variable	Estimate	SE	CR	*P*	Decision
H1	Knowledge about COVID-19	→	Reduction of COVID-19 spread	0.254	0.040	5.889	***	Accepted
H2	Attitudes towards a stay at home	→	Reduction of COVID-19 spread	0.227	0.062	6.551	***	Accepted
H3	Practices for COVID-19	→	Reduction of COVID-19 spread	0.389	0.051	6.001	***	Accepted

Table 5.
SEM weights

Note(s): SE = standard error; CR = critical ratio; p = significance level $^{***}p < 0.05$

to take precautionary measures to limit the pandemic's spread. The knowledge about the COVID-19 has been attained through diverse modes, i.e. social media, the Internet and mass media, which are regarded as responsible sources of information about the pandemic. They believe that a lack of awareness and knowledge about COVID-19 creates many worries in their lives. Therefore, they remain constantly updated about the current development of COVID-19. They also think that COVID-19 is an utmost dangerous virus globally and can easily be spread everywhere.

Further, our findings show a significant and positive effect of attitudes towards staying at home on the reduction of pandemic spread (H2 accepted). These outcomes are also supported by the numerous studies, i.e. Sumaedi *et al.* (2021), Chen and Chen (2020), Shah *et al.* (2020), who claimed a substantial role in the development of attitudes towards COVID-19 prevention might reduce its further increase. In the students' perceptions, they stay at home favorable to fight against the pandemic. These attitudes would make them safer.

Finally, H3 was supported by claiming significant and positive practices for COVID-19 on the alleviation of the COVID-19. These consequences are also parallel to several studies like Ahmed *et al.* (2020), Qian *et al.* (2020) and Tripathi *et al.* (2020), which support the same findings. These findings reflect that students of FUUAST believe that a virus is transmissible in a swift manner. Therefore, they were practicing the various modes to diminish the spread of COVID-19. They are increasing the frequency of washing hands and use frequent hand sanitizers. They are also taking initiatives of personal protective apparatus, i.e. masks and maintain the social distance and avoid coughing and sneeze openly. Finally, they avoid unnecessary travel or outing during the pandemic.

Consequently, the study's overall results demonstrated a significant and positive effect of knowledge, attitudes to a stay at home and effective practices on the reduction of COVID-19 spread among the students of FUUAST.

Limitations, implications and future directions

The study has some limitation because it is conducted during the peak time of the first wave of the COVID-19. The study applied a deductive approach based on cross-sectional data. It is restricted to an online survey conducted by the business, commerce and economics students of FUUAST. Besides, the study did not use any particular theory to support the conceptualization. Finally, the study is based on 222 samples.

The study provides understandable knowledge and empirical evidence about the factors that resist the pandemic's further spread. By pursuing the study's outcomes, policymakers and the government would develop plans and strategies to start virtual awareness sessions to offer complete information to the public concerning handwashing steps and keep a hygienic environment. It would also inspire them to practice social distancing and avoid social congregations. The study would further encourage social, print and electronic media to play a different role in making aware the individuals to diminish the spread of the COVID-19.

Finally, the study would contribute to the literature of health education, psychology and medical sciences to understand the spread and the resistance of the pandemic in the developing economies.

In future, more longitudinal studies may be conducted to examine the reduction of the COVID-19 spread by comparing the differences among the different waves of the pandemic. Future studies may consider other students like natural science, law and social science for sampling. The area of the survey should broaden location and sampling wise.

References

Ahmed, N., Hassan, W., Rasool, R., Fahim, U., Shakil, A. and Khan, K.S. (2020), "Knowledge, attitude and practices regarding Covid-19 among a cross-sectional sample from Karachi, Pakistan: descriptive data", *Journal of Infectious Diseases and Epidemiology*, Vol. 6 No. 5, pp. 1-12.

Ajzen, I. (1991), "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.

Aladul, M.I., Al-Qazaz, H.K. and Allela, O.Q.B. (2020), "Healthcare professionals' knowledge, perception and practice towards COVID-19: a cross-sectional web-survey", *Journal of Pharmaceutical Health Services Research*, Vol. 11 No. 4, pp. 355-363.

Alba, J.W. and Hutchinson, J.W. (1987), "Dimensions of consumer expertise", *Journal of Consumer Research*, Vol. 13 No. 4, pp. 411-454.

Algahtani, F.D., Hassan, S., Alsaif, B. and Zrieq, R. (2020), "Assessment of the quality of life during COVID-19 pandemic: a cross-sectional survey from the Kingdom of Saudi Arabia", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 3, pp. 1-12.

Alhwamdih, S., Abunab, H.Y., Algunmeeyn, A.A., Alfayoumi, I. and Hawamdeh, S. (2021), "Nurses' knowledge and attitude towards COVID-19 in the context of the acute health care settings in Jordan", *International Journal of Human Rights in Healthcare*. doi: 10.1108/IJHRH-02-2021-0037.

Alsoghair, M., Almazyad, M., Alburaykan, T., Alsultan, A., Alnughaymishi, A., Almazyad, S., Alharbi, M., Alkassas, W., Almadud, A. and Alsuhaibani, M. (2020), "Medical students and COVID-19: knowledge, preventive behaviors, and risk perception", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 2, pp. 1-9.

Alves, R.F., Samorinha, C. and Precioso, J. (2021), "Knowledge, attitudes and preventive behaviors toward COVID-19: a study among higher education students in Portugal", *Journal of Health Research*, Vol. 35 No. 4, pp. 318-328.

Alzoubi, H., Alnawaiseh, N., Al-Mnayyis, A., Abu-Lubada, M., Aqel, A. and Al-Shagahin, H. (2020), "COVID-19 - knowledge, attitude and practice among medical and non-medical university students in Jordan", *Journal of Pure and Applied Microbiology*, Vol. 14 No. 1, pp. 17-24.

Aragão, M.G.B., Gomes, F.I.F., Paixão-de-Melo, L.P.M. and Corona, S.A.M. (2021), "Brazilian dental students and COVID-19: a survey on knowledge and perceptions", *European Journal of Dental Education*. doi: 10.1111/eje.12676.

Brooks-Pollock, E., Tilston, N., Edmunds, W.J. and Eames, K.T. (2011), "Using an online survey of healthcare-seeking behavior to estimate the magnitude and severity of the 2009 H1N1v influenza epidemic in England", *BMC Infectious Diseases*, Vol. 11 No. 68, pp. 1-8.

Chen, X. and Chen, H. (2020), "Differences in preventive behaviors of COVID-19 between urban and rural residents: lessons learned from a cross-sectional study in China", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 12, pp. 1-14.

Chryssochoidis, G. (2000), "Repercussions of consumer confusion for late introduced differentiated products", *European Journal of Marketing*, Vol. 34 Nos 5/6, pp. 705-722.

Cousin, D. and Chartier, S. (2010), "Outliers detection and treatment: a review", *International Journal of Psychological Research*, Vol. 3 No. 1, pp. 58-67.

Fattah, A.F.A.M., Dahleez, K.A., Mohamed, A.H.H.M., Okour, M.K. and AL Alawi, A.M.M. (2021), "Public health awareness: knowledge, attitude and behaviors of the public on health risks during COVID-19 pandemic in sultanate of Oman", *Global Knowledge, Memory and Communication*. doi: 10.1108/GKMC-10-2020-0152.

Gefen, D., Straub, D. and Boudreau, M.C. (2000), "Structural equation modeling and regression: guidelines for research practice", *Communications of the Association for Information Systems*, Vol. 4, pp. 1-79.

Gómez, S.M., Mendoza, O.E., Ramírez, J. and Olivas-Luján, M.R. (2020), "Stress and myths related to the COVID-19 pandemic's effects on remote work", *Management Research*, Vol. 18 No. 4, pp. 401-420.

Hair, J.F., Tatham, R.L., Anderson, R.E. and Black, W. (1998), *Multivariate Data Analysis*, 5th ed., Prentice-Hall, New Jersey.

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010), *Multivariate Data Analysis*, 7th ed., Pearson, New York, NY.

Hair, J.F., Hult, G.T.M., Ringle, C. and Sarstedt, M. (2017), *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed., Sage, Thousand Oaks.

Huynh, G., Nguyen, T.N.H., Tran, V.K., Vo, K.N., Vo, V.T. and Pham, L.A. (2020), "Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City", *Asian Pacific Journal of Tropical Medicine*, Vol. 13 No. 6, pp. 260-265.

Khozaei, F., Kim, M.J., Nematipour, N. and Ali, A. (2021), "The impact of perceived risk and disease prevention efficiency on outdoor activities and avoidance behaviors in the urban parks during COVID 19 pandemic", *Journal of Facilities Management*. doi: 10.1108/JFM-09-2020-0065.

Kline, R.B. (2010), *Principles and Practice of Structural Equation Modeling*, 3rd ed., The Guilford Press, New York.

Liu, S., Chiang, Y.T., Tseng, C.C., Ng, E., Yeh, G.L. and Fang, W.T. (2018), "The theory of planned behavior to predict protective behavioral intention against PM2.5 in parents of young children from urban and rural Beijing, China", *International Journal of Environmental Research and Public Health*, Vol. 15 No. 2215, pp. 1-17.

Maheshwari, S., Gupta, P.K., Sinha, R. and Rawat, P. (2020), "Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: a cross-sectional study", *Journal of Acute Diseases*, Vol. 9 No. 3, pp. 100-104.

Mubeen, S.M., Kamal, S., Kamal, S. and Balkhi, F. (2020), "Knowledge and awareness regarding spread and prevention of COVID-19 among the young adults of Karachi", *Journal of Pakistan Medical Association*, Vol. 70 No. 5, pp. S169-S174.

National Action Plan for Corona virus disease (COVID-19) Pakistan (2019), *Government of Pakistan, Ministry of National Health Services, Regulations and Coordination*, available at: www.nih.org.pk)COVID-19-NAP-V2-13-March-2020.

Nunnally, J.C. and Bernstein, I.H. (1994), *Psychometric Theory*, McGraw-Hill, New York.

Obaje, H.I., Okengwu, G.C., Kenan, J.J., Uwimana, A., Ndayambaje, A., Carey, T.A. and Wong, R. (2021), "Assessing the knowledge, perceptions, and mental health impact of COVID-19 among students in Rwanda", *Journal of Public Mental Health*, Vol. ahead-of-print, doi: 10.1108/JPMH-10-2020-0125.

Olaimat, A.N., Aolymat, I., Shahbaz, H.M. and Holley, R.A. (2020), "Knowledge and information sources about COVID-19 among university students in Jordan: a cross-sectional study", *Frontiers in Public Health*, Vol. 8, pp. 1-9, Article 254.

Padel, S. and Foster, C. (2005), "Exploring the gap between attitudes and behavior – understanding why consumers buy or do not buy organic food", *British Food Journal*, Vol. 107 No. 8, pp. 606-625.

Qian, X., Ren, R., Wang, Y., Guo, Y., Fang, J., Wu, Z., Liu, P., Han, T. and Members of Steering Committee, Society of Global Health, Chinese Preventive Medicine Association (2020), "Fighting against the common enemy of COVID-19: a practice of building a community with a shared future for mankind", *Infectious Diseases of Poverty*, Vol. 9, Article 34, pp. 1-6.

Rahman, A. and Sathi, N.J. (2020), "Knowledge, attitude, and preventive practices toward COVID-19 among Bangladeshi internet users", *Electronic Journal of General Medicine*, Vol. 17 No. 5, pp. 1-6.

Raza, A., Ali, Q. and Hussain, T. (2021), "Role of knowledge, behavior, norms, and e-guidelines in controlling the spread of COVID-19: evidence from Pakistan", *Environmental Science and Pollution Research*, Vol. 28 No. 30, pp. 40329-40345.

Redmond, E.C. and Griffith, C.J. (2005), "Consumer perceptions of food safety education sources implications for effective strategy development", *British Food Journal*, Vol. 107 No. 7, pp. 467-483.

Rui, R., Tian, M., Tang, M., George Ho, T. and Wu, C. (2020), "Analysis of the spread of COVID-19 in the USA with a spatio-temporal multivariate time series model", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 2, pp. 1-18.

Shah, N., Kalwar, M.S. and Soomro, B.A. (2020), "Early COVID19 outbreak, individuals' mask attitudes and purchase intentions: a cohesive care", *Journal of Science and Technology Policy Management*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/JSTPM-05-2020-0082.

Siramaneerat, I. (2021), "Perceptions, knowledge and self-defense behaviors regarding COVID-19 among employees at Rajamangala University of Technology Thanyaburi, Thailand", *Journal of Health Research*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/JHR-09-2020-0426.

Soomro, B.A. and Shah, N. (2021), "Examining the intention to stay home due to COVID-19: a pandemic's second wave outlook", *Health Education*, Vol. 121 No. 4, pp. 420-435.

Stobbelaar, D.J., Casimir, G., Borghuis, J., Marks, I., Meijer, L. and Zebeda, S. (2007), "Adolescents'attitudes towards organic food: a survey of 15- to 16-year old school children", *International Journal of Consumer Studies*, Vol. 31 No. 4, pp. 349-356.

Sumaedi, S., Yarmen, M., Bakti, I.G.M.Y., Rakhmawati, T., Astrini, N. and Widianti, T. (2016), "The integrated model of theory planned behavior, value, and image for explaining public transport passengers' intention to reuse", *Management of Environmental Quality*, Vol. 27 No. 2, pp. 124-135.

Sumaedi, S., Bakti, I.G.M.Y., Rakhmawati, T., Widianti, T., Astrini, N.J., Damayanti, S., Massijaya, M.A. and Jati, R.K. (2021), "Factors influencing intention to follow the 'stay at home' policy during the COVID-19 pandemic", *International Journal of Health Governance*, Vol. 26 No. 1, pp. 13-27.

Tabachnick, B.G. and Fidell, L.S. (2007), *Using Multivariate Statistics*, 5th ed., Pearson International, Upper Saddle River, NJ.

Tripathi, R., Alqahtani, S.S., Albarraq, A.A., Meraya, A.M., Tripathi, P., Banji, D., Alshahrani, S., Ahsan, W. and Alnakhli, F.M. (2020), "Awareness and preparedness of COVID-19 outbreak among healthcare workers and other residents of South-West Saudi Arabia: a cross-sectional survey", *Frontiers in Public Health*, Vol. 8, pp. 1-13, Article 482.

Wibowo, A. (2020a), "COVID-19 dapat dicegah dengan disiplin dan gotong royong", available at: https://covid19.go.id/p/berita/covid-19-dapat-dicegah-dengan-disiplin-dan-gotong-royong (accessed 18 November 2020).

Wibowo, A. (2020c), "Jubir pemerintah: atasi COVID-19 dengan putus rantai penularan", available at: https://covid19.go.id/p/berita/jubir-pemerintah-atasi-covid-19-dengan-putus-rantai-penularan (accessed 18 November 2020).

World Health Organization (2020), "Q&A on coronaviruses (COVID-19)", available at: https://www.who.int/news-room/q-a-detail/q-a-coronaviruses (accessed 15 November 2020).

Worldmeters (2020), "COVID-19 coronavirus pandemic", available at: https://www.worldometers.Info/coronavirus/ (accessed 15 November 2020).

Zaid, A.A., Barakat, M., Al-Qudah, R.A., Albetawi, S. and Hammad, A. (2020), "Knowledge and awareness of community toward COVID-19 in Jordan: a cross-sectional study", *Systematic Reviews in Pharmacy*, Vol. 11 No. 7, pp. 135-142.

Zhong, B.L., Luo, W., Li, H.M., Zhang, Q.Q., Liu, X.G. and Li, W.T. (2020), "Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey", *International Journal of Biological Sciences*, Vol. 16 No. 10, pp. 1745-1752.

Corresponding author
Bahadur Ali Soomro can be contacted at: bahadur.ali@scholars.usindh.edu.pk

Engaging students in experiential learning through a public health campaign: a pre–post survey on hypertension and diabetes mellitus

Siew-Wei Yeong and Zhien-Hung Kon
Faculty of Pharmaceutical Sciences, UCSI University, Kuala Lumpur, Malaysia
Siew-Chin Ong
School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia, and
Zaheer-Ud-Din Babar
Department of Pharmacy, University of Huddersfield, Huddersfield, UK

Received 26 May 2021
Revised 4 September 2021
Accepted 3 October 2021

Abstract

Purpose – This study looked at the impact of a community-based public health campaign on hypertension and diabetes mellitus awareness and prevention, as well as student experiential learning in a campaign conducted by pharmacy students.

Design/methodology/approach – A convenience sampling cross-sectional pre–post survey was done to assess disease awareness and knowledge among those who attended the health campaign. The data analysis includes a total of 230 participants with complete data. After the campaign, the pharmacy students used self-assessment to reflect their learning experience.

Findings – Most participants were unaware of their blood pressure and blood glucose readings, but they reported improved awareness of diseases and prevention of hypertension and diabetes after the health campaign. Although most participants correctly identified the common signs and symptoms of hypertension, few could associate it with overweight. Most participants were unaware of the 5 g per day salt intake limit for controlling hypertension before the campaign. Most participants were less aware that diabetes is associated with impaired vision, peripheral neuropathy, renal and heart diseases. Students expressed increased confidence in leadership, teamwork and communication abilities after the campaign based on self-assessment.

Practical implications – A health campaign enhances the disease knowledge of the general public. It has been suggested that experiential learning be encouraged in the pharmacy curriculum.

Originality/value – This study adds to the knowledge on the roles of community-based health campaigns and the value of pharmacy students' involvement in experiential learning.

Keywords Public health, Disease awareness, Health promotion, Experiential learning, Pharmacy curriculum

Paper type Research paper

Introduction

Hypertension and hyperglycemia, left untreated, can greatly increase the risk of serious life-threatening complications. Due to the nature of these diseases, the signs and symptoms often do not manifest until a later stage; hence, the term "silent killers".

According to the Malaysian National Health and Morbidity Survey, the prevalence of hypertension and diabetes mellitus was 30 and 18.3%, respectively (Institute for Public Health, 2019). Some 14.1% of the patients with newly diagnosed hypertension were reported to be unaware of their hypertension, whereas 8.9% of the newly diagnosed patients with

Appreciation to the organising committee of the 18th UCSI Public Health Campaign for accommodating the study sites.

Ethical approval: All procedures in this study were following the ethical standards of the Malaysian Ministry of Health Medical Research Ethics Committee, code number NMRR-19-1319-48612. Written informed consent was obtained from participants before the survey.

Health Education
Vol. 121 No. 6, 2021
pp. 683-696

0965-4283
DOI 10.1108/HE-05-2021-0082

diabetes mellitus were unaware of their condition before the diagnosis. Both cardiovascular diseases and diabetes mellitus are major contributors to the total disease burden in Malaysia (Ministry of Health, 2004), highlighting the seriousness of hypertension and diabetes mellitus in the Malaysian population.

People in the community need to be aware of their health status to monitor and control their blood pressure and blood sugar levels. Various interventions could be used to disseminate health information to the general public. Face-to-face consultations, the use of mass media and health-promotion programs are the primary modalities for disseminating public health information (Health Development Agency, 2004). A community-based health campaign promotes public health within communities, often with a time-specific scope of interest. It focuses on direct education to the community and disease prevention strategies by mobilising the communities' citizens (Kibler *et al.*, 2018; Landy *et al.*, 2013). These education and awareness programs are frequently conducted by health professionals, and in some cases, by advocates in the community or by patients affected by the diseases.

Pharmacy is a part of the healthcare system contributing to patient-centred care and optimal drug therapy outcomes. The pharmacy profession has long been recognised for its roles in public health, health promotion and disease prevention (Levin *et al.*, 2018; Strand *et al.*, 2020). Pharmacists' responsibilities have grown in recent decades, such as self-care, herbal supplement management and even COVID-19 vaccination administration (Bell *et al.*, 2016; Petrelli *et al.*, 2019; Yeong and Choong, 2017). Pharmacists' expanding roles in public health necessitate changes in pharmacy education and training.

Kolb *et al.* described the experiential learning theory as learning from experience, often through human activities (Kolb and Kolb, 2017; Morris, 2020). The pharmacy curriculum consists of the core of didactic courses, laboratory experimental classes, clerkships and clinical rotations in hospitals with some innovations into teaching methods such as problem-based learning and problem-solving learning. Clerkships and clinical rotations resemble the experiential learning theory with students learning in real-life clinical situations. Experiential learning in pharmacy is a cycle of learning style with hands-on learning from real-life experience in a professional setting with a component of students reflecting on their learning (Owen *et al.*, 2008). Experiential learning is included into the pharmacy curriculum as a key ability for developing continued learning early in the professional years (Fjortoft, 2006; Wheeler *et al.*, 2017). Self-directed learning evaluation, or self-assessment, is an important method for gauging experiential learning, with review and reflection identified as one of Kolb's four components (Kolb and Kolb, 2017).

Aims and objectives

The aim of this study was to evaluate how a community-based public health campaign improved illness awareness and prevention, as well as how much experiential learning aided pharmacy students' learning. There are two specific objectives, which include

(1) Investigating whether community-based health campaigns contribute to the increased public awareness of disease knowledge and prevention of hypertension and type 2 diabetes mellitus.

(2) Employing a self-assessment questionnaire to assess pharmacy students' experience learning in planning a community-based health campaign.

Methods

This study looks at the outcomes of a community-based campaign and reports the experiential learning of a group of pharmacy students.

Pre–post survey of participants

The study design of this research engages the use of cross-sectional, pre–post surveys in the form of self-administered questionnaires at a community-based health campaign site to understand the outcomes of the health promotion campaign. The survey instrument was developed with reference to other cross-sectional studies on disease awareness and prevention (Fryar *et al.*, 2017; Ministry of Health, 2004; Ministry of Health Malaysia, 2018; National Institute of Health, 2017). Questionnaires were developed with the three main languages used among the communities' various ethnic groups, including English, Malay and Chinese. Both content and translation validation were conducted (Cota *et al.*, 2017; Zamanzadeh *et al.*, 2015). Translation validation was performed for the questionnaires in three different languages. Forward and backward translations were performed; the translated version was compared with the original version of the questionnaire based on conceptual and cultural equivalence. Five academic staff proficient in their mother tongue (in each of the languages) and English provided consultation in the content and translation validation. The questionnaires were amended based on them before the pilot study.

A pilot study was conducted with five participants for each language version (English, Bahasa Malaysia and Mandarin) of the questionnaire. This pilot study aimed to ensure proper interpretation between the three language versions and to reduce oversights and bias in the questionnaires. Data from the pilot study were not included in the final data analysis.

Convenience sampling was used with participants recruited from the site of the community-based public health campaign. Participants were recruited according to the following inclusion and exclusion criteria. Inclusion criteria included participants aged 18 years and older, with the understanding of one of the following three languages: English, Malay or Chinese. Exclusion criteria included those not registered in the community-based health campaign and those who did not provide consent to participate. The questionnaires were administered after obtaining written consent from the participants.

Upon completing the pre-campaign questionnaire, participants began the community-based health campaign activities, including health screenings and attending a poster exhibition about diseases and prevention. Poster exhibitions with general information about hypertension and type 2 diabetes mellitus were displayed at the campaign site. Explanations about the general information on the posters were provided by pharmacists and trained pharmacy students. Random blood pressure and blood glucose measurements were taken at the campaign site. A post-campaign questionnaire was completed before participants exited the health campaign site. Registered pharmacists were at the site to answer enquiries from the public regarding medicines and diseases. They explained the random screening readings to the participants and advised them to seek further medical check-ups if needed. The pharmacist also explained other medicine-related matters.

The sample size for this cross-sectional survey was calculated using the formula below (Charan and Biswas, 2013):

$$n = \frac{\left(Z_{1\text{-}\alpha/2}\right)^2 P(1-P)}{d^2}$$

n: sample size,

$(Z_{1-\alpha/2})$: 1.96 with 95% confidence interval, when the p-value is less than 0.05,

P: expected prevalence or proportion in population-based on previous studies, which is 0.14, and

d: absolute error or precision.

A minimum of 185 participants was needed for this study.

Data were coded, entered and subjected to statistical analysis using Statistical Package for the Social Sciences (SPSS) software version 20. Descriptive data were expressed as frequency and percentage. Wilcoxon signed-rank test was used to compare variables between pre–post data in the survey.

Experiential learning in organising a health campaign

This community-based health campaign was organised by a group of pharmacy students with the support of registered pharmacists. For organising the health campaign, students receive extra-curricular credit. Credits obtained count toward the number of credits necessary for graduation. Prior to the health campaign, students were expected to submit a proposal that included explanations of the campaign's themes and focus, targeted communities, health promotion strategies, activity budgets and fundraising plans. The plan required approval from both the faculty and the university's student affairs division. The health campaign included disease awareness and prevention activities, such as health information exhibitions, health screening tests, health discussions and forums, and drug counselling sessions. Students were asked to produce a post-event report that included a self-assessment to reflect on their experiential learning experience.

Results

Outcomes of a community-based health campaign

A total of 220 participants who met the inclusion criteria and consented to participate were recruited. Table 1 summarises the demographics of the participants in this pre–post survey. There were more women than men in this study. The majority of the participants were younger than 50 years of age and were married.

The majority of the participants were not aware of their blood pressure and blood glucose readings before attending the health campaign event (refer to Table 1). Blood pressure measured at the campaign site revealed that 29.3% of the participants had high blood pressure and 5.5% of the participants had elevated blood glucose.

Table 2 summarises the knowledge level of the participants in hypertension. The participants were found to be more knowledgeable about hypertension after the campaign compared with before, in relation to the questions asked. Fewer participants knew about the association between potassium intake and blood pressure pre-campaign compared with post-campaign. Although many were aware that high salt intake results in high blood pressure, not many knew about salt's daily maximum limit. Participants were also less aware that ageing and being overweight contributes to the risk of hypertension. Many of the participants were aware that hypertension could lead to heart failure and stroke; however, fewer of them associated kidney failure and impaired vision with hypertension.

Table 3 annotates the knowledge level of participants on diabetes. Participants showed significantly improved knowledge that thirst, hunger and weight loss were signs of type 2 diabetes mellitus after the campaign. Although participants showed sufficient knowledge about healthy lifestyles to prevent diabetes mellitus, many did not associate ageing and overweight as risk factors. Most of the participants knew that diabetic foot is a complication of diabetes; however, the majority did not associate peripheral neuropathy with diabetes.

Experiential learning reflections of pharmacy students

This community-based health campaign was organised by a group of 40 pharmacy students from year 1 and year 2 under the supervision of academic staff and qualified pharmacists. The creation of an organising committee, consisting of a chairperson, a treasurer and a

Participant characteristics	*n* (%) (*N* = 220)
Gender	
Male	90 (40.9)
Female	130 (59.1)
Age range (year-old)	
18–30	68 (30.9)
31–50	83 (37.7)
51–70	57 (25.9)
>70	12 (5.5)
Ethnicity	
Chinese	132 (60.0)
Malay	84 (38.2)
Indians	2 (0.9)
Others	2 (0.9)
Education level	
Primary education	3 (1.4)
Secondary or high school education	109 (49.5)
College or university	107 (48.6)
No formal education	1 (0.5)
Household income (monthly)	
<RM1000	37 (16.8)
RM1000 – RM3000	95 (43.2)
RM3001 – RM5000	72 (32.7)
>RM5000	16 (7.3)
Marital status	
Single	78 (35.5)
Married	142 (64.5)
Random blood pressure (SBP/DBP) (mmHg)	
<120/80	78 (35.5)
120–129 either or 80–84	45 (20.5)
130–139 either or 85 to 89	32 (14.5)
140–159 either or 90 to 99	48 (21.8)
160–179 either or 100 to 109	16 (7.2)
≥180/110	1 (0.5)
Random blood glucose (mmol/L)	
<7.8	176 (88)
7.8–11	13 (6.5)
≥11.1	11 (5.5)
*Not measured	20 (NA)
Self-awareness of own blood pressure readings	
Yes	43 (19.55)
No	172 (78.18)
Not sure	5 (2.27)
Self-awareness of own blood glucose readings	
Yes	16 (7.27)
No	194 (88.18)
Not sure	10 (4.55)

Note(s): SBP: systolic blood pressure; DBP: diastolic blood pressure; *measurement was not taken as no fasting 2 h before test; NA: not applicable (data were not included in statistics)

Table 1. Characteristics of participants

Table 2.
Knowledge of participants on hypertension before and after a community-based health campaign

		Pre-campaign					Post-campaign					Wilcoxon-signed rank	
		Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	*z*	*r*
Q3	*What are the signs and symptoms of high blood pressure?*												
	a. Headache	153, 69.5	40, 18.2	22, 10.0	5, 2.3	1.39	190, 86.4	20, 9.1	8, 3.6	2, 0.9	1.17	−5.176 $p < 0.001$	−0.355
	b. Dizziness	173, 78.6	21, 9.5	22, 10.0	4, 1.8	1.30	197, 89.5	15, 6.8	8, 3.6	0, 0.0	1.14	−4.051 $p < 0.001$	−0.276
	c. Fatigue	132, 60.0	55, 25.0	29, 13.2	4, 1.8	1.54	176, 80.0	32, 14.5	11, 5.0	1, 0.5	1.25	−5.793 $p < 0.001$	−0.395
Q4	*Which of the following lifestyle can lower blood pressure?*												
	a. High salt intake	6, 2.7	183, 83.2	28, 12.7	3, 1.4	2.10	2, 0.9	213, 96.8	2, 0.9	3, 1.4	2.00	−4.017 $p < 0.001$	−0.274
	b. Alcohol consumption	5, 2.3	175, 79.5	35, 15.9	5, 2.3	2.14	3, 1.4	191, 86.8	23, 10.5	3, 1.4	2.09	−2.84 $p < 0.05$	−0.195
	c. Regular physical activity	212, 96.4	5, 2.3	2, 0.9	1, 0.5	1.04	215, 97.7	4, 1.8	0, 0.0	1, 0.5	1.02	−1.518 $p = 0.129$	−0.103
	d. Healthy eating	216, 98.2	1, 0.5	1, 0.5	2, 1.0	1.01	217, 98.6	2, 0.9	0, 0.0	1, 0.5	1.01	−0.447 $p = 0.655$	−0.030
	e. Smoking	9, 4.1	204, 92.7	4, 1.8	3, 1.4	1.98	4, 1.8	213, 96.8	0, 0.0	3, 1.4	1.98	−0.302 $p = 0.763$	−0.021
	f. Stress	9, 4.1	196, 89.1	12, 5.5	3, 1.4	2.01	5, 2.3	209, 95.0	3, 1.4	3, 1.4	1.99	−1.213 $p = 0.225$	−0.083
	g. Increased potassium intake	37, 16.8	80, 36.4	96, 43.6	7, 3.2	2.28	77, 35.0	71, 32.3	68, 30.9	4, 1.8	1.96	−5.798 $p < 0.001$	−0.4
Q5	*What are the risk factors of high blood pressure?*												
	a. Family history of hypertension	183, 83.2	24, 10.9	7, 3.2	6, 2.7	1.18	205, 93.2	8, 3.6	4, 1.8	3, 1.4	1.07	−2.997 $p = 0.003$	−0.206
	b. Increased age	169, 76.8	40, 18.2	4, 1.8	7, 3.2	1.23	198, 90.0	18, 8.2	2, 0.9	2, 1.0	1.10	−4.761 $p < 0.001$	−0.328

(*continued*)

Table 2.

		Pre-campaign					Post-campaign					Wilcoxon-signed rank	
		Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	*z*	*r*
	c. Overweight	174, 79.1	35, 15.9	5, 2.3	6, 2.7	1.21	205, 93.2	11, 5.0	2, 0.9	2, 1.0	1.07	−5.231 $p < 0.001$	−0.359
	d. High salt intake	189, 85.9	3, 1.4	22, 10.0	6, 2.7	1.22	212, 96.4	1, 0.5	5, 2.3	2, 1.0	1.05	−4.300 $p < 0.001$	−0.295
	e. Salt intake of more than one teaspoon per day	148, 67.3	10, 4.5	54, 24.5	8, 3.6	1.56	198, 90.0	5, 2.3	15, 6.8	2, 1.0	1.16	−6.227 $p < 0.001$	−0.429
Q6	*High blood pressure can cause which of the following conditions?*												
	a. Heart failure	201, 91.4	6, 2.7	6, 2.7	7, 3.2	1.08	213, 96.8	2, 0.9	1, 0.5	4, 1.9	1.02	−2.739 $p = 0.006$	−0.189
	b. Stroke	203, 92.3	6, 2.7	4, 1.8	7, 3.2	1.07	216, 98.2	2, 0.9	1, 0.5	1, 0.5	1.02	−2.428 $p = 0.015$	−0.166
	c. Kidney disease	136, 61.8	39, 17.7	38, 17.3	7, 3.2	1.54	196, 89.1	15, 6.8	6, 2.7	3, 1.4	1.12	−6.903 $p < 0.001$	−0.475
	d. Impaired vision	125, 56.8	38, 17.3	49, 22.3	8, 3.6	1.64	190, 86.4	17, 7.7	11, 5.0	2, 0.9	1.18	−7.219 $p < 0.001$	−0.497
	e. Cancer	52, 23.6	122, 55.5	37, 16.8	9, 4.1	1.93	45, 20.5	160, 72.7	13, 5.9	2, 0.9	1.85	−2.256 $p = 0.024$	−0.156
	f. Diabetes	124, 56.4	60, 27.3	27, 12.3	9, 4.1	1.54	85, 38.6	128, 58.2	5, 2.3	2, 0.9	1.63	−1.980 $p = 0.048$	−0.137

Note(s): *question was not answered by participants

Table 3.
Knowledge of participants on diabetes before and after attending a health campaign

		Pre-campaign					Post-campaign					Wilcoxon-signed rank	
		Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	*z*	*r*
Q7	*What are the signs and symptoms of high blood glucose?*												
	a. Increased thirst	102, 46.4	35, 15.9	62, 28.2	21, 9.5	1.80	173, 78.6	12, 5.5	31, 14.1	4, 1.8	1.34	−7.258 $p < 0.001$	−0.517
	b. Increased hunger	78, 35.5	59, 26.8	63, 28.6	20, 9.1	1.93	163, 74.1	20, 9.1	34, 15.5	3, 1.4	1.41	−8.022 $p < 0.001$	−0.569
	c. Frequent urination	151, 68.6	17, 7.7	32, 14.5	20, 9.1	1.41	193, 87.7	8, 3.6	16, 7.3	3, 1.4	1.18	−4.642 $p < 0.001$	−0.329
	d. Frequent night time urination	155, 70.5	13, 5.9	31, 14.1	21, 9.5	1.38	195, 88.6	5, 2.3	16, 7.3	4, 1.8	1.17	−4.512 $p < 0.001$	−0.321
	e. Fatigue	130, 59.1	44, 20.0	26, 11.8	20, 9.1	1.48	188, 85.5	20, 9.1	10, 4.5	2, 0.9	1.18	−5.928 $p < 0.001$	−0.419
	f. Weight loss	82, 37.3	82, 37.3	36, 16.4	20, 9.1	1.77	158, 71.8	43, 19.5	15, 6.8	4, 1.8	1.34	−7.817 $p < 0.001$	−0.556
	g. Altered vision	139, 63.2	26, 11.8	35, 15.9	20, 9.1	1.48	197, 89.5	8, 3.6	13, 5.9	2, 0.9	1.16	−5.684 $p < 0.001$	−0.402
Q8	*Which of the following lifestyle can lower blood glucose?*												
	a. Smoking	198, 90.0	2, 0.9	0, 0.0	20, 9.1	1.99	216, 98.2	1, 0.5	0, 0.0	3, 1.4	2.00	−1.414 $p = 0.157$	−0.1
	b. Alcohol consumption	3, 1.4	196, 89.1	1, 0.5	20, 9.1	1.99	1, 0.5	216, 98.2	0, 0.0	3, 1.4	2.00	−1.000 $p = 0.317$	−0.071
	c. Healthy diet	197, 89.5	3, 1.4	1, 0.5	19, 8.6	1.03	217, 98.6	1, 0.5	0, 0.0	2, 0.9	1.01	−1.633 $p = 0.102$	−0.115
	d. Regular physical exercise	199, 90.5	2, 0.9	0, 0.0	19, 8.6	1.01	217, 98.6	1, 0.5	0, 0.0	2, 0.9	1.01	−1.000 $p = 0.317$	0.071

(*continued*)

Table 3.

		Pre-campaign					Post-campaign					Wilcoxon-signed rank	
		Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	Yes (*n*, %)	No (*n*, %)	I do not know (*n*, %)	*Not answered** (*n*, %)	Mean	*z*	*r*
Q9	*What are the risk factors of high blood glucose?*												
	a. Family history of hypertension	138, 62.7	51, 23.2	9, 4.1	22, 10.0	1.35	133, 60.5	77, 35.0	7, 3.2	3, 1.4	1.42	−1.303 $p = 0.193$	−0.093
	b. Increased age	147, 66.8	49, 22.3	3, 1.4	21, 9.5	1.28	197, 89.5	17, 7.7	3, 1.4	3, 1.4	1.11	−5.324 $p < 0.001$	−0.378
	c. Overweight	167, 75.9	27, 12.3	3, 1.4	23, 10.5	1.17	205, 93.2	12, 5.5	0, 0.0	3, 1.4	1.06	−4.669 $p < 0.001$	−0.334
	d. Physical inactivity	193, 87.7	3, 1.4	1, 0.5	23, 10.5	1.03	213, 96.8	4, 1.8	0, 0.0	3, 1.4	1.02	−1.000 $p = 0.317$	−0.071
	e. High blood pressure	147, 66.8	33, 15.0	16, 7.3	24, 10.9	1.33	189, 85.9	19, 8.6	9, 4.1	3, 1.4	1.17	−4.338 $p < 0.001$	−0.311
Q10	*High blood glucose can cause which of the following conditions?*												
	a. Impaired vision	142, 64.5	31, 14.1	25, 11.4	22, 10.0	1.41	203, 92.3	5, 2.3	9, 4.1	3, 1.4	1.11	−6.049 $p < 0.001$	−0.431
	b. Kidney disease	166, 75.5	15, 6.8	17, 7.7	22, 10.0	1.25	208, 94.5	5, 2.3	4, 1.8	3, 1.4	1.06	−4.327 $p < 0.001$	−0.308
	c. Peripheral neuropathy	99, 45.0	20, 9.1	77, 35.0	24, 10.9	1.89	173, 78.6	8, 3.6	36, 16.4	3, 1.4	1.37	−7.674 $p < 0.001$	−0.55
	d. Coronary heart disease	117, 53.2	28, 12.7	52, 23.6	23, 10.5	1.67	184, 83.6	10, 4.5	24, 10.9	2, 0.9	1.27	−6.964 $p < 0.001$	−0.496
	e. Stroke	133, 60.5	30, 13.6	34, 15.5	23, 10.5	1.50	186, 84.5	13, 5.9	18, 8.2	3, 1.4	1.23	−5.989 $p < 0.001$	−0.428
	f. Diabetic foot	187, 85.0	4, 1.8	7, 3.2	22, 10.0	1.09	212, 96.4	2, 0.9	3, 1.4	3, 1.4	1.04	−2.271 $p = 0.023$	−0.162
	g. Sexual dysfunction	87, 39.5	58, 26.4	53, 24.1	22, 10.0	1.83	154, 70.0	33, 15.0	30, 13.6	3, 1.4	1.43	−6.778 $p < 0.001$	−0.483
	h. Depression	55, 25.0	111, 50.5	31, 14.1	23, 10.5	1.88	119, 54.1	78, 35.5	19, 8.6	4, 1.8	1.54	−6.461 $p < 0.001$	−0.463
	i. Cancer	45, 20.5	121, 55.0	31, 14.1	23, 10.5	1.93	35, 15.9	163, 74.1	17, 7.7	5, 2.3	1.92	−0.146 $p = 0.884$	−0.01

Note(s): *question was not answered by participants

secretary, was mentioned in the post-event report. Structured divisions were developed to carry out the various health promotion activities, such as producing display materials, organising health screening activities, acquiring sponsorships, engaging with the public and publicising the campaign among the community. Additionally, pharmacy students worked with community pharmacists, doctors, health organisations and community associations in the area.

The students completed a self-assessment to critically reflect on the learning experience after the health campaign.

Their responses were as follows:

(1) 69% "strongly agree" and 11% "agree" that their participation in the health campaign helped them to better understand the knowledge learned in their didactic courses.

(2) 92% reported that they used what they learnt to organise the health campaign.

When comparing the learning experience of the health campaign to formal didactic courses.

(1) 94% indicated that they are better prepared for leadership and teamwork skills;

(2) 86% believed that they are better prepared for project management and budgeting skills;

(3) 83% indicated that they were better in presentation and interpersonal skills;

(4) 69% believed that they better understand cultures and personal behaviour in health;

(5) 64% indicated that they develop better critical and problem-solving skills.

Discussion

In this study, more women attended the campaign. The trend to have more women could be due to the greater health consciousness of women regarding self-care (Duplaga, 2019). Duplaga *et al.* similarly reported more women in their study and that men were more sceptical about the effectiveness of health-related campaigns. The screening tests of abnormal blood pressure readings among the participants in this study aligned to the prevalence of hypertension reported in the national level reported in NHMS 2019, whereas the number of abnormal high blood glucose levels was much lower. The lower number of abnormal blood glucose readings in our study could be due to the random blood glucose taken at the campaign and not the fasting blood glucose tests employed for the reporting of confirmed diabetes diagnosis at the national level. Nonetheless, these findings indicate further screening and diagnosis are needed at the community for chronic diseases, such as diabetes and hypertension.

Naing *et al.* had reported that those younger than 40 years old were more willing to attend health screening tests (Naing *et al.*, 2014). The results of our study concur with this report, with the majority of our participants aged younger than 50 years. Factors such as better access to the Internet, faster access to health information and better health education and awareness could have resulted in greater participation of the younger population in the health campaign. The fact that free health screening tests were available at the campaign could have been another aspect that drew younger people in. Those who have been diagnosed with the two disorders and see their doctors on a regular basis, usually older age groups, are less likely to attend the campaign as they believe their problems have been adequately addressed (Naing *et al.*, 2014).

One of the concerning findings in this study was the low self-awareness of own health status of the participants. This finding concurred with similar studies, which have indicated a low level of health status self-awareness among Malaysians (Abdul-Razak *et al.*, 2016; Minhat

and Hamedon, 2014; Yen *et al.*, 2017). There is a need to review the success of mass communication in changing the health behaviours of individuals in the communities.

Several studies have reported that a lack of community understanding of the importance of health screenings was the most common barrier to the early detection of hypertension and diabetes mellitus (Kibler *et al.*, 2018; Shima *et al.*, 2014). In addition, poorer people and indigenous ethnic groups were said to be less aware of their health state and are less likely to be treated for their ailments (Abdul-Razak *et al.*, 2016). Community-based health campaign targeting these populations could identify local health matters, identify high-risk individuals and share public health messages across the entire community to further support population health.

Overall, the participants were sufficiently aware of the signs and symptoms and healthy lifestyles for hypertension and diabetes. This may be due to the success of mass communication of health promotion messages. However, participants in this study did not recognise kidney failure and impaired vision as complications of hypertension. This finding is consistent with other studies in which the respondents were not able to identify the complications of hypertension (Bilal *et al.*, 2015; Sathish Kumar *et al.*, 2015). Although the participants in our study recognised kidney disease and diabetic foot as complications of diabetes mellitus, they were not able to associate peripheral neuropathy with diabetes mellitus. Despite being aware of physical inactivity as a risk factor, they did not associate overweight with diabetes mellitus. In addition, a study in Kuala Lumpur showed that 60% of the respondents had a misconception that diabetes mellitus is curable (Mahmud, 2015). Similar findings have been shown in other studies (Qamar *et al.*, 2017; Deepa *et al.*, 2014). Health education materials might require the use of appropriate examples relevant to the daily practice of a multi-ethnic group. Appropriately explained medical terms and information are also important for effective health promotion. Our campaign was able to identify the lack of knowledge or misconceptions of the local community about certain aspects of disease knowledge.

Our findings showed that this community-based health campaign could identify participants with abnormal blood pressure and blood glucose readings. Advice for further action by the participants was provided by health professionals. Landy *et al.* had reported the effectiveness of their campaign in identifying participants with abnormal blood cholesterol levels (Landy *et al.*, 2013). Altman *et al.* had found that participants in a community-based campaign showed improved knowledge of the symptoms and risk factors of cardiovascular disease (Altman *et al.*, 2014). Community-based health campaigns with knowledgeable health professionals could further educate the public and support healthier living styles.

The pharmacy students demonstrated their learning process, which began with prior learning experiences in didactic courses, progressed to concepts with a project proposal, then to new experiences with learning in a real-world setting, and finally to self-assessment and reflections on their learning; These are the components of Kolb's experiential learning theory – *concrete experience abilities, reflective observation abilities, abstract conceptualisation abilities and active experimentation abilities* (Kolb and Kolb, 2017). Self-assessment in this study, on the other hand, was structured and connected to the needs of the university's extra-curriculum credit units, in contrast to Kolb's reflective observation abilities, which did not emphasise "critical" reflection (Morris, 2020). Students did, however, gain additional skills necessary for their professional careers, which will help them continue to learn and practise in a field with ever-expanding positions in public health (Sinclair *et al.*, 2020; Singh *et al.*, 2020; Smith and Olin, 2010).

Conclusion

This study shows that a community-based health campaign supports disease awareness and prevention at the community level to some extent. After the campaign, the general population

reported enhanced disease knowledge and awareness, albeit the effect's long-term viability was unknown. Future research should include evaluation of the understanding of the public in the intended mass public health messages of the health authorities.

Pharmacy students demonstrated the application of public health principles through the organisation of the public health campaign. This study further supports the incorporation of public health concepts in a pharmacy curriculum through experiential learning. Future studies could measure the learning outcomes of experiential learning and compare them to the traditional forms of learning in a pharmacy curriculum.

Our study had some limitations. As with other cross-sectional studies, we investigated a particular population; thus, the results may not be generalisable to other sites. Other factors could have influenced participants' replies in the pre–post survey, as they are exposed to different health experiences and exposure from other sources. Because of the short time interval between the pre- and post-surveys in this study, it is not possible to say whether the disease knowledge gained will be maintained after the campaign. Future studies could include a longer follow-up period to investigate the effects of community-based health campaigns in public health.

On the other hand, the added "feel good" impacts of project completion could have affected the pharmacy students' high post-event self-assessment scores. Future studies could include external or faculty assessment in assessing the impact of experiential learning in pharmacy curriculum.

References

Abdul-Razak, S., Daher, A.M., Ramli, A.S., Ariffin, F., Mazapuspavina, M.Y., Ambigga, K.S., Miskan, M., Abdul-Hamid, H., Mat-Nasir, M., Nor-Ashikin, M.N.K., Ng, K.K., Nawawi, H. and Yusoff, K. (2016), "Prevalence, awareness, treatment, control and socio demographic determinants of hypertension in Malaysian adults", *BMC Public Health*, BMC Public Health, Vol. 16 No. 1, pp. 1-10.

Altman, R., Nunez De Ybarra, J. and Villablanca, A.C. (2014), "Community-based cardiovascular disease prevention to reduce cardiometabolic risk in Latina women: a pilot program", *Journal of Women's Health*, Vol. 23 No. 4, pp. 350-357.

Bell, J., Dziekan, G., Pollack, C. and Mahachai, V. (2016), "Self-care in the twenty first century: a vital role for the pharmacist", *Advances in Therapy*, Springer Healthcare, Vol. 33 No. 10, pp. 1691-1703.

Bilal, M., Haseeb, A., Lashkerwala, S.S., Zahid, I., Siddiq, K., Saad, M., Dar, M.I., Arshad, M.H., Shahnawaz, W., Ahmed, B. and Yaqub, A. (2015), "Knowledge, awareness and self-care practices of hypertension among cardiac hypertensive patients", *Global Journal of Health Science*, Vol. 8 No. 2, pp. 9-19.

Charan, J. and Biswas, T. (2013), "How to calculate sample size for different study designs in medical research?", *Indian Journal of Psychological Medicine*, Vol. 35 No. 2, pp. 121-126.

Cota, É., Ribeiro, L., Bezerra, J.S., Costa, A., da Silva, R.E. and Cota, G. (2017), "Using formal methods for content validation of medical procedure documents", *International Journal of Medical Informatics*, Elsevier B.V., Vol. 104, pp. 10-25.

Deepa, M., Bhansali, A., Anjana, R., Pradeepa, R., Joshi, S., Joshi, P., Dhandhania, V., Rao, P.V., Subhashini, R., Unnikrishnan, R., Shukia, D.K., Madhu, S.V., Das, A.K., Mohan, V. and Kaur, T. (2014), "Knowledge and awareness of diabetes in urban and rural India: the Indian council of medical research India diabetes study (Phase I): Indian council of medical research India diabetes 4", *Indian Journal of Endocrinology and Metabolism*, Vol. 18 No. 3, pp. 379-385.

Duplaga, M. (2019), "Perception of the effectiveness of health-related campaigns among the adult population: an analysis of determinants", *International Journal of Environmental Research and Public Health*, Vol. 16 No. 5, doi: 10.3390/ijerph16050791.

Fjortoft, N. (2006), "Self-assessment in pharmacy education", *American Journal of Pharmaceutical Education*, Vol. 70 No. 3, pp. 3-4.

Fryar, C.D., Ostchega, Y., Hales, C.M., Zhang, G. and Kruszon-Moran, D. (2017), "Hypertension prevalence and control among adults: United States, 2015-2016", *NCHS Data Brief*, No. 289, pp. 1-8.

Health Development Agency (2004), "The effectiveness of public health campaigns", *Consumers and Markets*, No. 7, pp. 1-5.

Institute for Public Health (2019), *National Health and Morbidity Survey 2019 Non-Communicable Diseases, Healthcare Demand and Health Literacy*, Vol. 035, pp. 1-3.

Kibler, J.L., Ma, M., Hrzich, J. and Roas, R.A. (2018), "Public knowledge of cardiovascular risk numbers: contextual factors affecting knowledge and health behavior, and the impact of public health campaigns", in *Lifestyle in Heart Health and Disease*, pp. 11-20.

Kolb, A.Y. and Kolb, D.A. (2017), "Experiential learning theory as a guide for experiential educators in higher education", *ELTHE: A Journal for Engaged Educators*, Vol. 1 No. 1, pp. 7-45.

Landy, D.C., Gorin, M.A., Rudock, R.J. and O'Connell, M.T. (2013), "Increasing access to cholesterol screening in rural communities catalyzes cardiovascular disease prevention", *Journal of Rural Health*, Vol. 29 No. 4, pp. 360-367.

Levin, B.L., Hanson, A. and Hurd, P.D. (Eds) (2018), *Introduction to Public Health in Pharmacy*, Oxford University Press, Oxford, NY, Vol. 1, doi: 10.1093/med/9780190238308.001.0001.

Mahmud, K.A. (2015), "Knowledge of diabetes mellitus, risk factors and complications among the general public in Kuala Lumpur", *Journal of Pharmaceutical Research*, Vol. 4 No. 12, pp. 154-170.

Minhat, H.S. and Hamedon, T.R. (2014), "Understanding towards diabetes mellitus among rural adult community in Malaysia", *World Journal of Medical Sciences*, Vol. 11 No. 2, pp. 217-221.

Ministry of Health (2004), *Malaysian Burden of Disease and Injury Study: Health Prioritization: Burden of Disease Approach*.

Ministry of Health Malaysia (2018), *Clinical Practice Guidelines: Management of Hypertension*.

Morris, T.H. (2020), "Experiential learning–a systematic review and revision of Kolb's model", *Interactive Learning Environments*, Taylor & Francis, Vol. 28 No. 8, pp. 1064-1077.

Naing, C., Jun, Y.K., Yee, W.M., Waqiyuddin, S.B., Lui, L.C., Shaung, O.Y. and Haw, F.J. (2014), "Willingness to take a screening test for colorectal cancer: a community-based survey in Malaysia", *European Journal of Cancer Prevention*, Vol. 23 No. 2, pp. 71-75.

National Institute of Health (2017), "Malaysian burden of disease and injury study 2009-2014", available at: http://iku.moh.gov.my/images/IKU/Document/REPORT/BOD/BOD2009-2014.pdf.

Owen, S., Ieva Stupans, A. and Davey, A. (2008), "Experiential placements in pharmacy 'quality indicators for best practice approaches to experiential placements in pharmacy programs", Final Report: March 2008 Steering Committee Membership, pp. 1-90.

Petrelli, F., Tiffi, F., Scuri, S., Nguyen, C.T.T. and Grappasonni, I. (2019), "The pharmacist's role in health information, vaccination and health promotion", *Annali Di Igiene: Medicina Preventiva e Di Comunita*, Vol. 31 No. 4, pp. 309-315.

Qamar, M., Iqubal, R.R.M., Ahmad, S., Shaikh, F.A. and Ismail, N.E. (2017), "Awareness of diabetes mellitus among general public in Shah Alam, Malaysia: a cross-sectional study", *Asian Journal of Pharmaceutical and Clinical Research*, Vol. 10 No. 9, pp. 192-196.

Sathish Kumar, K., Singh, A.B. and Asem, P. (2015), "Prevalence, awareness, treatment and control of hypertension in urban communities of Imphal, Manipur", *Journal of Interdisciplinary and Multidisciplinary Research*, Vol. 2 No. 3, pp. 61-70.

Shima, R., Farizah, M.H. and Majid, H.A. (2014), "A qualitative study on hypertensive care behavior in primary health care settings in Malaysia", *Patient Preference and Adherence*, Vol. 8, pp. 1597-1609.

Sinclair, D., Savage, E., O' Brien, M., O'Reilly, A., Mullaney, C., Killeen, M., O'Reilly, O., Field, C.A., Fitzpatrick, P., Murrin, C., Connolly, D., Patterson, A., Denieffe, S., Elmusharaf, K., Hicket, A., Mellon, S., Flood, M. and Sweeney, M.R. (2020), "Developing a national undergraduate standardized curriculum for future healthcare professionals on 'Making Every Contact Count' for chronic disease prevention in the Republic of Ireland", *Journal of Interprofessional Care*, Vol. 34 No. 4, pp. 561-565.

Singh, H.K., Kennedy, G.A. and Stupans, I. (2020), "Pharmacist health coaching in Australian community pharmacies: what do pharmacy professionals think?", *Health and Social Care in the Community*, Vol. 28 No. 4, pp. 1190-1198.

Smith, R.E. and Olin, B.R. (2010), "Wellness: pharmacy education's role and responsibility", *American Journal of Pharmaceutical Education*, Vol. 74 No. 4, p. 69.

Strand, M.A., Mager, N.A.D., Hall, L., Martin, S.L. and Sarpong, D.F. (2020), "Pharmacy contributions to improved population health: expanding the public health roundtable", *Preventing Chronic Disease*, Vol. 17, pp. 1-7.

Wheeler, J.S., McDonough, S.L.K. and Hagemann, T.M. (2017), "Assessing self-assessment practices: a survey of U.S. colleges and schools of pharmacy", *Currents in Pharmacy Teaching and Learning*, Elsevier, Vol. 9 No. 6, pp. 966-971.

Yen, S.T., Tan, A.K.G. and Mustapha, F.I. (2017), "Awareness of diabetes, hypertension, and hypercholesterolemia in Malaysia", *Journal of Diabetes*, Vol. 9 No. 9, pp. 874-883.

Yeong, S.W. and Choong, Y.C. (2017), "Knowledge and characteristics of herbal supplement usage among community pharmacy customers in a Malaysian population", *Complementary Therapies in Medicine*, Churchill Livingstone, Vol. 35, pp. 92-108.

Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H. and Nikanfar, A.-R. (2015), "Design and implementation content validity study: development of an instrument for measuring patient-centered communication", *Journal of Caring Sciences*, Vol. 4 No. 2, pp. 165-178.

Corresponding author
Siew-Wei Yeong can be contacted at: dryeongsw@gmail.com