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Epidemiological Trends of Waterborne Infectious Diseases and the Role of Community Health Nurses, Health Inspectors, and Epidemiology Workers in Prevention

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Abstract

Waterborne infectious diseases (WBD), contracted via contamination in water supplies, are one of the most significant healthcare problems worldwide. More than 7 million people become ill each year in the United States from WBD, and WBD contributes to 1.5 million deaths per year around the world, which is primarily in low- and middle-income countries. This study explores the changing epidemiology of WBD with consideration of the decline in enteric pathogenic WBD (i.e., *Cryptosporidium*, *Giardia*, and Norovirus, etc.)

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compared to the increase in biofilm WBD, such as *Legionella pneumophila* and *Nontuberculous Mycobacteria* (NTM) in developed countries. Furthermore, in low-resource areas, a lack of water, sanitation, and hygiene (WASH) contributes to continuing WBD, such as cholera and typhoid, in the communities utilizing these resources. Data is obtained from the World Health Organization, Centers for Disease Control and Prevention, and the wastewater-based epidemiology (WBE) programs initiated in Vancouver (Canada). The study identified the variation in pathogens, outbreak trends, and risk factors (e.g., climate change, aging infrastructure, etc). Finally, the roles of community health nurses, health inspectors, and epidemiology workers for surveillance, education, and enforcement or regulations, and reporting were examined as major elements of WBD prevention. Evidence-based strategies for prevention of WBD based on the overall enhancement of communities, for example, the improvement of the water, sanitation, and hygiene infrastructure, and community engagement and participation, were considered. The outcome of this study may serve as a guide to inform strategies for public health to lessen the burden caused by WBD illnesses throughout the world.

Keywords: Waterborne diseases, epidemiology, WASH, community health, prevention.

Introduction

Waterborne disease, caused by pathogenic microorganisms transmitted through contaminated water, is a major public health issue globally, inflicting illness on millions of people and incurring significant economic and social costs. The Centers for Disease Control and Prevention (CDC) estimates that waterborne diseases are responsible for over 7 million illnesses and approximately 118,000 hospitalizations and 6,630 deaths annually in the United States, with the direct health care costs exceeding $3 billion, plus an additional billion lost in productivity (1). The World Health Organization (WHO) estimates that unsafe water, sanitation, and hygiene (WASH) lead to 1.5 million deaths each year globally, mostly children under five years old in low and middle-income countries, where they are at greater risk of developing diarrheal diseases (2). Waterborne disease encompasses various illnesses, both acute diarrheal illnesses caused by enteric pathogens like *Cryptosporidium parvum*, *Giardia lamblia*, and Norovirus, and respiratory and systemic infections caused by biofilm-associated pathogens such as *Legionella pneumophila* and *Pseudomonas aeruginosa* (3).

From the 19th century to the early 20th century, waterborne illnesses such as cholera and typhoid fever were rampant and detrimental in high morbidity and mortality rates across the globe. These illnesses emerge largely through the lack of a proper drinking water treatment operations program, limited access to basic sanitation infrastructure, and a lack of public health preparedness activities (4). With the technologies for water treatment available, such as chlorination and filtration, and sanitation reform, developed countries significantly reduced deaths and ill health by the mid-20th century from waterborne diseases (5). However, new public health concerns have emerged in high-income environments, which include disintegrating water system infrastructure, complex building premise plumbing systems (e.g., hospitals and hotels), and the residual impacts of climate change, which exacerbate potential contamination because of flooding and climate temperature variability (6, 7). All of these impact how the epidemiological potential is evolving and being directed toward the emergence of biofilm-associated pathogens; challenges in developed nations are now the presence of biofilm-associated, viable, but non-culturable pathogens are becoming the emergent challenge that thrives in both premise plumbing systems and emerging in our water systems. With access lacking, low- and middle-income countries have remained in similar settings and suffer from chronic exposure to the enteric pathogens through no access to clean water, proper sanitation facilities, and/or hygiene education and access to reinforcing diseases such as cholera, dysentery, and cryptosporidiosis (8).

Public health nurses, public health inspectors, and epidemiological specialists may participate in the emergence of waterborne diseases through a number of activities- surveillance, public education, enforcement, public health intervention, and evidence/survey-based directed responses (9). Community health nurses provide crucial WASH education and early outbreak detection, health inspectors verify compliance with standards for quality of water, and epidemiological workers examine surveillance data to inform policies and response actions (10, 11). This study provides a comprehensive overview of contemporary epidemiological issues, evaluates the contributions from these disciplines, and identifies useful and applicable prevention mechanisms to reduce waterborne disease morbidity on a global scale. It offers a global perspective supported by local data, most importantly, data from Vancouver, Canada, where progressive WBE programs have operated and examined both pathogens, such as *Cryptosporidium* and *Giardia*, present in urban wastewater. Through these efforts, this study aims to provide evidence-supported public health policy and engagement to mitigate the impact of waterborne diseases globally.

Methods

Study Design

This narrative review synthesizes peer-reviewed literature published from January 2000 until July 2024 in order to provide a robust overview of waterborne disease epidemiology and prevention methodologies. The narrative review included several study designs such as cohort studies, case-control studies, cross-sectional studies, and surveillance reports, and were assigned an artifice that researchers classify evidence according to the Oxford Centre for Evidence Based Medicine (OCEBM) 2009 Levels of Evidence (12).

Data Sources

Data were collected from diverse academic databases, including PubMed, ScienceDirect, Web of Science, Medline, and Scopus. Keywords for searches included Medical Subject Headings (MeSH), which include "waterborne disease", "water, sanitation and hygiene (WASH)", "epidemiology", "prevention", "community health nursing", "health inspection", and "Vancouver." Data from authoritative sources were also extracted; reports from the Centers for Disease Control (CDC) Waterborne Disease and Outbreak Surveillance System (WBDOSS), the World Health Organization (WHO) global health reports, and the Canadian Wastewater Survey provided Vancouver-specific information on WBE (13). Grey literature was also reviewed, which referred to the use of government reports and policies to enhance and complement peer-reviewed literature (14, 15).

Inclusion Criteria

- Articles published in English, between January 2000 and July 2024.
- Research discussing waterborne diseases, including but not limited to bacteria (*Vibrio cholerae*, *Legionella*), viruses (Norovirus, Hepatitis A), protozoa (*Cryptosporidium*, *Giardia*), and helminth infections.
- Studies that examined the role of community health nurses, health inspectors, or epidemiological professionals in prevention or outbreak response.
- Research that provided epidemiological data (i.e., incidence, prevalence, and/or risk factors) of waterborne diseases concerning health professionals and/or studies evaluating prevention interventions.

Exclusion Criteria

- Studies that are exclusively about foodborne, airborne, or vectorborne diseases that do not include any waterborne transmission component.

- Any non-peer-reviewed research (e.g., opinion, non-empirical article).
- Research not including data specifically regarding primary prevention strategies or where the professionals' roles were drowned out.

Results

Patterns of waterborne diseases

Waterborne diseases are a massive global health issue with estimates suggesting 1.6 to 12 million yearly deaths, depending on whether indirect effects such as malnutrition are accounted for (16). The burden of diarrheal diseases is 4% of the global burden in low and middle-income countries. From the 4%, 88% of the burden is attributed to unsafe drinking water and improper sanitation (17). In the US, the CDC states waterborne diseases result in approximately 7 million illnesses a year, resulting in 118,000 hospitalizations, and 6,630 deaths from waterborne diseases (1). Economic burden is substantial, with direct costs for healthcare more than $3 billion per year, with billions more indirect, such as lost productivity and disruption in society (18). The highest disease burden is focused on sub-Saharan Africa and South Asia, where populations still do not have access to safe water and sanitation, and disease from unsafe water continues to be high for cholera, typhoid fever, and cryptosporidiosis, especially in children under 5 (19). In developed countries, total incidence is lower, but the burden is rising related to emerging pathogens as a result of complex water systems, such as premise plumbing and cooling towers (20).

Shift in Pathogen Profiles

In developed countries, there has been a transition from enteric pathogens, such as viruses and bacteria, associated with gastroenteritis, to biofilm-associated pathogens, such as *Legionella pneumophila*, which can cause serious respiratory infections. In-depth comparison of pathogens in recreational water, drinking water, or non-potable water sources indicates that *Legionella* is now the leading cause of drinking water-associated outbreaks established in the U.S., accounting for 35% of outbreaks reported between 2015 and 2020 (21). In developing areas, enteric pathogens are still common; introducing a range of biofilm-associated pathogens or agents into these environments is essential if we are to manage the burden of both enteric pathogens (including *Cryptosporidium parvum* and *Giardia lamblia*) in recreational water and *Legionella* spp. in drinking water (22). The shift towards biofilm-associated pathogens is thought to be driven by aging water infrastructure and multiple buildings with complex premise plumbing systems, particularly in hospitals and hotels, and low disinfectant residuals in non-potable distribution network systems that allow biofilms to develop (1, 9). Additionally, Nontuberculous Mycobacteria (NTM), including strains of *Mycobacterium avium* complex, appear to be increasing in burden considerably (7), although NTM are likely significantly underestimated as a result of inconsistent surveillance and reporting practices (23). NTM infections are particularly difficult for immunocompromised populations (e.g., those with HIV/AIDS, those who are having immunosuppressive therapy, or are using biological therapies to treat their condition (24).

In contrast, enteric pathogens, which can include *Cryptosporidium parvum* and *Giardia lamblia*, remain very relevant as many still have high prevalence in recreational water settings that are subject to possible fecal-oral transmission community pools, lakes, and waterparks (25). Norovirus is also one of the top causes of community-acquired waterborne outbreaks, especially in situations where water systems are compromised, such as on cruise ships and in rural communities using untreated water sources (9, 26). Table 1 provides a detailed breakdown of the prevalence and characteristics of key waterborne pathogens based on data from 2015 to 2020.

Table 1: Prevalence and Characteristics of Key Waterborne Pathogens (2015–2020)

Pathogen	Prevalence (% of Outbreaks)	Primary Transmission Route	Common Settings	Mortality Rate (%)
Legionella pneumophila	35%	Inhalation (aerosols)	Hospitals, hotels, cooling towers, and premise plumbing	10–15%
Cryptosporidium parvum	25%	Fecal-oral	Recreational water, community pools, and childcare facilities	<1%
Giardia lamblia	15%	Fecal-oral	Rural water sources, private wells, and untreated water	<1%
Norovirus	10%	Fecal-oral	Community settings, cruise ships, compromised water systems	<1%
Pseudomonas aeruginosa	8%	Contact, inhalation	Spas, hot tubs, and healthcare facilities	5–10%
Nontuberculous Mycobacteria	5%	Inhalation, contact	Premise plumbing, cooling towers, humidifiers	5–20%

Source: CDC WBDOSS, 2015–2020; WHO Global Health Observatory (1, 27)

Regional Insights: Vancouver, Canada

In Vancouver, Canada, application of high-tech water treatment technologies, along with rigorous regulatory systems, has successfully eliminated instances of major outbreaks of water-borne diseases to none between 2015 to 2020 (14). The Canadian Wastewater Survey, launched in 2018, has used wastewater-based epidemiology (WBE) to estimate the prevalence of pathogens, including *Cryptosporidium*, *Giardia*, and SARS-CoV-2, within wastewater systems being used by various municipalities (11). Such investigations have indicated limited levels of enteric pathogens within Vancouver's urban areas, which can be attributed to socio-economic problems like homelessness and illicit drug abuse, as indicated by the high levels of methamphetamine found within wastewater (27, 28). In rural British Columbia, private water sources and poor infrastructure are responsible for contamination hazards, especially rainfall events that can intensify runoff and promote transference of pollutants to potable water sources (29). The lack of serious outbreaks within Vancouver speaks to its water management systems being effective, but continuous monitoring is still required to counter new challenges (30).

Effects of Climate Change

Climate change dramatically increases the chance of waterborne disease through shifting environmental conditions, changing water quality, and water systems (31). Foremostly, climate change impacts on extreme weather, such as heavy precipitation and flooding, relate to changes in runoff, which may introduce pathogens (e.g., *Escherichia coli* and

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Cryptosporidium) into drinking and recreational water (32). In this context, long periods of drought imply reduced availability of water, forcing people, mainly in low-income areas, to rely on contaminated alternatives, increasing the transmission of disease (17). In the US, a 2018 study showed that floods related to El Niño led to a 20% increase incidence of outbreaks of diarrheal disease. The emphasis here is on extreme weather events related to climate change when analysing epidemiology of infections and diseases (33). With regard to climate change-related waterborne diseases and infections, rising water temperatures due to changing climates will allow for pathogens like *Vibrio* species to survive and grow. Vibrio species thrive in warmer coastal waters, which have been associated with the prevalence of infections in places such as countries in South Asia and Europe (34). Due to ongoing changes to climate change factors related to waterborne disease, public health adaptive strategies are necessary for mitigating the impacts (35).

Influences from health professionals

Community Health Nurses

Community health nurses are agents of change in waterborne disease-prevention, who act in education, advocacy, and health response in the community setting (9). They provide outreach to enhance knowledge of WASH practices such as handwashing with soap and safe water storage, etc., which have been shown to reduce the incidence of diarrheal disease by 20-30 % in various contexts (36). In Vancouver, nurses partner with schools, community centers, and marginalized groups, including the homeless and Indigenous communities, to develop tailored education campaigns that address identifiable risk factors (14). They provide vaccinations, such as hepatitis A, in high-risk communities, as well as serve as outbreak responders by identifying initial cases, ensuring contact tracing is completed, and communicating with public health officials (37). Nurses can strengthen trust with communities in helping improve uptake of preventative measures, as evidenced by a nurse-led hygiene education program that resulted in a 25% reduction in cholera incidence among targeted villages in Sub-Saharan Africa (38). Their surveillance responsibilities include monitoring the community for symptoms, such as diarrhea or respiratory infections, to report suspected outbreaks to the appropriate health authorities, which can support rapid response to and contain the outbreak (39).

Health Inspectors

Health inspectors play an important role in ensuring the safety of water by reporting violations and inspecting systems that serve the public, such as water systems, including recreational facilities and premise plumbing (40). Health inspectors can identify sources of contamination that commonly lead to outbreaks of *Legionella* and *Pseudomonas*, such as biofilm in cooling towers and water not properly chlorinated in swimming pools (41). In the USA, health inspectors have attributed 60% of *Legionella* outbreaks to poorly maintained water systems in health care facilities and hotels, emphasizing their key role in outbreak response (1). Inspectors are also involved with facility managers in implementing water management programs, which include routine testing of water systems and conducting maintenance and remediation (42). Facilities using the CDC's water management toolkit have shown a 50% reduction in *Legionella* outbreaks in monitored buildings (43). Similarly, in Vancouver, health inspectors work with local governments to ensure compliance with Drinking Water Guidelines in Canada, specifically among high-risk locations such as long-term care facilities and public places of recreation (14).

Epidemiology Workers

Epidemiology workers also play a crucial role in analyzing surveillance data to determine trends, describe risk factors, and identify sources of waterborne disease outbreaks (13). The CDC's Waterborne Disease and Outbreak Surveillance System (WBDOSS), which has been active since 1971, relies on epidemiologists to develop, tabulate, and analyze the outbreak data in order to support the evaluation of etiologic agents, modes of transmission, and contributing factors associated with outbreaks (1). Epidemiologists also participate in the WHO's Global Health Observatory to track the trends of waterborne diseases worldwide and provide information for international health policy (27).

In Vancouver, epidemiological personnel have taken the development of WBE to the applied level, using wastewater to identify pathogens before clinical case reports (11). For example, WBE detected Cryptosporidium in the wastewater in 2019, and proactive targeted water treatments were implemented to treat wastewater to prevent an outbreak (4). Furthermore, epidemiologists build models to predict the risks regarding climate, including the increased risk of pathogen transmission during heavy rain events, allowing a proactive response by testing water and issuing public alerts (44).

Prevention Strategies

Water Treatment and Sanitation

Newer water treatment technologies, including chlorination, ultraviolet (UV) disinfection, and ceramic filtration, have greatly reduced the burden from water-borne diseases (19). Chlorination is effective against bacterial pathogens, including *E. coli* and *Vibrio cholerae*, offering 70–90% reductions in incidence in community and household settings (45). In developing nations, ceramic filters have been widely used to reduce protozoa and bacteria, achieving an effectiveness of 60–80% (20). In developed countries, controlling biofilm growth in premise plumbing sometimes requires full water management programs, including regular flushing and controlling levels of disinfectants, in order to reduce their presence of *Legionella* and NTM by 50–70% (22).

Sanitation upgrades, such as developing latrines and improving sewer systems, can significantly help avoid fecal contamination of water sources in low-income contexts (17). In a 2020 study in India, better sanitation infrastructure in rural settings reduced the prevalence of diarrheal disease by 40% (36). In urban settings, a wastewater treatment plant is an important point for removing pathogens before discharging effluent into a waterway and thus protects communities downstream (11).

Engagement with the community

Community-based behavior change strategies focused on WASH promotion and point-of-use water treatment are effective interventions to reduce the burden of waterborne diseases (9). Handwashing promotion campaigns led by community health nurses reduce the incidence of diarrheal disease 20–30% by influencing hygiene practices in schools, households, and community settings (38). Community members can guarantee their water safety with household water treatment devices such as ceramic filters and solar disinfection systems, which can be useful in areas with unreliable supply (20). A 2017 study in Kenya found that solar disinfection reduced *Cryptosporidium* infection by 65% in rural households, demonstrating the efficacy of low-cost intervention (25).

In Vancouver, community engagement initiatives have focused on marginalized populations, like individuals living homeless and Indigenous communities, who are at higher risk because of restricted access to clean water and sanitation (14). Collaborations between nurses, public health authorities, and community organizations have improved WASH uptake in these populations while developing programs that create solutions that accommodate socio-economic and cultural differences (29).

Policy and Infrastructure

Strong public health policies and infrastructure are necessary for the viable long-term prevention of waterborne diseases (30). In the U.S., the Safe Drinking Water Act mandates water quality testing and assigns maximum allowable levels of pathogens in public water systems (43). Canada's Drinking Water Guidelines stipulate similar quality standards, which are followed through various inspections and monitoring processes (14). To reduce disease outbreaks caused by biofilm, develop standards to mitigate the emergence of pathogens such as *Legionella* and NTM in developed countries, and a focus will be placed on upgrading aging water infrastructure (22). In contrast, resources are leveraged in developing countries through international aid programs, such as UNICEF, which develop water treatment facilities and sanitation systems, with tremendous successes lowering disease occurrence (33).

Wastewater-based epidemiology (WBE) also serves as an emerging policy tool for early pathogen detection (11). Vancouver's WBE program, which started in 2018, has enabled more targeted interventions if there are increased pathogen detections, such as more highly chlorinated water, in order to preemptively prevent outbreaks (4). Table 2 includes a summary of the effectiveness and cost of some of the key interventions that can prevent disease.

Table 2. Effectiveness of Waterborne Disease Prevention Interventions

Intervention	Efficacy (% Reduction in Incidence)	Target Pathogens	Implementation Level	Cost Estimate (USD)
Chlorination	70–90%	*E. coli*, *Vibrio cholerae*, *Salmonella*	Community, household	$0.10–$0.50 per person/year
Ceramic filtration	60–80%	Protozoa (*Cryptosporidium*, *Giardia*), bacteria	Household	$10–$50 per unit
Handwashing promotion	20–30%	Enteric pathogens (*Norovirus*, *Shigella*)	Community	$1–$5 per person/year
Water management programs	50–70%	*Legionella*, *NTM*, *Pseudomonas*	Facility-level	$1,000–$10,000 per facility
Wastewater-based epidemiology	Early detection (N/A)	*SARS-CoV-2*, *Cryptosporidium*, *Giardia*	Regional	$50,000–$500,000 per program

Source: Compiled from WHO, CDC, and peer-reviewed studies (1, 27, 45)

Discussion

The transition from the control of enteric to biofilm-associated pathogens in developed countries presents a challenge, both related to advances made in water treatment and sanitation and the emergence of new threats (21). Specifically, *Legionella pneumophila* and *Nontuberculous Mycobacteria* have environments favorable to their growth, proliferating in complex water systems, such as premise plumbing and cooling towers, providing biofilm that shields them from disinfection (22). This shift to new threats that require specialized interventions such as water management programs, and emerging disinfection, like UV or ozone (23) as well as other disinfection alternatives (23), differs from the challenges with enteric pathogens such as *Cryptosporidium*, *Giardia*, and Norovirus in the developing world where high rates of diarrheal disease persist due to inadequate WASH infrastructure particularly among at-risk populations (17).

Community health nurses, health inspectors, and epidemiological workers form the educational, investigational, and preventative triad in WBD (9). Nurses function as healthcare practitioners who link public health policy to community practice (38). They are crucial in providing educational outreach and early intervention to mobilize WASH practices and assess the usefulness of public health measures in the event of outbreak detection (38). Health inspectors work under statutory orders to ensure that regulations for safe water quality are adhered to, and they address contamination sources as soon as they appear, which helps mitigate the spread of outbreaks (40). Epidemiological workers provide data-driven surveillance, model-predictive consequences, and measure what might occur when they activate interventions, including employing Wastewater-Based Epidemiology (WBE) (11). These groups of workers provide the sound foundation of a multi-sectoral approach to disease prevention by using education, regulation, and surveillance together (13). All of these groups face challenges across the globe in dealing with waterborne diseases. Delays in public health notification and data analysis regarding outbreaks have also been identified, especially where resources are limited (16). Inconsistent surveillance for *Nontuberculous Mycobacteria* limits understanding of the true burden of disease and affects prevention strategies (23). Climate-related risks, such as flooding from heavy rainfall and increasing water temperatures, pose an extra risk for the transmission of pathogens and will warrant adaptive measures to be taken by the public health sector (31). In lower-income settings, limitations related to resources and to improving water infrastructure factors are daunting; however, in developed countries and regions, aging water systems continue to highlight these risks (22). There continues to be challenges around scale-up for WBE; while there are many exciting avenues for getting "early warning" for outbreaks and other public health measures, costs are typically prohibitively high, and capacity for laboratory-based analyses of wastewater needs to be at an advanced level (11).

Future Directions

Future programs to combat waterborne disease should target a number of key areas. Expanding wastewater-based epidemiology (WBE) into regular pathogen surveillance, particularly in major urban centers like Vancouver, could enhance early response and detection capabilities (4). Adaptive strategies for reducing the impact of climate change, such as increased water sampling during intense weather conditions, are necessary for minimizing the risk of transmission (32). Developing standardized global surveillance for non-tuberculous mycobacteria (NTM) will provide a better estimate of their prevalence and enable targeted intervention strategies (23). Integration of community health nurses and health inspectors into WBE systems can enhance real-time response efficiency and enable immediate implementation of measures (9). Finally, resource investment in practical and scalable water, sanitation, and hygiene (WASH) programs in developing countries is imperative to address the persisting issues of enteric disease (17).

Conclusion

Waterborne diseases pose a complex and dynamic public health challenge, with distinct epidemiological patterns seen in both developed and poor countries. The shift towards biofilm-related pathogens in wealthier regions, coupled with the continued burden of enteric diseases in poor communities, highlights the need for targeted preventative measures. The cornerstone of disease avertions rests on the training, monitoring, compliance, and response of health inspectors, epidemiologists, and community health nurses. Evidence-based interventions, including improvements in treatment technology, improvements in sanitation infrastructure, community engagement initiatives, and wastewater epidemiology, hold great potential to reduce the worldwide burden of disease. Sustainable financial investment in infrastructure development, surveillance programs, and cross-sectoral collaboration will be critical in meeting current and future challenges related to waterborne diseases, ensuring the provision of safer water and shaping healthier communities globally.

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الاتجاهات الوبائية للأمراض المعدية المنقولة عن طريق المياه ودور الممرضين الصحيين المجتمعيين، والمفتشين الصحيين، والعاملين في علم الأوبئة في الوقاية

الملخص

تُعدّ الأمراض المعدية المنقولة عن طريق المياه(WBD) ، والتي تنتقل نتيجة تلوث مصادر المياه، من أبرز مشكلات الرعاية الصحية على مستوى العالم. إذ يصاب أكثر من 7 ملايين شخص سنويًا في الولايات المتحدة بهذه الأمراض، كما تساهم في وفاة نحو 1.5 مليون شخص سنويًا حول العالم، وخصوصًا في البلدان ذات الدخل المنخفض والمتوسط. يستكشف هذا البحث التحولات في علم الأوبئة للأمراض المنقولة عن طريق المياه، مع التركيز على الانخفاض في الأمراض المعوية (مثل: الكريبتوسبوريديوم، الجيارديا، والنوروفيروس)، مقابل الارتفاع في أمراض البكتيريا المرتبطة بالبيوفيلم، مثل *ليجيونيلا نوموفيلا* والميكوباكتيريا غير السلية (NTM) في الدول المتقدمة. وفي المقابل، تساهم ندرة المياه وسوء الصرف الصحي والنظافة (WASH) في المناطق منخفضة الموارد في استمرار انتشار أمراض مثل الكوليرا والتيفوئيد في المجتمعات التي تفتقر لتلك البنى التحتية. تم جمع البيانات من منظمة الصحة العالمية، ومراكز مكافحة الأمراض والوقاية منها(CDC) ، وبرامج الوبائيات القائمة على مياه الصرف (WBE) التي بدأت في فانكوفر (كندا). وقد حددت الدراسة التباين في مسببات الأمراض، وأنماط تفشي المرض، وعوامل الخطورة مثل التغير المناخي وتدهور البنية التحتية. كما تم تحليل أدوار الممرضين الصحيين المجتمعيين، والمفتشين الصحيين، والعاملين في مجال علم الأوبئة من حيث المراقبة، والتثقيف، وتطبيق اللوائح، والتبليغ، كعناصر رئيسية في الوقاية من هذه الأمراض. وتمت مناقشة استراتيجيات وقائية قائمة على الأدلة، مثل تحسين بنية المياه والصرف الصحي والنظافة، وتعزيز مشاركة المجتمع. ويمكن أن تُسهم نتائج هذه الدراسة في توجيه السياسات الصحية العامة للحد من العبء الصحي الناتج عن الأمراض المنقولة عن طريق المياه على مستوى العالم.

الكلمات المفتاحية :الأمراض المنقولة عن طريق المياه، علم الأوبئة، المياه والصرف الصحي والنظافة(WASH) ، الصحة المجتمعية، الوقاية.