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Environmental health experiences in prolonged displacement: A systematic scoping review of challenges and interventions in low- and middle-income countries (LMICs)

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Abstract

Providing adequate environmental health services is crucial in contexts of forced displacement, where over 70 million people—mostly in urban or informal settlements—often face prolonged displacement with limited access to water, sanitation, and hygiene (WaSH). The presence of these unmet needs of environmental health leads to a greater likelihood of falling sick, social unrest, and long-term inequality. Although the magnitude of the crisis is tremendous, there is a lack of in-depth understanding of the environmental health situation and responses in the context of long-term displacement. The proposed article will thus synthesize the currently available knowledge base on environmental health in prolonged displacement contexts, identify key conditions and issues, and provide suggestions for future action. This study employed a systematic scoping review methodology that adhered to the PRISMA guidelines. A search was conducted of 212 peer-reviewed studies, institutional reports (also known as gray literature, which refers to materials published outside of academic journals, such as NGO reports and working papers). The findings indicate that research on water, sanitation, and overcrowding has found substantial evidence, whereas other environmental health domains, including waste disposal, feminine hygiene, and air quality, have extremely low representation. Issues that have been faced are institutional fragmentation, lack of funds, and political constraints, which impede the sustainable provision of services. Excessive exposure to waterborne and respiratory diseases, as well as poor environmental conditions and failure to adhere to international humanitarian standards, are also highlighted as significant issues in the review. The paper emphasizes the importance of inclusive environmental health policies, enhanced stakeholder collaboration, and ongoing planning and management. It recommends integrating displaced populations into national systems, prioritizing critical health areas, and strengthening evidence to guide policy and practice—key steps to ensuring dignity, equity, and resilience in protracted displacement.

Introduction

Displacement is not just the loss of a physical house; it is the corruption of basic human rights, dignity, and access to basic necessities of life. To the refugees who did not have much choice but to escape, the war rages much more than just across borders or tent walls; it is also a war on health, safety, and identity. Not only the environmental health, such as access to clean water and sanitation, and a safe place to live in become an

everyday fight, but also a logistical issue. There are over 70 million people worldwide who have been forced to leave their homes, with many living in poor (developing) countries (Albu, 2019). It's essential to provide everyone proper health services like clean water, sanitation, and hygiene (WaSH), regardless of their immigration condition (Murthy, 2021). In recent studies, the necessity of the immediate response to WaSH needs of displaced populations is further highlighted by the current global wars, climate-related crises, and urbanization emergencies (Aliga, 2023; Behnke et al., 2020; Cooper et al., 2021). Minor studies have also pointed to the role of underutilized environmental health activities, such as menstrual hygiene and energy supply, in worsening health inequality in prolonged displacement conditions (Altare et al., 2019; Barbieri et al., 2017; Milton et al., 2017). Such studies highlight an emerging trend of integrated, rights-based and sustainable models of service delivery and stress the importance of newer frameworks in policy and practice (Cronk et al., 2015; Murthy, 2021). Displaced populations live in crowded spaces and are more susceptible to transmissible diseases, so basic health services like WaSH are required for those vulnerable populations. Poor health services can harm displaced people and the host communities (Cronin et al., 2008). The lack of environmental health services, especially the lack of access to clean water, safe sanitation, and hygiene facilities, has been a recurrent source of harmful outbreaks of infectious diseases among displacement populations, including cholera, dysentery, and respiratory diseases (Altare et al., 2019). These epidemics can spread to host communities, burdening the health system infrastructure and increasing morbidity and death. The overall effect of such failures causes a spiral of vulnerability in situations of prolonged crises, which is why it is no longer a humanitarian problem; it is a health crisis. However, it’s hard to fully understand how to provide these services in crises, particularly in places like refugee camps, and the available information is not always reliable (Cronk et al., 2015).

Even though taking care of environmental health is very important during emergencies, it's tough to maintain long-term, sustainable services and keep track of them, both in and out of refugee camps. In fact, 60% of displaced people live outside of camps (Shultz et al., 2020). Camps are usually meant to be temporary solutions, but many displacement situations last much longer than the emergency period. For example, 80% of refugee crises last more than 10 years, and 40% last over 20 years (Crawford et al., 2022). When people are displaced for more than two years, this is called a protracted crisis, and it requires different health standards compared to short-term emergencies (Grafham, 2020). The Sphere handbook, which sets international guidelines for humanitarian aid, has special principles for handling these long-term crises (Association, 2018).

Using the PRISMA guidelines, which provide a systematic framework for reviewing research, we analyzed data from scientific papers, grey literature (materials not formally published in academic journals, such as reports, guidelines, and working papers), and other relevant sources. Our findings address environmental health issues related to water, sanitation, hygiene, overcrowding, waste disposal, energy supply, pest control, menstrual hygiene, air quality, and food security. We identified barriers to improving these conditions, as reported in the reviewed papers, and consolidated their recommendations for change. Based on these findings, we propose suggestions for environmental health practitioners, policymakers, and researchers. Although the past few years have produced a growing body of literature on environmental health in emergencies, the notable absence of a meta-synthesis with a particular focus on prolonged displacement—experienced by millions of people—remains. Existing reviews have primarily examined short-term humanitarian responses or single elements of environmental health, such as WaSH, cooking technologies, and disease outbreaks, without considering long-term perspectives. Consequently, the complex interrelationships among environmental exposures, health outcomes, and structural barriers in protracted displacement settings remain underexplored. This review addresses this critical gap by synthesizing diverse strands of literature to outline the scope of environmental health conditions and challenges, and to highlight actionable recommendations for communities experiencing long-term displacement.

In response to the identified problem, this scoping review aims to systematically review environmental health conditions and challenges, as well as recommended interventions, in settings of prolonged displacement. Specifically, it assesses reported practices in water, sanitation, hygiene, waste management, energy access, vector control, menstrual hygiene, food safety, and air quality in protracted refugee and IDP contexts. Unlike earlier reviews that focused on emergency or short-term solutions, this research synthesizes evidence across various environmental health areas, particularly in protracted displacement settings. This review contributes new knowledge to inform future policies, planning, and research by mapping existing studies and identifying underexplored areas. The following research questions will be addressed in this scoping review: What are the reported environmental health conditions, experiences, and consequences in prolonged refugee or internally displaced person (IDP) settings? What difficulties hinder environmental health development in these settings?

What recommendations or suggestions do previous studies offer to improve environmental health in these contexts?

The review is likely to make a theoretical and practical contribution, as it will provide in-depth insight into environmental health in prolonged displacement situations. The results are expected to inform humanitarian planning, capacity building for effective environmental health, and equitable and sustainable access to basic services for displaced populations. Also, the synthesis is likely to provide a basis for developing future scholarly works and policies in the domain of global displacement and public health.

Method

This study adhered to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) methodology (Moher et al., 2009) for the systematic review, opting for a scoping review to delineate the principal concepts within this expanding research domain. The aim of the study was to explore various and cross-connected aspects of health in the environment of protracted displacement areas. These encompass various environmental factors, including water supply and quality, sanitation facilities, hygiene practices specific to menstrual and hand hygiene, waste disposal channels, energy supply, vector control, air quality and ventilation, and food security. Both of these dimensions were analyzed systematically in terms of the conditions reported, health consequences, barriers to service delivery, and recommended interventions. A scoping review technique was employed to provide a comprehensive analysis of the current data, building upon the groundwork established by earlier systematic reviews (Peters et al., 2015). We designed a focused search strategy, including terms pertinent to environmental health and displaced people, based on prior reviews (Adair-Rohani et al., 2013; De Buck et al., 2015) and (Grimes et al., 2014; Moffa et al., 2019). The search phrases included many environmental health issues, including water quality, hygiene, sanitation, waste management, energy supply, pest control, food safety, air quality, and cleanliness, along with terms pertinent to displaced people, displaced persons (IDPs), refugees, and asylum seekers (See Table 1).

Table 1. Search terms categorized by environmental health themes and displacement status

Theme	**Environmental health**
Search term details	Water: “water”
	Sanitation: “sanitation”; “plumbing”; “latrine”
	Hygiene: “hygiene”; “soap”; “shower”; “feminine hygiene”
	Waste management: “waste management”; “landfill”; “wastewater”
	Energy: “electricity”; “generator”; “lighting”
	Vector control: “vector control”; “rodent”; “infestation”
	Air pollution: “indoor air”; “ventilation”; “mold”
	Food safety: “food safety”; “undercooked”; “foodborne”
	Cleaning: “fomite”; “disinfect”; “cleanliness”
	Other environmental health issues: “environmental health”; “environmental exposure”; “lead poisoning”; “overcrowding”
Search term details	Refugees: “refugee”; “refugees”
	Internally displaced persons: “internally displaced person”; “internally displaced people”
	Other displaced populations: “immigrant”; “asylum seeker”

A comprehensive literature search was conducted on January 23rd, 2024, targeting peer-reviewed articles across multiple databases, including PubMed, Web of Science, Scopus, and EBSCOhost Global Health. Utilizing Cochrane's Covidence software, a team of two reviewers systematically screened article titles and abstracts for relevance. Additionally, a grey literature search was performed in April 2024, encompassing various databases and repositories, such as DisasterLit, International Rescue Committee, United Nations International Children's Emergency Fund (UNICEF), Water sanitation and hygiene (WaSH), United nation higher commission for refugees (UNHCR), International Committee of the Red Cross, and World Bank Water, to ensure a thorough exploration of the research landscape. Furthermore, we had specific criteria for excluding articles from the search database. Additionally, for grey literature, we followed the AACODS checklist (Tyndall, 2018), which evaluates publications based on their Authority, Accuracy, Coverage, Date,

Objectivity, and Significance. If a publication didn't meet these criteria, it was excluded from our review. After reviewing the full text of each publication, the reviewer categorized them into one of three phases of displacement: emergency phase (0–6 months), medium-term (duration from 6 months to 2 years), and prolonged (above two years), following UNHCR's definitions. This review focuses on publications that fall into the "prolonged" category. This review followed PRISMA guidelines and employed a standardized data extraction protocol to improve the validity and consistency of data extraction. Two independent reviewers performed data extraction and ensured accuracy through cross-verification of the extracted data. Discrepancies were addressed through discussion and consensus, with a third reviewer available for additional arbitration if necessary. This approach adhered to established PRISMA guidelines for systematic scoping reviews, enhancing the findings' reliability.

The reviewer gathered various details from the publications we included, such as basic information like publication title and study year, as well as the type of study conducted, and also noted down contextual details like the country or countries where the study took place and the displacement phases at the time of the research. Information about the population involved was also recorded, including where they came from and why they were displaced. Additionally, we collected data on the setting itself, including when it was established, its total population, who managed it, and who funded it. We recorded environmental health conditions, including sanitation services, the existence of animal vectors, and water supplies along with exposures and risks such as toxins and infections. We also examined outcomes including health and livelihood, along with pertinent issues such as climate, seasonality, natural disasters, and applicable national policies. Ultimately, we identified barriers to enhancement, deficiencies in information, and suggestions presented in the articles. Publications were categorized into regions according to the Sustainable Development Goals (SDG) geographical classifications set out by the United Nations in 2017. Furthermore, income levels were designated following the World Bank's economic categorization (2018), contingent upon the specific nation or countries examined in each study. When a publication covered numerous nations, economic levels, or regions, it was categorized in all relevant classifications to provide a thorough and nuanced study.

Methodological insight and implications

The methodologies in this study exhibit various strengths and shortcomings in tackling the intricacies of environmental health in extended displacement scenarios. Quantitative research was predominant, offering quantitative data on critical environmental health variables such as water access, sanitation coverage, and hygiene habits. The quantitative approaches enabled broader applicability and provided essential measures for assessing the efficacy of treatments. Many of these studies, however, depended on cross-sectional data, constraining their ability to identify longitudinal health effects over time, which is a critical aspect in extended displacement situations.

Qualitative approaches, including interviews and focus groups, yielded substantial insights into the experiences of displaced people, emphasizing complex issues such as menstrual hygiene management and the social dynamics associated with hygiene practices. This depth is crucial for understanding the influence of cultural and behavioral variables on environmental health outcomes. Qualitative research sometimes faces constraints related to sample size and representation, hindering the applicability of results to broader displaced groups. Mixed-methods techniques were seldom found in the examined research; yet, they demonstrated a robust capacity to synthesize quantitative and qualitative results.

This research combined statistical data with personal narratives, offering a holistic view of environmental health concerns by situating numerical findings inside the lived experiences of impacted communities. Logistical constraints, including limited funding and the difficulties associated with data collection in displacement settings, frequently hindered the broader implementation of mixed methods. A notable methodological deficiency was the restricted application of longitudinal studies, essential for comprehending the long-term impacts of environmental health interventions in prolonged crises. The lack of longitudinal research underscores the necessity for ongoing funding and logistical support to facilitate studies that accurately reflect the changing health needs and outcomes in displacement contexts. Future research should incorporate greater methodological diversity, particularly through longitudinal and mixed-methods studies, to effectively address the complex aspects of environmental health in prolonged displacement.

Results

We found 305 publications that met our search criteria. Out of these, 212 publications focused on the "prolonged" displacement phase are considered for this systematic scoping review. Our search generated 212

publications that provided valuable data on environmental health services, which include populations from the prolonged phase. The majority (196) were derived from peer-reviewed sources, while 16 came from grey literature (Figure 1). The attributes of the selected database are presented in Table 2. Notably, over half (52%) of the studies employed a quantitative approach (111 out of 212), while 28 studies (13%) utilized diverse methodologies, such as project reports, situation analyses, risk assessments, guidance papers, and appraisals, or did not specify their study type. The publication dates ranged from 1947 to 2017, with a notable gap in eligible publications before 1979. Interestingly, more than half of the publications (53%) were published after 2008, indicating a recent surge in research interest in this field.

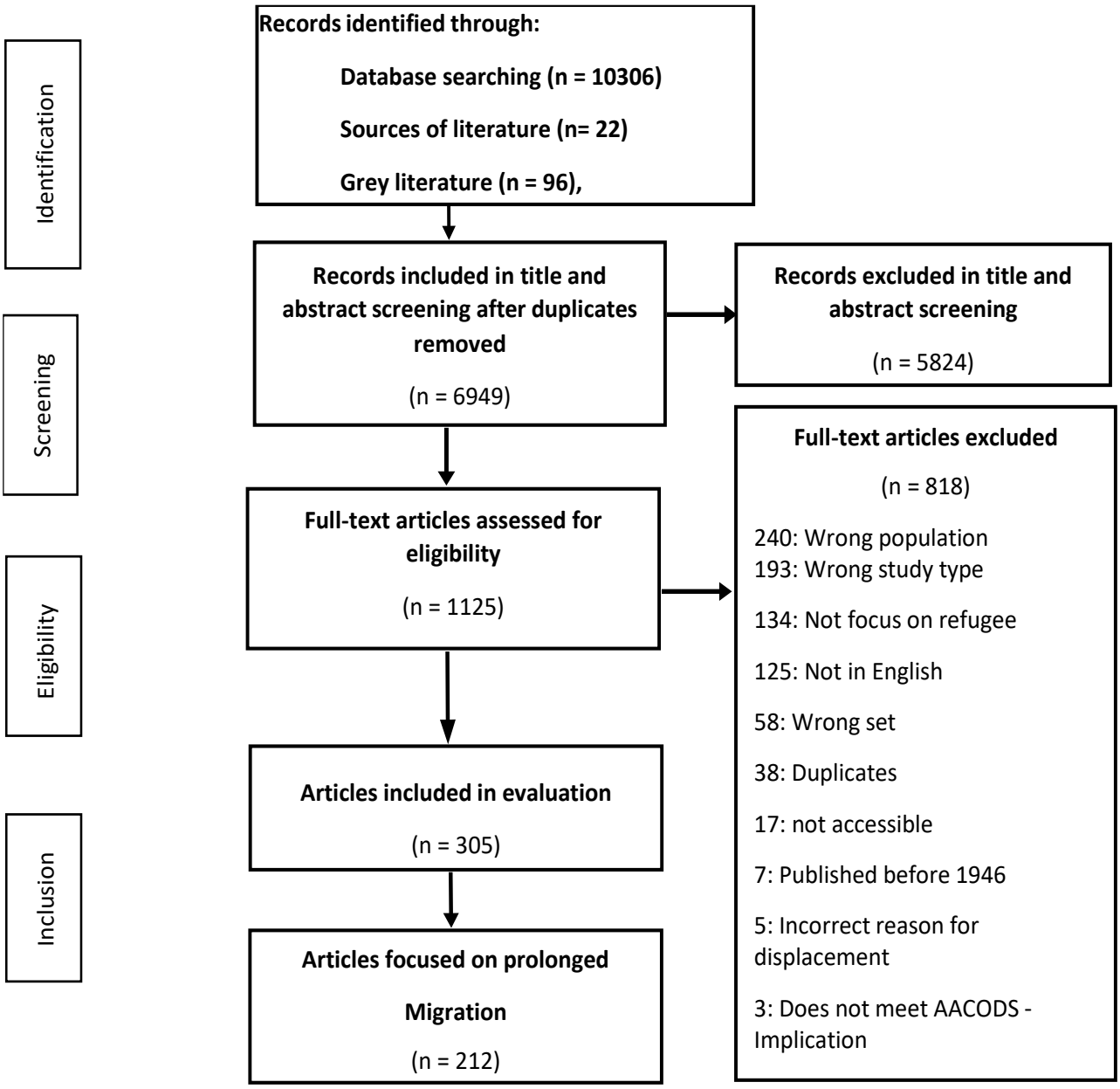

Figure 1. PRISMA Flow Diagram for a systematic scoping review on environmental health in protracted displacement

Table 2. Study characteristics for a systematic scoping review

Characteristic	Count	Percentage
Publication source		
Peer-reviewed database	196	92%
Grey literature	16	8%

Study type		
Quantitative	111	52%
Cross-sectional	89	80%
Case Control	12	10%
Cohort	6	5%
Controlled Trial	4	3%
Existing studies	38	18%
Mixed methods	19	9%
Qualitative	13	6%
Case study	5	2%
Other (report, etc.)	26	12%

Characteristics of the setting

The 212 publications encompass research from 54 countries, spanning all Sustainable Development Goals (SDGs), excluding Oceania. A detailed analysis of the regional and country-specific coverage is provided. Notably, a single study (0.5%) represents results at the European regional level, while another focuses on Africa as a whole. Additionally, the study concentrates on the Sahel region, and 18 articles (8%) did not mention the nations under investigation. This diverse geographic scope highlights the global relevance and applicability of the research findings. The regional distribution of publications reveals a significant focus on Northern Africa and Western Asia (74 publications, 35%), followed closely by Sub-Saharan Africa (71 publications, 33%). These two regions dominate the literature, with three publications compared to Central and Southern Asia (26 publications, 12%) and Eastern and Southeastern Asia (23 publications, 11%). In contrast, Latin America and the Caribbean (6 publications, 3%) and Europe and North America (4 publications, 2%) receive relatively little attention. At the country level, Kenya has 22 publications (10%), followed by Sudan (21 publications, 10%) and Thailand (19 publications, 9%). Maximum publications (55, 26%) show low-income countries, while lower-middle-income countries are represented by 87 publications (41%). The terminology used in the publications is categorized into three groups: Camp (184 publications, 86%), Settlement (19 publications, 9%), and Other (38 publications, 18%).

Characteristics of the population

The majority 155 of publications (73%) focus on refugees, while a significant proportion 58 publications (27%) explore the experiences of internally displaced persons (IDPs). Other terms are used to describe displaced populations, including displaced individuals or persons or peoples or populations (3%), asylum seekers (1%), environment or climate migrants or refugees (1%), and displaced migrants or peoples (0.5%). While some studies use multiple terms, the primary focus remains on refugees and IDPs. The majority of publications 132 (62%), specified the reasons for displacement, which were varied, with conflict being the most common (94%), followed by natural disasters (14%) and famine (5%). Specific natural disasters mentioned include droughts (9%), earthquakes (5%), floods (4%), cyclones (2%), river erosion (2%), and tsunamis (1%). Notably, some publications (11%) highlight multiple reasons for displacement.

Environmental health areas

Frequently discussed environmental health area is water, which covered 148 studies (70%), followed by sanitation (106 studies, 50%), and then crowding (78 studies, 36%) (see Table 3).

Table 3. Prevalence of environmental health topics included in the review

Topic	**Water**	**sanitation**	**Crowding**	**Vector control**	**Energy**	**Waste management**	**Hand hygiene**	**Food safety**	**Menstrual hygiene**
Frequency	148	106	78	62	36	34	32	24	8
Percentage	70%	50%	36%	29%	17%	16%	15%	11%	3%

Environmental health conditions, experiences, and consequences

Environmental health conditions

The summary of environmental health conditions, experiences, and consequences is presented in Figure 2. Themes regarding water supply conditions include various aspects such as water sources, collection methods, distribution, reliability, quantity, quality, treatment, storage, uses, cost, and management. Water sources range from unimproved types like unprotected Ills and surface water to improved sources like boreholes and piped water (Organization, 2006). Studies also discuss factors like distance from water points, time spent collecting water, and safety concerns such as threats at collection points and conflicts over w. Water distribution methods involve both trucking and pipeline systems, delivering water to communal taps or individual homes. However, limitations abound, including restricted collection hours, frequent system failures, and intermittent supply disruptions.

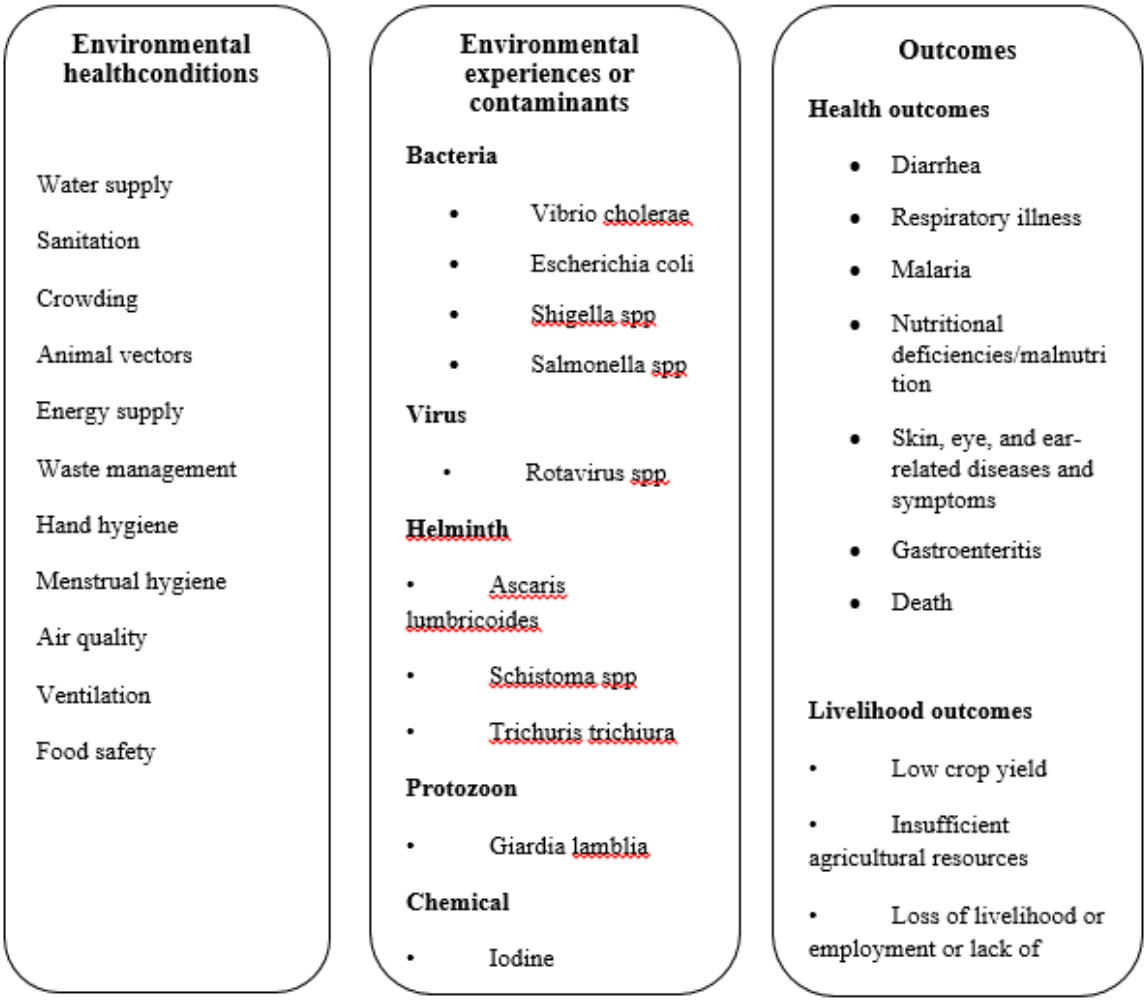

Figure 2. Summary of environmental health conditions, contaminants, and outcomes reported in 213 publications included in a systematic scoping review

Daily water consumption varies widely, with 18 publications reporting averages ranging from 1 to 40 liters per person per day (see Table 4). While a single systematic review explores the least water distribution required in post-disaster scenarios, it doesn't provide original data (De Buck et al., 2015). Water quality is a significant concern, with reports of bad odor and contamination by chemicals, bacteria, and parasites. Both distilled and undistilled water are used, with treatment occurring at various levels, from municipal to household, using techniques like boiling, chlorination, filtration, and UV disinfection. At the household level, water is stored in buckets and tanks.

Studies stated that water is utilized for a range of purposes, including drinking, household chores, personal hygiene, food preparation, and irrigation. While access to water is sometimes free, sometimes costs associated with water taxes and connection fees are also documented. Affordability is a significant concern, particularly for water purchased from private merchants. Management strategies include the establishment of water committees, although concerns about theft and lack of accountability are noted. Additionally, the use of

established standards, such as those set by UNHCR and Sphere, is mentioned in the context of water management. The research investigates many sanitation methods, including numerous latrine kinds (pit, ventilated enhanced pit, communal, home, emergency, and hanging) and toilet systems (standard, pour-flush, U-bend, aqua privy, container-based, and public sewerage systems). Essential factors such as spacing, ventilation, and drainage are also addressed. Nonetheless, open defecation continues to be a widespread problem. The management of wastewater is a critical emphasis, encompassing cesspits, soak-away systems, septic tanks, flood control measures, and desludging procedures. Furthermore, several studies explore wastewater treatment techniques, such as waste stabilization ponds, oxidation ponds, and wastewater treatment facilities, emphasizing the significance of efficient sanitation management.

Reports of sanitation conditions in displacement settings reveal stark contrasts. In some cases, IDP populations in the Central African Republic and Somalia (Grünewald, 2012), have no access to latrines, while in Haiti, residents of an IDP camp have been forced to defecate into plastic bags thrown into a ravine (Schuller & Levey, 2014). In contrast, refugee camps in Thailand-Myanmar and Jordan border camps have achieved remarkable success with nearly universal access to sanitation infrastructure (McCleery et al., 2015), and high rates of households (97%) had connectivity to sewerage networks in Jerusalem (Issa et al., 2015). Among the 106 publications (50%) present sanitation conditions, 42 (20%) provide quantitative data on coverage, using various metrics such as sanitation of household and population coverage, toilet or latrine to person ratios, technology-specific coverage to sanitation, open defecation rates, child excreta disposal practices, and percentage of households meeting UNHCR excreta disposal standards. Multiple studies employ a range of indicators to assess sanitation conditions, highlighting the complexity of this critical issue.

Table 4. Summary of average water quantity consumption by settlements

Reference	years	Country/ ies	Population	Settlement	Water quantity
Waters	1984	Thailand	R. P	C.S	12.5-40 L. P. D
Herrera & Sataviriya,	1984	Thailand	R. P	Camp: holding center	15-40 L. P. D
Toole & Waldman	1990	Ethiopia[3]	R. P	C.S	6 L. P. D
M. Toole & Malkki,	1992	Ethiopia; Kenya[4]	R. P	C.S	1-3 L. P. D
CDC	2003	Liberia	I. D. P	S	1.8 L. P. D
Davey & Maziliauskas	2003	Lebanon	R. P	C.S	Less than 50 L. P. D
UNHCR	2006	Sudan; Chad	I.D.P; Refugee	Camp; Village	19 L. P. D
UNHCR	2008	Ghana; Kenya;Uganda	R. P	C.S	40 (Ghana), 20.5 (Kenya), and 15.2 (Uganda) L. P. D
Cronin et al.	2009	Ethiopia; Kenya; Tanzania; Sierra Leone; Democratic Republic of the Congo(DRC); Republic of the Congo	R. P	C.S	8-20 L. P. D
Shultz et al.	2009	Kenya	R. P	C.S	19 L. P. D
Fadul & Reed	2010	Sudan	I.D.P; Refugee	V. S	12 L. P. D
Crooks & Hailegiorgis	2014	Kenya	R. P	C.S	4-15 L. P. D
Vivar et al.	2016	Algeria	R. P	C.S	15-17 L. P. D
UNHCR	2016b	South Sudan	R. P	C.S	9 L. P. D
Singh et al.	2017	Kenya	I.D. P	C.S	20 L. P. D

Milton et al.	2017	Bangladesh	R.P; displaced individuals	C.S	16-18 L. P. D
Van der Helm et al.	2017	Jordan	R. P	C.S	35 L. P. D
UNHCR	2017b	DRC; Rwanda; Uganda; Tanzania	R. P	C.S	17 L. P. D

C.S=Camp Settlement, S=Settlement, V. S= Village Settlement
R.P = Refugees' Population, I. D. P= Internally Displaced Persons
Liter per person per day= L. P. D

A limited number of studies endeavor beyond family toilet coverage to explore broader sanitation concerns. One such study highlights the need for proper management of sanitary disposal from health care services (Cronin et al., 2008), while another examines sanitation conditions in restaurants. The dumping of the deceased in camps is also addressed in two publications (Al-Khatib & Al-Mitwalli, 2007). International guidelines and standards from organizations like the World Health Organization (WHO), UNICEF, and UNHCR serve as references (Schuller & Levey, 2014). Notably, a single study reveals that refugees found the UNICEF guideline of 14 persons per toilet to be inadequate, leading to conflicts over toilet maintenance (N. L. Behnke et al., 2020). Overcrowding is a significant concern. in this study, we found it as the third most discussed topic, with many studies describing it as a prevalent issue without providing further details. Various metrics are used to quantify crowding, including the crowding index (persons per room), household number, tent size, population density, population growth, and persons per tent or shelter. A few studies 8 (4%) specifically report on the crowding index (Afon et al., 2010; Al Khatib & Tabakhna, 2006; Dolan et al., 1996; Habib et al., 2014) and (Molla et al., 2014; Mourad, 2004; Rueff & Viaro, 2009), with the maximum recorded index found in a Nigerian refugee camp, where nearly 30% of the population resides in poorly overcrowded spaces, having more than seven individuals per room (Afon et al., 2010). Additionally, crowding is noted in other settings, such as schools and hospitals (Ekmekci, 2017), highlighting the pervasive nature of this issue.

A range of animal vectors that spread disease are identified, encompassing insects like mosquitoes, cockroaches, and flies, as well as mites, rodents, birds, and larger animals like donkeys, dogs, and livestock. The breeding grounds and reservoirs for these vectors include various sources, such as household water supplies, stagnant water, inadequate sanitation infrastructure, wastewater ditches, poor waste management practices, nearby forests or fields, food storage areas, and the presence of animals near homes. To combat vector-borne diseases, several control measures are mentioned, including the use of bed nets, spraying, bed sheets of good quality, disinfection, corralling animals, screening latrine vents, effective drainage systems, and securely sealing water containers. Additionally, factors like seasonal changes, cost, drug resistance, and low immunity among displaced populations can impact vector control and disease transmission.

Access to energy varies widely, with reports ranging from zero household access to over 95% coverage (McCleery et al., 2015; Rodriguez et al., 1982). Urban proximity is noted to improve electricity access in some cases (BOSS et al., 1987). Various energy sources are utilized, including solar power, fossil fuels, wood or charcoal, gas, and repurposed waste (Yassin et al., 2016). Energy is essential for cooking, water management (pumping, purification, and treatment), refrigeration, lighting, heating, and powering NGO operations. However, cost poses a significant barrier, with some studies indicating that displaced individuals often cannot afford energy services (Grünewald, 2012), water pumping costs are high, and only more affluent persons have electricity access (Krings, 1987).

Disposal management includes various aspects, including household waste generation, and collection, transportation, and disposal (Yassin et al., 2016). Studies highlight issues like inadequate waste storage, litter around shelters, and blocked drains and latrines due to improper waste disposal. Waste collection methods vary, with some relying on NGO or municipal trucks, private contractors, or community-organized efforts where residents take on waste collection roles (Mission, 2014). Collection frequencies differ, ranging from daily to less regular schedules. Disposal methods include dumping and burning, both at household and settlement levels, as well as composting and using waste as manure (Dolan et al., 1996). Burning is also used in healthcare facilities. Effective waste management remains a significant challenge in these settings. Hand hygiene is a crucial aspect, with several key themes emerging. These include access to water, accessibility of detergent or ash, hand-washing practices, the proximity of hand-washing amenities to washrooms, and hygiene teaching. Studies on hand hygiene behavior highlight important practices such as washing hands before and after eating, and after using the latrine. Other notable mentions include the adoption of handwashing habits,

using drinking water cups for handwashing, and promoting hand hygiene in educational institutions and health posts (Aliga, 2023).

Feminine hygiene is another important aspect, with publications focusing on various related topics. These include access to and supply of feminine hygiene products like hygienic pads, proper dumping of this stuff, privacy for menstruating women, and proper services available in educational institutions. Hygienic pads are sometimes included in distributions of non-food items. Additionally, the cost and purchase of menstrual hygiene materials are discussed in some studies, highlighting the economic burden faced by many women and girls (Altare et al., 2019). Additional environmental health topics not mentioned in Table 3 comprise quality of air and pollution, ventilation, fungus, and humidity, as well as food safety and hygiene. Food safety and hygiene were grouped under the broader category of "other hygiene", which encompasses various aspects such as washing, washing dishes, bathing, laundry, hygienic nursing practices, sanitation tools, and general hygiene-related circumstances and aspects. The research predominantly emphasized sanitation, overcrowding concerns, and water, whereas other significant environmental health domains—such as food safety, air quality, and menstrual hygiene—were conspicuously ignored. These areas necessitate focused research since they profoundly affect health outcomes and quality of life in prolonged relocation scenarios. Menstrual hygiene care is essential for preserving dignity and preventing infection; nevertheless, displaced girls and women frequently face inadequate facilities and resources. Food safety poses considerable health hazards when displaced communities lack sufficient food storage and processing facilities. Moreover, air quality problems, exacerbated by insufficient ventilation and the proximity of displaced individuals in densely populated regions, contribute to respiratory illnesses. Expanding the focus on these concerns may enhance the breadth of environmental health treatments in future research, offering more comprehensive support for the needs of displaced people.

Environmental hazards and experiences

The contaminants identified in the studies were classified into two categories: pathogens and chemicals. A significant proportion of the studies, 36 (n=77), reported findings on pathogens, while 11% (n=23) focused on chemicals. Among the pathogens, Vibrio cholerae was the most frequently mentioned (12%), followed by E. coli (6%). In contrast, iodine was the most commonly cited chemical contaminant (3%), and notably, all related research was conducted in the Tindouf province of Algeria. The top ten most frequently addressed pathogens are categorized by their environmental classifications according to the Sphere handbook (Association, 2018). Several studies have identified a correlation between specific environmental health conditions and the presence or prevalence of contaminants. As shown in Table 5, certain environmental health conditions have been linked to eight of the most frequently reported contaminants in at least one publication included in this review. This suggests that specific environmental health conditions may be associated with an increased risk of contamination, highlighting the importance of addressing these conditions to mitigate the risk of exposure to harmful contaminants. The table provides a summary of these relationships, illustrating the connections among environmental health circumstances and pollutants stated in the literature.

Table 5. Reported associations between environmental health conditions and contaminants as reported in studies for a systematic scoping review

Environmental Conditions	Cholera	E. coli	Shigella	Giardia	Rotavirus	Malaria	Iodine	Lead
Water	*	*	*	*	*	*	*	*
Sanitation	*	*	*	*	*	*		
Crowding	*							
Energy	*					*		
Waste Management	*					*		
Hand Hygiene	*	*	*	*	*			
Food Hygiene	*		*	*	*			

Environmental health consequences or outcomes

136 studies (64%) showed the environmental health conditions, and they are characterized as health (62%) and livelihoods (5%). The consequences of environmental health conditions are reported in 136 studies (64%)

and were categorized as health (62%) or livelihood (5%). Diarrhea is the leading health consequence (25%), followed by respiratory illness (16%) and malaria (16%). Reported respiratory illnesses include various infections like pneumonia and bronchitis. Nutritional deficiencies and malnutrition outcomes, such as anemia and scurvy, are also mentioned. Skin-related diseases like rashes and scabies, eye-related afflictions, and ear infections are noted. Environmental health conditions can lead to various other health outcomes, including vomiting, fever, cold-like symptoms, and mental health issues. Sadly, death is often a consequence, either explicitly or implicitly through discussions of morbidity and mortality rates. These outcomes highlight the importance of addressing environmental health conditions to prevent severe and potentially life-threatening consequences. While few studies focus on livelihood outcomes, some report specific challenges. For farmers, these include reduced crop harvests and insufficient funds for improvements (Muhammad et al., 2012), limited land, greenhouse, and a lack of sufficient funds for crop diversification (Singh et al., 2017). Additionally, livestock face difficulties such as inadequate vegetation for their animals and animal diseases. Additionally, displacement can lead to loss of livelihood, unemployment, economic vulnerability, low income, limited market access, and inability to secure loans (Ahsan et al., 2011; Barbieri et al., 2017) and (Caniato et al., 2017). These results highlight the far-reaching impact of displacement on individuals' ability to sustain themselves and their families.

Hindrances in the development of environmental health

Nearly one-fifth of the studies (43, 20%) identify specific challenges to developing environmental health conditions. These obstacles are related to formal, diplomatic, and application. Formal hindrances include inadequate legal and policy frameworks, ineffective management (Table 6), and a lack of international laws protecting internally displaced persons (IDPs). National laws and policies often restrict refugees' access to health care and compel them to stay in camps (Cooper et al., 2021 and Rueff & Viaro, 2009). Diharmonization among various institutions like NGOs, governments, and the private sector, combined with short project durations and high staff turnover, hinder service quality and continuity (Ahsan et al., 2011; Bonda, 2007; Cooper et al., 2021; Waters, 1984). Balancing rapid infrastructure deployment with long-term development goals also poses a significant challenge (Tota-Maharaj, 2016)

The literature highlights political challenges at various levels, including international, national, and community levels. International conflicts, lack of cooperation, and violence are common obstacles (Bonner et al., 2007). Fear from state officials (Mohamed et al., 2014), and misinformation (such as gossip about biological weapons) (Grünewald, 2012), hinder efforts. Locally, the exclusion of both displaced populations and host communities (Cooper et al., 2021), from decision-making processes leads to resentment and tensions between the two groups (Bonda, 2007). These political challenges exacerbate the difficulties in addressing environmental health conditions, underscoring the need for collaborative efforts and community engagement to address these complex issues. Studies often found a shortage of resources such as agricultural resources, water, and energy (Juel-Jensen, 1985). Insufficient equipment and human resources (Bonner et al., 2007), along with financial obstacles like high prices for essential commodities and low incomes, are also common challenges (Waterkeyn et al., 2005).

Reported challenges in implementing interventions include issues with infrastructure, behavior, and monitoring. Infrastructure challenges range from breakdowns in health facilities during conflicts and calamities to issues with sewage systems and inappropriate loam for latrines (Bonda, 2007). Specific challenges comprise difficulties in digging circular latrine pits and latrines without roofs, which deter their use (Nyoka et al., 2017). Behavioral challenges include negligence, lack of awareness, and theft or vandalism of infrastructure (Waterkeyn et al., 2005). Research challenges include ensuring field member security and addressing difficulties in tracking water use when respondents use multiple sources (de Souza et al., 2014).

The recommendations of included studies

Ninety-nine studies, nearly half, offer recommendations. Most of these recommendations are general, lacking specific details on how to achieve them. Similar to obstacles, recommendations were grouped into categories such as formal, diplomatic, and Application-related (Table 6).

Formal recommendations tackle legal structures, management, and camp planning. Management suggestions include action plans and frameworks for waste management (Al-Khatib & Al-Mitwalli, 2007) or housing (Al Khatib & Tabakhna, 2006), or through an integrated approach (Cronin et al., 2008). Some studies suggest using existing guidelines, like the WHO guidelines on infectious diarrhea management (Organization, 2006), and another (Cronin et al., 2008) recommends the practice of the lowest standards for environmental health services. Standardization of indicators (Cronk et al., 2015), and addressing displacement alongside other health

determinants are also recommended (Aagaard-Hansen & Chaignat, 2010). Deliberate camp placement near clean water sources or existing communities is advised (Araya et al., 2011). In diplomatic commendations, reducing violence and war is highlighted to remove barriers to improving environmental health conditions. Transparency in program implementation and enhancing the political voice of displaced populations are suggested. Strengthening fundraising efforts, enhancing stakeholder coordination, and engaging more with international contractors are also recommended.

Table 6. Summary of examples of reported obstacles and recommendations

Groupings	Formal,			Diplomatic,			Application		
Difficulties	Legal/policy environment	Management challenges	Lack of coordination	Conflict and instability	Resources scarcity	Financial concern	Infrastructure	Behavioral	Monitoring and research
Example	Laws limiting expansion or development of camp infrastructure (Rueff and Viaro, 2009).	Balancing needs for rapid deployment of infrastructure and interventions in crises with the potential for integrated development in the future (Tota-Maharaj, 2016).	Lack of coordination between WaSH NGO partners and across sectors (McNicholl et al., 2017).	Rival military force denying IDPs access to food and healthcare (Waldman, 2008).	Insufficient water supply infrastructure; 400 families relying upon a single borehole (Singh et al., 2017).	Cost of sanitation infrastructure construction (Taylor, 1979).	Poor road infrastructure preventing delivery of WaSH supplies (Als et al., 2020).	Theft of crockery from drying racks (Waterkeyn et al., 2005).	Difficulty of tracking multiple source water use (Abouteir et al., 2011).
Recommendations	More effective legal/policy structure	Management improvement	Better camps planning	Increase transparency	Improve political agency of displaced population	Bolster fundraising efforts	Increase education and awareness	Implement targeted intervention	Targeted adaptation of technology
examples	Regulations establishing periodic food safety inspection and training (Kalipeni and Oppong, 1998)	Centralize information on WaSH programs through development of a database system (Melloni et al, 2016).	Settling displaced populations near existing communities (Afon et al., 2010)	Avoid mistrust through increased transparency about use of community resources (Bönda, 2007a)	Ensure that displaced populations are able to participate and exert influence in relevant forums (Aagaard-Hansen and Chaignat, 2010)	Seek additional funding from private philanthropic organizations and international agencies (Milton et al., 2017)	Training refugees to provide basic health diagnostic and curative services (Dick and Simmonds, 1983)	Temporary closure of markets during cholera outbreaks (Moren et al., 1991)	Pilot mass cholera vaccinations in high-risk populations (Dorlencourt et. al., 1999)

The majority of recommendations focus on implementation strategies, emphasizing education, awareness, interventions, technology, infrastructure, and research. Numerous studies emphasize the necessity of instructing displaced people on environmental health and advocating for health education initiatives, awareness campaigns, and community activities. To successfully engage these groups, several studies recommend disseminating environmental health messages during periods of heightened disease transmission (Ahmed et al., 2012) and equipping refugees with training to deliver fundamental health services (Dick & Simmonds, 1983). Multiple actions are advocated, including immunization, illness surveillance, water purification, disease prevention, reduction of congestion, and assistance for both host and displaced populations. Moreover, particular recommendations encompass prioritizing interventions for respiratory infections (Ahmed et al., 2012), enhancing food with essential nutrients (Jemal et al., 2017), temporarily suspending market operations during cholera epidemics (Moren et al., 1991), and augmenting tuberculosis screening among HIV-positive individuals (Kimbrough et al., 2012). Implementing these principles can successfully address the intricate environmental health concerns encountered by displaced communities.

Certain studies propose technological interventions, including the installation of microgrids to enhance electricity accessibility (Aste et al., 2017) and the improvement of cooking technology in the households of displaced individuals (Barbieri et al., 2017). Recommendations for infrastructure encompass ensuring robust protection, improving sanitation around shelters, and formulating standards for latrine construction (Melloni et al., 2016). Recommendations entail constructing demonstration latrines to educate displaced populations on

building techniques, replicating water systems from adjacent communities, and systematically phasing out water trucking (Waters, 1984).

Recommendations about research underscore the necessity for enhanced field investigations, gathering user feedback on interventions, and undertaking additional qualitative studies (Rueff & Viaro, 2009). Specific proposals entail disseminating research outcomes to resource managers, donors, and other stakeholders (Aliga, 2023), analyzing the timing of interventions amid crises (Lam et al., 2015), and scrutinizing the unintended behavioral consequences that research may impose on displaced populations (Inci et al., 2015).

Regional Comparative analysis

The review examines LMICs collectively; however, the environmental health challenges associated with prolonged displacement differ significantly across regions. In Sub-Saharan Africa, water scarcity and inadequate sanitation infrastructure are prevalent challenges, often addressed through temporary measures like water trucking and communal latrines in camps and settlements. Southeast Asia encounters specific challenges regarding vector control and air quality, where overcrowding and insufficient ventilation lead to a rise in respiratory and vector-borne diseases among displaced populations. The MENA regions experience significant displacement and limited access to health services, resulting in chronic overcrowding and dependence on innovative water management strategies, including solar-powered water pumps, to mitigate water scarcity. Latin America is underrepresented in the literature and exhibits distinct environmental health risks associated with food safety, nutritional deficiencies, and the effects of natural disasters, exacerbated by socio-political instability. This regional comparison highlights the necessity of context-specific environmental health interventions, as the unique challenges of each region require targeted and sustainable solutions. Integrating regional insights into policy and program development enhances the alignment of interventions with local needs and resources.

Discussion

Overview

Our systematic scoping review offers a comprehensive overview of the environmental health challenges encountered by individuals in prolonged displacement, addressing a significant gap in the literature. Unlike prior reviews, such as (De Buck et al., 2015), which distinguished between disaster and post-disaster phases in their examination of emergency water needs, our review concentrates solely on the protracted phase. Additionally, while Yates et al. (2017) performed a systematic review of WaSH interventions in emergency contexts, they intentionally omitted prolonged crises. Additional research has examined certain facets of environmental health in contexts of forced displacement, encompassing cooking technologies (Barbieri et al., 2017), vaccine-preventable illnesses (Lam et al., 2015), and TB (Kimbrough et al., 2012). Conversely, our review offers a comprehensive examination of environmental health conditions, experiences, and repercussions in prolonged displacement situations, highlighting substantial deficiencies in reporting on essential factors such as waste management, energy access, menstrual hygiene, hand hygiene, food safety, air quality, ventilation, and mold among displaced populations. Our analysis identifies three significant themes pertinent to prolonged displacement crises. Firstly, the degree of integration or segregation of displaced populations from host communities is a critical factor. Secondly, the fluctuating nature of funding and management for environmental health services underscores the necessity for flexible and sustainable solutions. Lastly, institutional and political challenges are identified as a significant obstacle, underscoring the importance of effective governance and coordination in addressing environmental health concerns in prolonged displacement settings. At the time of displacement population and host communities were integrated or separated, and this phenomenon is significant. Research has documented resentment among host populations and between displaced and host populations (Bonda, 2007; N. L. Behnke et al., 2020), highlighting the importance of considering community relationships in long-term planning, including environmental health service provision. Including host communities and local leaders in decision-making processes may help alleviate such conflicts (Bonda, 2007). Notably, the literature review reveals a disproportionate focus on camps (n=184,86%) and settlements (n=19,9%), both groups reside separately from host populations, whereas nearly 60% of them live in urban zones (Aliga, 2023). Only 18% of the research articles (n = 38) reported data from urban areas, slums, or integrated settings, indicating a substantial overrepresentation of camp settings in the literature. This imbalance may lead to a limited understanding of environmental health conditions for the majority of displaced populations living outside of camps.

A second prominent theme that emerged is the challenge of sustaining long-term aiding and managing for environmental health services in displaced populations. As time passes, the responsibility for these services

becomes increasingly ambiguous, as aid decreases and outside actors gradually decrease their support (Murthy, 2021). However, proactive decisions made during the initial planning stages of a crisis can help mitigate this issue. For example, strategically positioning camps adjacent to established communities can enhance the future expansion of municipal services, including water and sanitation infrastructure (Afon et al., 2010). This progressive strategy can facilitate the maintenance of vital services and enhance the overall environmental health results for displaced people. Prolonged crises have expedited institutional and political issues, as displaced populations, governments, and host communities confront the realities of sustained displacement. The hesitation to recognize the enduring nature of displacement is seen in national policy, exemplified by the Lebanese law that forbids the establishment of permanent infrastructure in refugee camps (N. L. Behnke et al., 2020). Legal and political obstacles impede the establishment and extension of sustainable environmental health services, despite the urgent necessity for their long-term supply. This mentality perpetuates a loop of short-term remedies, hindering attempts to tackle the intricate environmental health issues that emerge in extended displacement scenarios.

This study offers a significant resource for humanitarian groups, policymakers, and researchers addressing the environmental health requirements of displaced populations in prolonged crises. Our study provides practical ideas for enhancing environmental health outcomes in various contexts by synthesizing existing information and pinpointing research deficiencies. Furthermore, our research establishes a foundation for further studies aimed at improving the health and welfare of displaced populations, so facilitating more efficient and sustainable solutions in this vital area. The findings underscore the pressing need for a paradigm shift in the strategy for environmental health in prolonged displacement scenarios. Humanitarian organizations, Policymakers, and other stakeholders should perceive these health challenges as both urgent necessities and long-term developmental concerns. Comprehensive policy strategies that merge water, sanitation, and hygiene (WaSH) with gender-responsive and food safety initiatives are expected to yield more sustainable results. Enhanced cooperation between international agencies and local governance can facilitate a shift from reactive crisis management to a systematic, long-term strategy prioritizing environmental health for displaced populations. This transition could significantly reduce health burdens and improve resilience in forcibly displaced populations, emphasizing the crucial role of integrated, policy-driven strategies to promote environmental health outcomes.

Recommendations for monitoring, policy, and practice

The main challenges highlighted in the studies are mainly about rules and how different groups work together. For example, displaced people aren't usually recognized in laws and regulations governing development, which makes it impossible to provide them with the proper environmental services. This is because there's a misunderstanding about who's responsible for them and what their job is. Making sure displaced individuals are part of international policy is vital, especially as we shift from emergency support to long-term solutions (N. Behnke et al., 2018). But to achieve that, I need everyone—like governments, aid groups, and communities—to work together seamlessly. And that can only happen if there are clear rules and responsibilities for everyone involved (Murthy, 2021).

Forced migrants often get left out when it comes to tracking how international policies on environmental health are working. For example, when we look at the Sustainable Development Goals (SDGs), which aim to improve things like water and sanitation for everyone by 2030, we don't have detailed information about how well these services reach forced migrants like refugees or internally displaced persons (United Nations General Assembly, 2015). Without this info, it's hard to figure out if their rights are being met or how to help them better. So, monitoring programs like the WHO and UNICEF Joint Monitoring Programme need to start gathering this kind of detailed data on water, sanitation, and hygiene services for forced migrants, just like they've started doing for educational institutions and health facilities (UNICEF, 2017).

The UN General Assembly acknowledged in 2010 that access to water and sanitation is a basic human right for everyone, including forcibly displaced populations (United Nations General Assembly, 2015). Based on human rights principles, being forcibly displaced shouldn't mean losing access to basic rights. However, sometimes, when people rely on humanitarian aid, they're often seen as needy recipients rather than individuals with rights, which makes it hard to move toward long-term solutions (Murthy, 2021). A human rights approach would mean involving displaced people in local and national development planning and making sure they have access to services like water and sanitation over the long term. This inclusive approach helps build sustainability and resilience for everyone involved (Murthy, 2021). To improve environmental health services during prolonged displacement, it's crucial to rethink how we move from emergency response to long-term solutions. Instead of treating emergencies and development as separate, some experts suggest blending them

from the start. The study of (Mason et al., 2017) proposes a new approach where crises are seen as part of normal life, and development activities kick in early on. This means closer cooperation between humanitarian groups, governments, and international development organizations, as well as more flexible funding arrangements (Mason et al., 2017). This approach could help overcome the institutional and political challenges mentioned earlier in Obstacles to Improvement.

Policy adjustments may improve environmental health in displacement contexts. Implementing policies that require the inclusion of menstrual hygiene products as standard non-food items in aid packages would effectively address a significant yet frequently neglected health requirement. In areas facing water scarcity, governments may implement policies that promote water recycling and the adoption of safe water storage practices in camps. As an example, UNHCR and local authorities in the ZaĬatari refugee camp in Jordan designed policies to integrate solar-powered water pumps and water recycling into camp systems, where pumps allow camps to increasingly rely on the water provided by the pumps instead of continuously importing water on water trucks, thus ensuring long-term water supply (Van der Helm et al., 2017). This project has shown the capacity of a site-specific policy and infrastructure integration to increase sustainability in displacement environments with limited amenities. Furthermore, promoting collaborations between local and international NGOs to enhance food safety standards—such as regular inspections for contamination and storage conditions—would mitigate the risks of foodborne illnesses. Targeted policy actions would enhance immediate health outcomes and foster sustainable health improvements during prolonged displacement.

Existing gaps and future study direction

To improve support for forcibly displaced populations, we need a clearer understanding of the different situations they face. This includes everything from formal refugee camps to makeshift settlements in cities. Our review starts this process by identifying key terms used in the literature as mentioned earlier, but it's just the beginning. We need a more detailed vocabulary to capture the diversity of displacement experiences and settings.

There are considerable deficiencies in our comprehension of environmental health during extended displacement, especially regarding specific regions. For example, research on Latin America and the Caribbean is scarce, and there is an absence of studies on Small Island Developing States, despite their susceptibility to climate change (United Nations General Assembly, 2015). This data deficiency implies that we may not entirely understand the environmental health challenges confronting displaced populations in these areas. For instance, Colombia and Syria, which host millions of internally displaced persons, lack research on this subject, underscoring the necessity for further investigation in these regions (Ferreira et al., 2020).

Research in environmental health during extended displacement exhibits notable gaps. For example, there is little investigation of air quality, menstrual hygiene, ventilation, food safety, and mold-related concerns in these circumstances. This signifies the imperative for scholars to expand their focus and explore these vital domains more thoroughly. Although not the central emphasis of this review, our findings are pertinent beyond contexts of conflict or disaster-induced displacement. Individuals enduring prolonged displacement due to extreme poverty may face analogous environmental health challenges. Therefore, further research is necessary to comprehend the living conditions of these populations and to address their environmental health requirements.

Data Limitations

Given the comprehensive nature of this assessment, it is possible that certain terms or databases were omitted. Moreover, discrepancies among researchers may have resulted in errors in screening and data extraction. It is important to acknowledge that our evaluation was confined to English-language publications, potentially affecting the regional coverage of the research. Certain articles lacked explicit information about the date of displacement, perhaps resulting in rare misclassification. Notwithstanding these constraints, we attempted to mitigate data loss and guarantee thorough coverage.

This review provides a comprehensive analysis of environmental health during prolonged displacement; however, several limitations affect the generalizability of its results. The constraints of geographic data, particularly from Latin America and the Caribbean, impeded a more equitable regional assessment. Moreover, numerous reviewed publications lacked critical methodological specifics, such as sampling methods and data validation procedures, which may limit the robustness of the reported findings. Another constraint was the consistent integration of qualitative and quantitative data across studies. The dependence on English-language publications may have resulted in the underrepresentation of research from non-English-speaking regions.

Future research must address these geographic and methodological gaps by prioritizing diverse data sources and ensuring robust methodological transparency.

Quality and generalization of data

The quality of evidence varied significantly across the studies included in the review. We didn't conduct a formal evaluation of study quality but rather focused on summarizing the findings as a whole. Many studies lacked important metadata such as study type, making it challenging to assess their rigor. Furthermore, recommendations provided by studies often lacked specificity, limiting their practical applicability.

Because of the diverse nature of the data gathered in this review, it's important to acknowledge the heterogeneity of the results. Each study captured different contexts, settings, and populations facing protracted displacement, making it challenging to draw broad generalizations. However, this review serves as an initial effort to document evidence of environmental health conditions in prolonged displacement situations. While findings may not apply universally, common themes and insights can still offer valuable lessons for responding to similar crises in the future.

Conclusion

This review is the first to examine the state of environmental health for people in long-term displacement. The population of displaced people is rising in the world, with about 37,000 people being displaced each day, based on the UNHCR (2019) report. Due to population growth and climate change, displacement is expected to increase, and disasters are likely to last longer. Providing good environmental health services is essential for the health, dignity, and rights of these people. However, we found that the conditions in long-term displacement are often poor, leading to the spread of diseases and other health problems. Additionally, various institutional, political, and practical challenges make it difficult to improve these conditions. Research isn't given much importance in these situations, and there aren't enough systems in place for sharing findings and learning from them. People don't fully understand how NGOs, governments, and others can effectively provide long-term environmental health services for those displaced for a long time. However, the fact that we found a lot of publications in this review shows that there's a chance to learn from what's already known and improve the environmental conditions for displaced people.

Based on these findings, the review suggests the following targeted recommendations made to the stakeholders: strengthen the coordination and future thinking between stakeholders; add some of the areas of environmental health that were underrepresented in the program design like menstrual hygiene and air quality, and employ inclusive and rights-based programming with population anchorage into host systems. These recommendations aid in the intent of the study to cover the planning of humanitarian interventions as well as valorize the long-term displacement in the affordability of equitable human health within the premises. There is need of a transition in terms of withholding on the treatment of emergencies through reactive plans so as to embrace more development-oriented plans that are systematic in nature to improve long term success. The continuation of the pattern of regional and thematic gaps in substitution in the future studies need to include longitudinal studies and mixed-methods studies to give a better evaluation of the shifting health requirements.

Declarations

Ethics declaration:

Not applicable. This is a systematic scoping review based on existing literature and does not involve human participants or primary data collection.

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Statement of Originality and Plagiarism-Free

The author declares that this article is an original work that has not been published elsewhere and is free from plagiarism. All references and citations have been properly acknowledged according to the applicable standards.

Declaration of Conflicts of Interest

The author declares no conflicts of interest related to this research, authorship, or publication.

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