Factors that influence individual and community behavioural change regarding environmental health

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Abstract

Background: Increased environmental health problems have led to a rise in concern among individuals, as well as government and non-governmental organizations to tackle them. To achieve this, there is a need for behavioural change among individuals and the community on environmental health at local to international levels. The purpose of this paper is to critically explore the factors that influence personal and community behavioural change regarding environmental health.

Method: The study is a systematic review of the literature on the factors that influence personal behavioural change regarding environmental health based on the relevant studies published between 2005 and 2020. We carried out a comprehensive literature review following the PRISMA statement for systematic reviews. We searched for articles using relevant themes from different potential bibliographic databases, including Science Direct, Web of Sciences, MEDLINE, EMBASE, PubMed and Scopus. We systematically selected, compiled, and analyzed articles using descriptive methods.

Results: This study revealed the following factors that influence personal and community behavioural change towards environmental health: knowledge and awareness, attitudes, beliefs and core values, social and life adoption skills, psychological disposition, media, sociocultural, economic and political influences, contextual factors and environmental stressors.

Conclusion: This paper offers new and current cross-sectoral factors that influence personal and community behavioural change towards environmental health at local to international levels.

Keywords: Behavioural change, Environmental health, Human knowledge and attitudes, Systematic review

1. Introduction

Life in the world depends on environmental health systems. Human health depends on the environment. The food we grow and eat, the water we drink, and the air we breathe all demonstrate the link between health and the environment. If the environment has deteriorated, human life is harmed. The link between the environment and health needs to be evaluated and considered to improve global health [1]. The global priority is to ensure a good environment with strong socioeconomic and political ties that support health.

Environmental health is considered a key pillar for human wellbeing. More efforts are underway to ensure a good relationship between the environment and health systems [2]. We need support from all stakeholders to ensure that everyone in our society can access these resources. Every individual and country should consider environmental health as the best way to safeguard health and life. Yet, economic growth is also very important. Thus, every

country is also striving to achieve environmental health management by emphasizing that all stakeholders participate fully in environmental protection and conservation [3].

The world is experiencing many challenges threatening environmental health. People are exposed to environmental risk factors in their homes, workplaces, and communities. Exposure includes air pollution (including indoor and outdoor), inadequate water, sanitation and hygiene, chemicals and biological agents, ultraviolet and ionizing radiation, community noise, occupational risks, agricultural practices (including pesticide use and wastewater re-use), built environments (including housing and roads), and climate change [4]. Many people die because of these harmful environmental exposures. The World Health Organization (WHO) reports [4,5] found that low and middle-income countries bear the greatest environmental burden in all types of diseases and injuries [5]. In 2016, it was estimated that 13.7 million people died each year as a result of living and working in unhealthy environments [4]. Eight and a half million of the 13.7 million deaths caused by the environment are due to non-communicable diseases [4]. High-income countries have the greatest burden of non-communicable diseases such as cancers, stroke and cardiovascular, heart, and chronic respiratory diseases [6].

Environmental impacts on health are uneven across age and gender. In addition, they mostly affect the poor. Children under five and adults between 50 and 75 years old are most affected by environmental problems [7]. About 1.6 million deaths in children each year are due to lower respiratory infections and diarrhoeal diseases. Roughly 5.2 million deaths in adults per year are due to non-communicable diseases and injuries [5]. Men are affected by occupational risks and injuries. In contrast, women bear higher exposures to traditional environmental risks such as smoke from cooking with solid fuels such as biomass or firewood or carrying water [8].

We cannot solve environmental health problems without changing human behaviours regarding environmental conservation and protection. The most important aspect is the change of attitudes and behaviours of the people at local and international levels. Community behaviours play a vital role in effecting sustainable environmental health change. Behavioural change and environmental management draw on evidence from behavioural economics and psychology to outline a new approach that enables people at home and at work to control

and conserve the environment [9]. Better use of the environment at an individual level can transform the current environment and health systems in the world. Sustainable use of natural resources results in better environmental health management [10].

Environmental health entails environmental protection, food safety, housing, public and occupational health. To achieve sustainable development, one must consider various aspects including good health and wellbeing, clean water and sanitation, affordable and clean energy, sustainable cities and communities, responsible consumption and production, climate action, and health of living things [11]. Different social systems and cultures help determine how people use these resources. They can also help people uphold specific environmental health management behaviours. Interactions between cognitive and contextual norms, material culture, and management practices can enable people to achieve environmental health management behaviours [12].

Various studies have been conducted regarding environmental health behaviours in different countries [13,14]. These studies focused on the individual and organizations' attitudes and behaviours on environmental health. Their results differed from one country to another, as well as between different individuals and organizations. Each country desires to protect the environment and safeguard health to realize sustainable development. The management of the environmental health sector has a vital role in achieving sustainable development. This has led to increased attention and interest in studies on the environmental and health management behaviours from around the world. Thus, we conducted a systematic review to assess the attitudes and behaviours of individuals and communities regarding environmental health changes.

2. Methodology

We conducted this review to provide an overview of the factors that influence individual and community behavioural change regarding environmental health. This review provides a synthesis of the current state of knowledge in the environmental health behaviours among individuals and communities. It evaluates theories, models or approaches about how or why individual behaviours change on environmental health. To date, few review papers have been published regarding factors influencing environmental health behavioural change among individuals and communities [15]. We recommend clear and more systematic review studies to be

carried out in this field to bridge the gap in the previous literature. This paper aims to present a systematic review of journal papers that exist in several academic databases regarding factors influencing personal and community behaviours on environmental health from 2005 to 2020. These dates were selected to ensure that findings are relevant and up-to-date.

The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement for systematic reviews [16]. We searched Science Direct, Web of Sciences, MEDLINE, EMBASE, PubMed and Scopus databases by using keywords such as "Awareness", "Knowledge", "Attitudes", "Behaviours", "Environment", "Health" and "Environmental Health". The inclusion criteria were as follows: (i) studies published between 2005 and 2020, (ii) studies written in English, (iii) research papers reporting behavioural change on environmental health among individuals, and (iv) studies published in peer-reviewed journals. The exclusion criteria included: (i) publications based on weak analysis, and (ii) protocol and descriptive studies. Some studies were published before the year 2005. These studies were used to complement the theoretical background of the study topic.

Keywords in all of the publications were evaluated in detail according to set criteria in the title and abstract sections. As a result of this review, 151 out of 272 were found to be relevant to the study topic, and 98 had full text available. After a systematic screening, 67 studies met the inclusion criteria (Fig. 1). We worked independently to collect data from reports and later met to compile the findings. Moreover, we worked together to assess risk to each study. After the selection of relevant studies, a thematic analysis was performed to classify identified factors following emerging themes. Semi-quantitative analysis was executed to measure the frequency in which factors were mentioned by the included studies. The PRISMA checklist items used in this study is found in https://github.com/obishoge/PRISMA.git.

3. Results

The study of individual and community knowledge, attitudes and behaviours regarding environmental health is complex and influenced by multifactorial personal and situational/contextual reasons [17]. The complexity is observed since the decision making of this type of study involves fragmented and different disciplines such as psychology, engineering, natural and applied sciences, sociology, philosophy, economics, environment, technology and sociology. After examining the selected papers in our review, we identified eight main factors that influence the individual and community behavioural change regarding environmental health (Table 1). These factors differ among individuals, communities, nations, and generations.

4. Discussion

Through a comprehensive literature review, we identified eight main factors that influence environmental health behavioural change among individuals and communities (Table 1). Our discussion provides theories or approaches related to personal and community behavioural change.
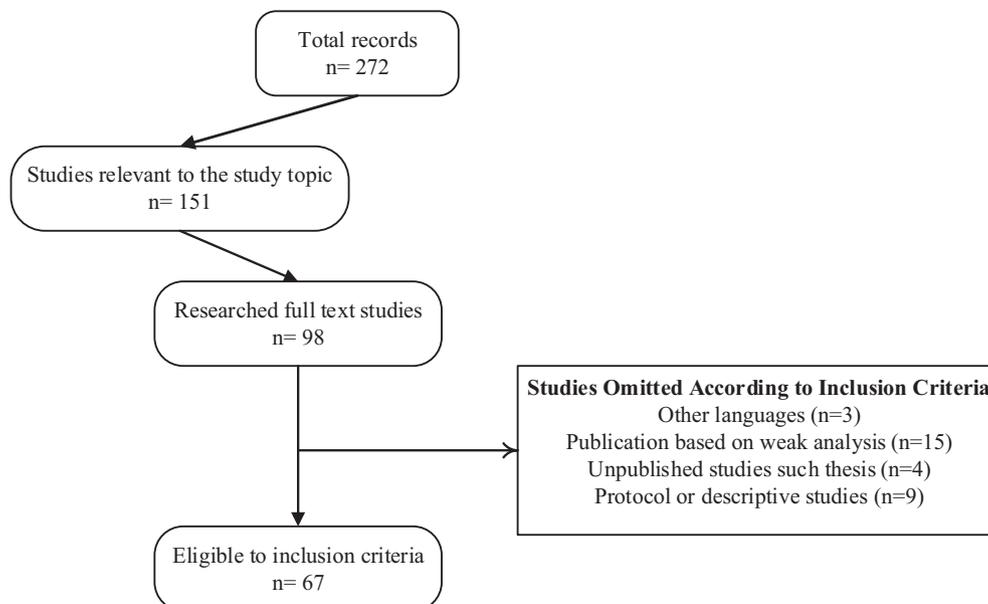

Fig. 1. The methodology used for the review process.

Table 1. Main themes influencing individual and community behavioural change regarding environmental health that were identified after a systematic review.

No.	Theme	Implications to behavioural change	References	Countries
1	Awareness and knowledge	Change individuals' actions of doing things	[9]	Nigeria
		Increase environmental literacy	[18]	Iran
		Environmental sanitation knowledge has a positive significance to change peoples' behaviour on environmental sanitation and solid waste management in the societies	[19,20]	Russia and Malaysia
		Encourage appropriate management operations associated with environmental health issues	[21]	Nigeria
2	Attitudes, beliefs and core values	Attitudes influence behaviours	[22,23]	Oman and England
		Students' environmental behaviours are strongly associated with their environmental worldviews and values conditioned by their political alignment	[24]	England
		Spiritual and religious beliefs promote environmental sustainability issues	[25]	USA
3	Social and life adoption skills	Enhance adaptive actions to reduce health impacts	[26]	USA
		Individuals with poor social and life skills tend to have higher rates of behaviour problems		
4	Psychological disposition such as self-efficacy	Self-efficacy reflects confidence in the ability to exert control over one's motivation, behaviour, and social environment	[27,28]	USA
		Self-efficacy and outcome expectations are key tools for behaviour initiation and maintenance		
5	Media	Disseminates information or data concerning environmental health issues and environmental conservation of natural resources such as forests	[29,30]	Pakistan and The Republic of Korea
		Bridges the gap between a high degree of public awareness and a low degree of public concern	[31]	USA
		Communicates about environmental issues		
6	Socio-cultural, economic and political conditions	Are key determinants of decision making on something	[32]	Romania
		People's behaviours on environmental health tend to differ according to their socio-economic, cultural and political status	[33]	Indonesia
7	Contextual factors including policies, laws and regulations	Context shapes the effectiveness of knowledge implementation and influences human development through behaviour changes	[34]	USA
		Laws or rules prohibit and guide people from destroying the environment	[35]	Philippines
8	Environmental stressors	Constrain productivity, reproductive success, and ecosystem development	[36]	Canada
		Individuals tend to change their behaviours to overcome environmental stressors	[37]	India

4.1. Awareness and knowledge

Awareness and knowledge about something can change the individuals' actions of doing things. The *Behavioural Change Model* explains that if individuals are well-informed and have a better understanding of something, they are likely to become more motivated to behave responsibly [9]. When it comes to environmental health, environmental awareness and knowledge lead to environmental literacy [18]. According to educators at Oregon State University [38], environmental literacy means *"an individual's understanding, skills and motivation to make responsible decisions that consider his or her relationships to natural systems, communities and future generations."*

Knowledge of what is effective in the field of health behaviour change is vital for attaining improvements in health and preventing disease [39]. Awareness and knowledge of environmental issues may change the individual behaviour on environmental health. For instance, the study conducted by Mustikaningrum and Puji [20] showed that environmental sanitation knowledge had a positive significance to change peoples' behaviour on environmental sanitation in societies of Semarang City, Russia.

Being aware of environmental health is not a guarantee that people will be willing to change their behaviours. People may have awareness and knowledge but yet they do not change their actions

towards environmental health. Desa et al. [19], showed that knowledge and awareness moderately influence the behaviour of the students on solid waste management. This study suggested that more programs on education and awareness among the students on managing solid waste on the campus would be needed to promote attitude change and sustainable environmental practices in Malaysia.

There is a lack of awareness and knowledge on effective and appropriate management operations associated with environmental health issues such as waste and climate change. This situation may pose a potential threat to human health and the environment [21]. Increased awareness and knowledge among people can influence them to make a positive behavioural change regarding environmental health management. Thus, more efforts are needed to initiate various programs which impart awareness and knowledge among individuals on environmental health.

4.2. Attitudes, beliefs and core values

Attitudes are considered hypothetical constructs that present a person's like or dislike for something. According to Jung [40], attitude can be defined as *"the readiness of the psyche to act or react in a certain way."* In practice, the term "attitude" is often used as an umbrella expression covering concepts such as preferences, feelings, emotions, beliefs, expectations, judgments, appraisals, values, principles, opinions, and intentions [23].

Attitudes, beliefs and values are well described in the *Value-Attitude-Behaviour Model* that was proposed and tested by Homer and Kahl [41]. This model demonstrates that values are a fundamental factor in the formation of attitudes that lead to a specific behaviour. Although attitudes are relatively good predictors of behavioural change on environmental health and are relatively easy to change, they only help explain specific behaviours [22]. For instance, a study conducted by Inkpen and Baily [24] showed that undergraduates' environmental behaviours were strongly associated with their environmental world-views and values conditioned by their political alignment.

Traditional values and beliefs influence personal or community behavioural change on environmental health protection and conservation [42]. Traditionally, spiritual and religious beliefs are applied to promote issues of environmental sustainability [25]. Spiritual and religious beliefs are parts of indigenous knowledge systems. For instance, traditional African societies possess indigenous knowledge systems that promote and facilitate cheap, effective and

sustainable community environmental health care delivery and sanitation. These traditional or indigenous knowledge systems have developed in response to local environments and conditions [43].

On the flip side, sacred beliefs can also perpetuate traditions that expose people to repeated environmental risks. For instance, in three studies conducted by Sachdeva [25], researchers observed that sacred beliefs may habituate participants to the harmful effects of pollution in the Ganges River, India.

4.3. Social and life adoption skills

Social and life skills enable individuals to use adaptive and positive behaviour to deal effectively with the demands and challenges of everyday life. They are defined as *"abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life"* [44]. Life skills are behaviours that enable individuals to adapt and deal effectively with the demands and challenges of life. They differ across cultures and settings. Analysis of the live social and skills field suggests that there is a core set of skills that are at the heart of skills-based initiatives for the promotion of the environmental health and well-being of the people. People need to be imparted with social and life skills that should be easily adopted. These skills may be psychological or interpersonal. They are linked with each other to help the people in decision making. Ideally, they should involve creative and critical thinking components and values analysis among the people. Unfortunately, communities with poor social and life skills tend to have higher rates of behaviour problems [26].

Social and life skills are used to prevent and adapt to environmental health-related problems. They enhance adaptive actions to reduce health impacts. Thus, the individual and society need to gain skills on how to conserve and manage environmental health. These skills may include environmental awareness skills that are needed to assess the costs, benefits, and risks of investments in an environmentally friendly manner. Children at school levels should receive life skills-based education about good sanitation and hygiene for their bodies and environment. Life skills together with knowledge, attitudes, and values help them to make suitable decisions and act upon them.

4.4. Psychological disposition such as self-efficacy

A disposition is *"a habit, a preparation, a state of readiness, or a tendency to act in a specified way"* [45]. It reflects the concept of personality traits.

Table 2. Element of psychological disposition.

No.	The element of psychological disposition	Meaning	References
1.	Self-efficacy	The belief people have in their abilities, specifically their ability to meet the challenges ahead of them and complete a task successfully.	[47]
2.	Self-esteem	A sort of general or overall feeling of one's worth or value.	[48]
3.	Self-regulation	An individual's "self-generated thoughts, feelings, and actions that are systematically designed to affect one's learning.	[49]
4.	Motivation	The individual's desire to achieve something.	[50]
5.	Resilience	The capacity to recover quickly from difficulties; toughness.	[51]
6.	Confidence	Strength of belief in oneself, the conviction that one can meet life's challenges and succeed and the willingness to act accordingly.	[52]

Psychological disposition is a major indicator of an individual's health experience and predicts self-reported health. Self-efficacy is considered a major element of psychological disposition. According to Bandura [46], self-efficacy refers to *"an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments."* Self-efficiency is associated with self-esteem, self-regulation, motivation, resilience and confidence. However, they have slightly different meanings (Table 2).

Self-efficacy is explained in the *self-efficiency* and *social-cognitive theories* that were proposed by Bandura [46]. In these theories, self-efficacy and outcome expectations are key tools for behaviour initiation and maintenance [28]. Self-efficacy constructs that have been applied to behaviours include self-management of chronic disease, smoking cessation, alcohol use, eating, pain control and exercise [27].

Self-efficacy beliefs influence personal environmental attitude, concern, and perception of environmental health issues. For instance, a study conducted by Morris et al. [53] revealed that self-efficacy together with functional limitations and environmental perceptions are significantly related to environmental health and physical activity among individuals. Surprisingly, there is the belief that someone may have low self-efficacy on environmental health, but can be ready to change the behaviour. This is explained in the study of Saribas et al. [54], whereby the participants had no sufficient self-efficacy beliefs related to environmental education, but their environmental attitude, concern, and perception of environmental issues were relatively high. This is because the personal behavioural change not only depends on self-efficacy but other more factors.

4.5. Media

Media is the communication tool used to store and deliver information or data. It refers to components of the mass media communications industry such as broadcasting, print media, publishing, news media, photography, cinema, and advertising. Media is a tool that is used to disseminate information or data concerning environmental health issues. It bridges the gap between a high degree of public awareness and a low degree of public concern [30]. The responsibility and duties of the media are to raise awareness, inform and promote debate on environmental health matters. Media is used to communicate about environmental issues [31].

The media play a dual role as a public sphere and as political actors in the process of environmental communication. This usually changes people's behaviour in using natural resources for the sake of environmental protection and conservation. For instance, the study conducted by Park [29] revealed that media acts as political actors and public spheres in providing information related to the environmental conservation of natural resources such as forests in the Republic of Korea. The media has been a communication tool for many years. For instance, the study conducted by Parlour and Schatzow [55] indicated that over 90% of people change their attitudes and perceptions of air pollution due to their reliance on the mass media for information in Canada. Another study by Mikami et al. [56] explained that people's exposure to television has a significant correlation with anti-environmental attitudes. This finding suggested that television programs hurt public awareness of environmental issues in Japan.

More education on environmental health can be provided to the public through the media. This helps to strengthen the public knowledge of environmental health. Uche [57] showed that people who were not exposed to mass media had low education about the situation in Nigeria. Oyama and Okpara [58] reported that there were other diseases worse than the Ebola virus that has been present and killing people daily. However, those diseases do not get more media attention needed to change

people's behaviour and attitude about environmental health management. We also observed that media attention is so focused on COVID-19. We are forgetting that other diseases such as malaria, typhoid, and cholera are killing people every day. Thus, ideally, the media should disseminate information on all diseases that affect people's life and destiny. Another challenge is that sometimes the media releases fake news, especially on websites. Large proportions of the public may listen to fake news and believe them through its coverage in mainstream news outlets [59]. Exposure to fake news can significantly modify the unconscious behaviours of individuals and communities on environmental health [60]. Thus, more attention must be directed to the role of mainstream media in the dissemination of disinformation [59].

4.6. Socio-cultural, economic and political influences

Recent development and associated variations in the health practice and delivery depends on the changes in socio-cultural, political, economic and environmental conditions. Socioeconomic, political, cultural and environmental conditions usually shape society. These conditions are key determinants of decision making [32]. Attitudes and behaviours about a specific topic tend to differ according to the socio-economic, cultural and political status of different members of society [33]. People with higher education, earning more and having higher employment status are usually more proactive in tackling environmental health concerns than those who are poor, uneducated and have low-status jobs.

Human factors also play a vital role in shaping people's knowledge, attitudes, willingness, motivation, capability and capacity to act towards good environmental health [61]. Human factors refer to environmental, organizational and job factors, and human and individual characteristics, which influence behaviour in a way that can affect health and safety.

The conditions in which people live, learn, work, and play determine the social and environmental health of society. These conditions affect people's ability to take part in environmental healthy behaviours. Poor conditions can upset their health. Social factors that affect environmental health behaviour include education level, income, housing, and access to health care [62] (Table 3). Rural communities often have income and social services such as education, water supply and health that are lower than urban inhabitants. Rural communities may also experience less behavioural change on environmental health [79]. Thus, there is a need to strengthen social services such as education and relationships regarding environmental health among rural communities.

4.7. Contextual factors including policies, laws and regulations

Contextual factors are special characteristics that reflect a particular context and are unique to an individual, a particular group of people, community, and society [80]. In general, the factors or characteristics of the environment that influence the behaviour of human beings or society are referred to as contextual factors. In real life, a context shapes the effectiveness of knowledge implementation and

Table 3. Social factors affecting environmental health behaviour and their implications.

No.	Social factor	The implication on environmental health
1.	Education level	• It provides tools to make good and informed decisions about environmental health issues. • People with more education are more likely to live in a good environment. • They are likely to participate regularly in detecting environmental health risks. • They are also less likely to participate in environmental unhealthy activities such as poor waste disposal, poor cleaning homes surrounding, poor washing of home utensils and creating bush fires.
2.	Income	• People with higher incomes tend to be live in environmentally healthier areas than people with low incomes. • They have more access to grocery stores and healthy foods. • They usually have more access to safe spaces for exercise, recreation or other activities. • These incentives are difficult for poor people
3.	Housing	• People who are continually exposed to poor living conditions have a higher risk of developing health problems. • Conditions such as pests, mould, structural problems, and toxins in the home can all affect people's health. • A neighbourhood that is free from violence, crime, and pollution gives children and adults a safe place for physical activity and recreation

influences human development through behaviour changes from visual perceptions to social interactions. Context influences how human being sees objects and emotions and acts towards something. Everything that a human being does is influenced by the situation in which it is done. Contextual factors usually help an individual to make sense of their situation and to decide whether to do a certain action or not. Moreover, they are necessary for interpreting social interactions [63]. In environmental health, contextual factors influencing human beings include policies, laws and regulations, scientific and technical capability, biospheric value, institutional capability, climate change, technology conditions, access to information, financial support and incentives, risk, the role of models, and social support. All of these factors influence the behaviours to change in environmental health. These factors together with psychological and socio-demographic variables influence individuals' or societal behaviours towards environmental health.

For instance, the study conducted by Abun [35] shows that laws or rules can prohibit people from destroying the environment. Moreover, these should be implemented in the way that they change the culture and mindsets of the people on the environment health. The main aim of formulating environment-related policies, laws or regulations is to change the people's knowledge, attitudes and behaviour on environmental conservation and protection.

4.8. Environmental stressors

Our everyday lives are full of environmental stressors that cause minor irritations. These stressors cause discomfort to people. These factors may constrain productivity, reproductive success, and ecosystem development [36]. Environmental stressors include noise, insects, light, crowding, colours, natural disasters such as tornadoes, hurricanes, and flooding, and man-made disasters such as war.

Environmental stressors change a person's way of life as they deal with demands from the environment. It is difficult to avoid environmental stressors because they are part of people's everyday life. They can be considered as pollutants to the mind. Many people create and adopt coping strategies for the sake of changing emotions, behaviours, thinking ability and physical health [64]. To overcome environmental stress, people practice coping and adaptation mechanisms. These mechanisms change their behaviours on environmental health. Every individual's practices reflect one's ability to handle environmental stressors and ultimately to

promote environmental fitness. For instance, in a study by Rishi and Khuntia [37], residents of the city of Bhopal, India faced traffic congestion, vehicular emission, congested habitat, and expansion of the slum. To adapt to their environment and overcome these problems, people living in this area adopted coping strategies such as cultural, religious, environmental, social, and physical strategies.

4.9. Limitations of this study

There were other different factors influencing individual and community behaviours regarding environmental health that we could not discuss in depth. Thus, there is a need for more studies on single factors affecting environmental health. Such studies can provide a deeper discussion of different factors influencing the environmental health behaviours of the community. For instance, further, studies can evaluate how gender, education level, and weighing of costs and benefits influence individual and community behavioural change on environmental health. Moreover, environmental health is a broad field that covers issues such as food safety, air pollution, inadequate water, poor sanitation and hygiene, exposure to chemicals and biological agents, ultraviolet and ionizing radiation, noise pollution, occupational risks, agricultural practices, built environments and climate change [65]. Thus, further studies are required to evaluate the factors influencing individual and community behavioural change to each specific aspect of environmental health.

5. Conclusion

This narrative review provides a critical discussion concerning the overall environmental health knowledge and behaviours among individuals. It is important to address the individuals' knowledge and behaviours toward environmental health to realize sustainable development. In this study, we found that improving environmental health requires multidisciplinary and sectoral approaches. Effective environmental health depends on individuals' knowledge and behaviours that encompass different disciplines such as environment, health, psychology, communication, engineering and sociology. Changing human behaviours at the individual, family, organization or national level influences and determines environmental health management capacity.

Awareness and knowledge are the major determinants of the behavioural changes among the

individual toward any action. Thus, individuals need all the information related to the environment and health when they make changes in environmental health. With greater awareness and knowledge, individuals may change their attitudes, appreciate their self-value and social norms, and then acquire intention towards behaviours change. However, educational programs to increase knowledge and awareness should consider the culture of the relevant individuals or society. We recommend that educators incorporate environmental health behaviour into the cultural activities of the relevant society because the environment and health are the major factors related to each other. Human health and life depend on a good environment. Thus, the establishment of good environmental health culture and behaviour means the creation of a good life for society.

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Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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