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Exploring the Relationship between Water Resource Management and Community Health in Jordan: A Literature-based Case Study

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ABSTRACT

Background: Nurses play a key role in educating communities about safe water practices, hygiene, and disease prevention related to waterborne illnesses. ***Purpose***: This detailed examination rigorously investigates the complex and multi-farious relationship between the management of water resources and the various health outcomes observed in communities across Jordan. ***Methods***: A comprehensive literature search was conducted using databases, such as Web of Sciences, CINAHL, PubMed (through MedLine), and the Jordanian Database for Nursing Research. Keywords included: "water resource management", "community health", "Jordan", "waterborne diseases", "public health", and "nursing and environmental health". The literature search was conducted in 2025, and the publication date range for the included studies spans from 2019 to 2025. ***Results***: This review identified critical challenges in water resource management in Jordan, including limited access to clean water, rising incidences of waterborne diseases, and the insufficient integration of environmental health in public health strategies. Sustainable water management practices—such as water recycling, conservation technologies, and community-based initiatives—were shown to influence individual and community health outcomes positively. These practices also contribute to economic stability and long-term societal resilience. ***Conclusion***: The findings underscore the urgent need for evidence-based water management strategies that align Sustainable Development Goals (SDG), particularly SDG 3 [good health and well-being] and SDG 6 [clean water and sanitation] and SDG 3 [good health and well-being]. Integrating sustainable water practices into policy and nursing interventions can reduce health disparities, enhance living standards, and promote community resilience. This study highlights the vital role of nurses and public health professionals in addressing environmental determinants of health through inter-disciplinary, preventive approaches. ***Implications for Nursing***: Nurses can monitor and report health outcomes linked to water quality, such as diarrheal diseases, skin infections, or other water-related conditions. Additionally, nurses, especially those in public and community health roles, can advocate for improved water management policies that prioritize health outcomes.

Keywords: Water resource management, Health outcomes, Sustainability, Community health in Jordan, Nursing practices.

What does this paper add?

1. This paper provides an in-depth, literature-based case study, highlighting how water resource management directly influences community health

outcomes in Jordan, a water-scarce country facing growing environmental and public health challenges.
2. This review uniquely underscores the underexplored, but crucial, role of nurses in monitoring water-related health conditions, advocating for environmental health policies, and leading community education efforts.
3. This paper links findings to the Sustainable Development Goals and social determinants of health through highlighting the impact of limited access to safe water resources on health equity, disease burden, food security, and well-being, especially among vulnerable populations. It provides insights for cross-sectoral policies and integrated interventions.
4. This review contributes actionable insights for integrating environmental health into nursing practice and national water management strategies, with a focus on disease prevention, community resilience, and long-term health promotion.

Introduction

Access to clean, safe, and reliable water sources is a fundamental determinant of public health and community well-being (Eaton et al., 2021). Globally, effective water resource management is increasingly recognized as essential for protecting population health and promoting resilience in the face of environmental stressors. In Jordan—one of the world's most water-scarce countries—this connection is particularly urgent. Addressing water scarcity through sustainable resource management is critical to maintaining public health and reducing health disparities (Berihun et al., 2022).

This literature-based case study explores the intricate relationship between water resource management and community health in Jordan, focusing on the roles of infrastructure, conservation efforts, and policy frameworks in shaping health outcomes (Berihun et al., 2022). The study integrates nursing perspectives to underscore the vital contributions of nurses in managing water-related health challenges, such as dehydration, waterborne diseases, and the psycho-social burdens of water insecurity (Kimutai et al., 2024). As frontline healthcare providers, nurses are uniquely positioned to advocate for equitable water access, educate communities on hygiene and conservation, and implement interventions that bridge environmental and health inequities (Clark et al., 2020).

In the Jordanian context, water quality directly influences population health, particularly among marginalized and rural communities (Al-Addous et al., 2023). Environmental justice (EJ) is an emerging theme in Jordan's water discourse, emphasizing the need for equitable access to clean water across socio-economic and ethnic groups (Ikuta et al., 2022). However, EJ remains under-researched. A review by LeClair et al. (2021) highlights that low-income and under-served populations are disproportionately exposed to contaminated water, leading to higher rates of waterborne illnesses. For example, rural areas in northern Jordan that depend on over-exploited groundwater sources face more frequent outbreaks of such diseases compared to urban regions with stronger infrastructures (Al-Addous et al., 2023).

The water–health nexus in Jordan is shaped by a confluence of factors including socio-economic inequality (Mokhtar et al., 2020), governance challenges (Berihun et al., 2022), ongoing water scarcity (Grönwall & Danert, 2020), and persistent quality concerns (Zohud & Alam, 2022). While Jordan has made notable strides through infrastructure development and national water policies, barriers remain—particularly regarding resistance to demand-side reforms and inconsistent policy implementation. Achieving sustainable water resource management requires community engagement, gender equity, and integrated public health strategies (Kimutai et al., 2024).

This review identifies a critical knowledge gap in the literature concerning the influence of water resource management on community health in Jordan. It calls for inter-disciplinary and context-specific approaches that combine insights from environmental science, public health, and nursing. In doing so, it sheds light on the under-explored role of nurses in addressing environmental determinants of health and advocates for their inclusion in national water and health initiatives.

Focusing on Jordan contributes a unique perspective to global environmental health discourse. As a country grappling with severe water scarcity alongside pressing health challenges, Jordan exemplifies how environmental, social, and political factors converge to impact public health. By examining this intersection, the review offers localized insights with broader relevance for other arid and resource-limited settings. Ultimately, addressing Jordan's water challenges through integrated, multi-disciplinary solutions is essential—not only for conserving its limited water resources, but also for promoting sustainable, equitable community health.

Methodology

Literature Search

A literature search to identify the studies regarding the relationship between water resource management and community health in Jordan was conducted *via* electronic databases: Web of Sciences, CINAHL, PubMed (through MedLine), and the Jordanian Database for Nursing Research. Research articles on healthcare access were identified using various combinations of keywords, such as "water resource management," "community health, "healthcare", "nursing", and "Jordan". Transparency and rigor were ensured by conducting this literature-based case study under the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria.

Inclusion and Exclusion Criteria

Included studies were peer-reviewed articles published between 2019 and 2025, written in English, and focused on the relationship between water resource management and community health within the Jordanian context. Eligible studies specifically addressed issues, such as water quality, accessibility, sanitation, and their impact on health outcomes, particularly among under-privileged, rural, or refugee-hosting communities. Studies that explored the involvement or potential role of healthcare professionals—especially nurses—in water-related health interventions or environmental health planning were also included. Articles were excluded if they focused solely on technical or engineering aspects of water management without linking to health implications, lacked relevance to Jordan, or were non-peer-reviewed sources, such as editorials, commentaries, or conference abstracts. The screening process involved reviewing titles and abstracts, followed by full-text evaluation based on the above criteria. This systematic approach ensured the inclusion of studies that meaningfully contributed to understanding the complex relationship between water resource management and public health in Jordan.

Results

The literature search, limited to studies published between 2019 and 2025, identified a total of 456 articles. Figure (1) revealed that after removing 96 duplicates, 360 articles remained for title and abstract screening. Of these, 218 were excluded, since they did not match the inclusion criteria, suffering from issues, such as lack of relevance to the Jordanian context or absence of a clear focus on water resource management or community health outcomes. Full-text reviews were conducted for the remaining 142 articles, of which 57 studies met all inclusion criteria and were included in the final synthesis. The included studies encompassed a range of themes, including water resource management and its direct impact on public health (n=18), challenge and strategies (n=12), community health in Jordan (n=9), key indicators (n=11), and the inter-connection between water resource management and community health (n=7). The analysis identified the following themes: (1) water resource management in Jordan; (2) challenges and strategies; (3) community health in Jordan; (4) key health indicators; (5) inter-connection between water resource management and community health; (6) case studies and examples from Jordan.

Water Resource Management in Jordan

Jordan is classified as one of the poorest countries in terms of water availability, with only a tenth of the global average water resources available *per capita* (Salameh, 2024). Otherwise, based on the percentage average, Jordan had the least water available in 2013 (Al-Hasani et al., 2025). Water availability is projected to decline even further in the future due to increased demand and reduced supply (Salehi, 2022). The country has considered its natural constraints to develop sound water management while working within a structured institutional framework. Major policy objectives in water resource management in Jordan include the rehabilitation of present water systems to guarantee that available water supplies are optimally used and laying down the basic policies and management guidelines for improving future water systems (Bozorg-Haddad et al., 2022). Jordan is undergoing an ongoing process of refining its water policies and developing corresponding implementation strategies. To address the nation's water-related challenges, a range of context-specific approaches has been employed. These strategies include the evaluation of alternative water sources, the adoption of advanced technological solutions, and the active involvement of communities in water resource management.

However, enormous investment is put into pipeline development and the establishment of large pumps to increase water supply and meet a growing thirst.

Presently, up to 60% of the nation's water supply is over-extracted from both surface and sub-terranean water reservoirs (Shammout, 2023). As a consequence, springs are drying or borehole flow is reduced. The population cannot rely on those river flows annually, given their irregularity, to meet their needs.

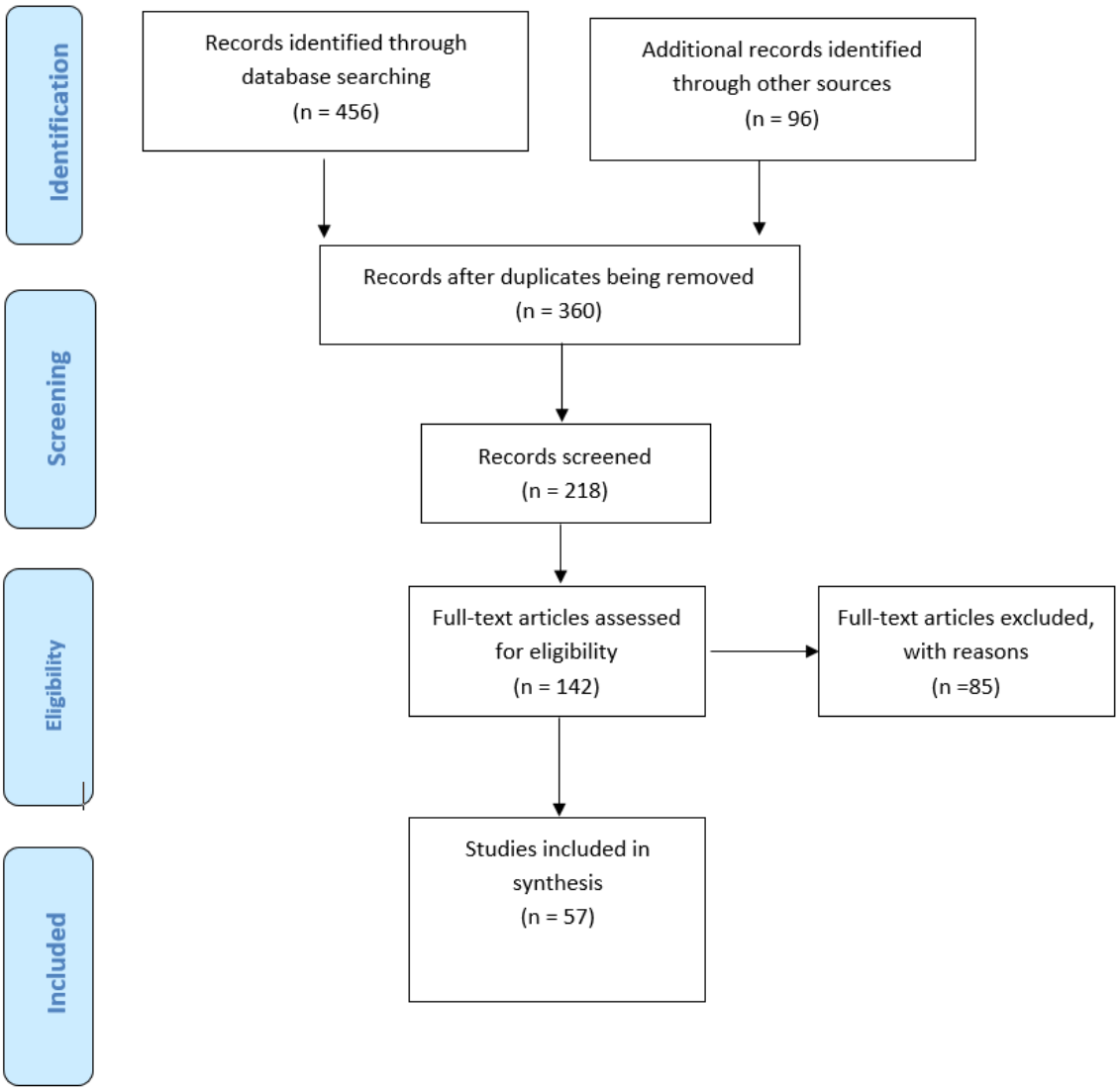

Figure 1. PRISMA flow diagram

In a study performed by Grönwall and Danert (2020), it was reported that in the absence of conventional means of water supply, more and more people are drilling directly into the groundwater to provide water for local agriculture, drinking, and other household needs. Here, too, the quantity of water is insufficient, resulting in an additional reduction of groundwater. Twenty-one new wells have been developed in Al-Mafraq and Jerash governorates, resulting in extreme pressure on aquifers (Isaf et al., 2025). Other sources, such as dams, pipelines, and reservoirs need to be employed to a greater extent than individual remote boreholes, which are prohibitively expensive. All of the above, together with hygiene and treatment, would represent an integrated situation in Jordan that may involve the abrupt release of groundwater onto the ground's surface. This counter-cyclical approach must abandon existing water plans and invest significant capital in building storage reservoirs and creating improved distribution systems. This pathway will improve water quality at the point of use and offer the public a longer water supply. This is in contrast to the shorter journey that borehole water would usually require to reach the consumer through less

sanitary water sources. At least villages should have storage reservoirs, while water management should include training assistance.

Challenges and Strategies

Water resource management faces numerous difficulties in Jordan because of the country's resource-poor status (Najim et al., 2021). The resources are finite and already taxed. Excessive pumping of groundwater from deep aquifers is rapidly leading to depletion (Kinzelbach, 2025). At the same time, shallow springs providing drinking water to large parts of the population are under stress from over-extraction and pollution (Warner et al., 2022). In a study performed by Shekhar and Jha (2023), it was revealed that excessive amounts of untreated or only partially treated wastewater and the leaching of fertilizers and pesticides into the environment further pollute the surface water and groundwater. This degradation of the quality of water resources is increasingly jeopardizing the future, as governmental and public investments in the water sector compete with other sectors for scarce financial resources (Rahman, 2024). Although water is needed in the agricultural, domestic, and industrial sectors, expenditures per cubic meter for these three sectors are disproportionate, unlike their respective contributions to gross domestic product (AbuEltayef et al., 2023). This entire predicament is further aggravated by rapid urbanization and population growth, which necessitate the need for huge and sustainable investments in new water supply and sanitation infrastructures (Talat, 2021). National strategies indicate such challenges and strategic interventions, including policies in sectors, such as agriculture, facing rapid urbanization, or investment in integrated water management. Further strategies undertaken for the management of water resources include planning, legislation, and strengthening of institutions, combating pollution through legislation, as well as investments in the structural optimization of infrastructures, like the development of appropriate technology to save water. Moreover, this can be in the form of leakage reductions in water networks, as well as investments in more saline-resistant cultivations, rainfed and other methods to save water, such as artificial lakes and dams (Candido, 2022; Koop et al., 2022; Ngene et al., 2021). The existing situation could only be altered if the scarce resources are carefully managed and protected by both community members and the relevant stakeholders. These stakeholders carry full responsibility and should have adequate assets to sustainably manage the country's limited renewable water resources. However, since these responsibilities are not met, numerous health externalities stem from the mismanagement of these available resources (Abdel Hadi et al., 2024; Al-Husaini et al., 2021). The situation in Jordan could then be tentatively used as a reference case for numerous developing countries similarly endowed with limited resources and a high population density, although each country will have to carry out further research in its respective contexts to understand the relative importance attributed to these two variables.

Community Health in Jordan

Jordan, as well as the Middle East countries in general, struggle with several environmental and social issues that affect public health. Waterborne diseases in children are a major cause of morbidity and mortality in the Middle East. Many factors, both social and environmental, make the Jordanian community particularly susceptible to worsened health outcomes, due to incomplete or inequitable water distribution. Societal issues, like poverty, low socio-economic status, and poor public health education, cause a lack of access to healthcare and a high rate of preventable diseases. Those in more rural conditions are particularly susceptible to illness based on a lack of clean drinking water facilities and poor sanitation. There is also an apparent link between social conservatism and refusal to modernize public health. Those who are less educated are not as likely to have a clear understanding of sanitary and hygienic practices and the importance of allowing girls to attend school (Manetu & Karanja, 2021).

With 97% of the population having access to basic sanitation facilities and 99% of the population using at least basic drinking water services, Jordan has made great strides in increasing access to these services (Unicef, 2025). While 77% of people have access to safely managed sanitation systems, 85% of people have access to securely managed drinking water, which is defined as water that is available on-site, when needed, and free from pollution. Even with these high national averages, there are still significant issues, especially with regard to equity and service quality. Water supply is often intermittent, with some urban areas receiving water only once a week, and nearly 50%-52% of the

municipal water is lost due to leakage or illegal use (Unicef, 2025).

Jordan boasts an infant mortality rate of 23 per 1,000 births. Infant deaths make up 58% of under-5 deaths every year. The maternal mortality rate is 75 per 100,000 live births. Additionally, only 16% of the population in Jordan is under 5 years of age, revealing that there is a relatively small number of live births in Jordan. Life expectancy is 74 years. Both non-communicable and communicable diseases add to morbidity, and little to no screening services allow these conditions to deteriorate until the individuals are critically ill. The prevalence of waterborne diseases is related to the poor water quality in the environment (World and United, 2022). Gastroenteritis and psychosomatic diseases are some of the most common conditions. Data on underlying conditions, such as immune-suppression, is not digitized. Mortality data also falls short of identifying the exact condition that caused the death, since the full autopsy rate in Jordan is less than 1%. The Ministry of Health is considering making autopsies more frequently utilized in some cases, but is up against a culturally sensitive problem (Sultan et al., 2014). Forty percent of water-related diseases are due to poor water, sanitation, and hygiene functions in the home, mirroring the breakdown of water management. It is 0.48% of water-related diseases that cause a serious impact on the healthcare system, and therefore could potentially be prevented with improved water management (Naghavi et al., 2024). It is especially important to educate the community to treat and test surface water before drinking.

Key Health Indicators

Life expectancy is increasing in Jordan, and infant mortality is decreasing; 74% of the population have access to healthcare services. One of the most prevalent causes of death in Jordan is from diarrheal diseases – the fifth most common cause of death. Communicable diseases – especially those associated with water and sanitation – continue to be common in Jordan. Malaria continues to be common in northern Jordan and, though there have been years in which there have been no cases, it has not been eradicated. Reproductive health issues are also prevalent, with 64% of infants in Jordan being delivered at home by a non-skilled birth attendant and 13% of total births from women aged 15-19 years. Women's health in general is a problem in Jordan, as ten thousand women die every year during childbirth. Studies performed by (Alolayyan et al., 2025; Jalghoum et al., 2021) reported that Jordan has recently had a reproductive health survey, the results of which are not yet available, so Jordan has yet to establish the prominence of different factors related to women's health.

A significant gap is evident between health indicators in urban *versus* rural regions, with higher rates of diarrheal diseases reported in rural areas. Jordan is categorized into two main types of governorates: the water-scarce governorates including Amman, alongside the surrounding areas of Zarqa, Russeifeh, and Wadi Mousa, and the water-rich governorates, such as Salt, Al-Karak, Al-Tafilleh, Ma'an, and Aqaba. According to the latest report, as anticipated, Aqaba recorded the highest proportion of residents who have access to water within their homes, in addition to solid waste collection services (Al-Awwad et al., 2021; Smadi et al., 2021). Additionally, children aged 12-23 months who had complete immunization were much higher in Aqaba governorate. Raised unemployment levels (15% unemployment rates) and large populations living below the poverty line were noted in Zarqa and Amman. Also, levels of pollution were highest in these areas, as well as high incidence of diseases associated with fecal-oral transmission of gastro-intestinal illnesses (Al-Kraimeen et al., 2024; Hyarat et al., 2022).

A study performed by Kamruzzaman et al. (2025) implied that the environmental data for the water sector and health is clear, and the necessity for intersectoral human health and environment monitoring is stressed. It is highly recommended to use these and other potential datasets to fully monitor and assess the health and safety impacts of reliable future water supply and sanitation across Jordan, in addition to complementary health and socio-demographic data.

The Inter-connection between Water Resource Management and Community Health

The relationship between water resource management and community health is complex and multi-directional (Bera et al., 2022; Graf & Pyszny, 2021). A study conducted by Anik et al. (2023) reported that a lack of effective management practices and triggers, resulting from the engineering of local land and water supplies, is often said to be the basis of limited water resource availability and quality. The lack of

water resources seems to lead to spring depletion and salinization, and this in turn impacts health, particularly at the level of water-related infections.

In the northern part of Jordan lies the diverse governorate of Irbid, a region that interfaces with the vast eastern Badia and the crucial territories of Ma'an and Aqaba. Here, the narrative unfolds around a pressing challenge that communities face—one that intertwines the management of water resources with public health. The residents in these areas are grappling with a critical problem: not just a scarcity of water, but also the troubling state of its quality. This predicament has triggered a worrisome increase in waterborne illnesses, such as cholera, typhoid fever, and brucellosis, while also heightening the occurrence of acute respiratory infections (Zohud & Alam, 2022). Yet, the crisis doesn't end with physical ailments. The emotional and social toll of water-related stressors runs deep, affecting mental health and straining family bonds. For many, especially those without the necessary resilience, coping strategies, and resources, everyday life becomes an even greater struggle, as socio-economic difficulties compound their challenges. Nevertheless, a closer look at different case studies from these regions reveals a hopeful narrative. There are indeed effective coping mechanisms being utilized that offer glimpses of resilience. These observations highlight an urgent need for a well-coordinated policy framework that integrates health initiatives with environmental strategies. Such a combined approach is essential for fostering improved health and overall well-being for all Jordanian citizens who are currently battling these urgent issues.

Water is of vital importance to human life and social development and is a central component of policies aimed at sustainable development. Ensuring a safe water supply is a pressing issue. For communities living in water-scarce regions, such as Jordan, particularly in dry areas like the Jordan Valley and eastern Badia, and the mountainous regions in the south of the country, inadequate water sources are closely associated with the well-being and health of individual community members. In the last thirty years, water supply in the Jordanian kingdom has seen a rapid decline in both quantity and quality.

Case Studies and Examples from Jordan

Several case studies vividly demonstrate the relationship between Water Resources Management (WRM) and health, confirming the findings given above (World Health Organization [WHO], 2020; UN-Water, 2021). They demonstrate a range of settings and give insights into when interventions to improve WRM can enhance health and when they cannot (Jordan Ministry of Water and Irrigation, 2019). Furthermore, they illustrate some of the challenges and lessons that have stemmed from these interventions in the past and hence provide guidance about what we might do to improve health by finding synergies between WRM and human health (World Bank, 2022).

Wastewater Treatment in Northern Jordan

The building of specially designed wetlands that can treat more than 300 m^3 per day of domestic wastewater has had mixed results. Compliance rates with effluent standards are often high (Jordan Water Authority, 2020), but wildlife has either enjoyed the "natural ornithological garden" that has now been wiped out or suffered from infection with parasitic worms, leading to conflict with local people who also use this water (United Nations Environment Program [UNEP], 2021).

The wetlands in northern Jordan, designed to treat domestic wastewater, were initially a natural ornithological garden, but later experienced negative health effects due to insufficient ecological risk assessment and long-term planning. The loss of the biodiverse habitat suggests that the system was not managed sustainably or adaptively. The use of treated water by local communities has led to human-wildlife conflict and public health concerns, highlighting the complexity of implementing green infrastructure in fragile ecosystems and socially sensitive regions.

Water Demand Management in the Jordan Valley

A comparison of water use and surface water quality in different parts of the valley showed how the introduction of storage cisterns helped dilute contaminant loadings, thus improving water quality (Food and Agriculture Organization [FAO], 2020). As a consequence, communities that invested in the cisterns had lower conjunctivitis rates than those that did not (WHO, 2021).

The Jordan Valley has implemented storage cisterns as a water demand management strategy, demonstrating significant health and environmental benefits. These cisterns increased water availability and reduced contaminant concentrations in surface water, improving

overall water quality. However, the evidence does not fully address causality, and the equity of implementation is a concern. Long-term sustainability depends on regular maintenance, water safety monitoring, and community training, which are often under-emphasized in infrastructure-driven solutions. The case highlights the need for integrated approaches that combine physical infrastructure with public health education and governance reforms.

Water Supply Development in Rural Areas of Jordan

The ambitious groundwater development program in Jordan raised the question of what impacts new supplies might have on diseases transmitted through water, such as schistosomiasis or Guinea worm (Jordan Ministry of Health, 2018). Researchers drew up plans for rapid-response epidemiological surveillance to help identify changes in infection patterns. Although the studies were not finally conducted, it is clear that such rapid-response, low-information gathering surveys can be valuable, as pressures are put on the environment and disease/health transmission systems (Centers for Disease Control and Prevention [CDC], 2020).

The groundwater development program in rural Jordan aimed to address chronic water scarcity, but raised concerns about public health implications. Diseases like schistosomiasis and Guinea worm pose risks when changes to water access and use alter pathogen transmission and human-environment interaction. The initiative's strengths included proactive recognition of risks and rapid-response epidemiological surveillance plans, which can help prioritize resource allocation in under-served settings. However, the planned surveillance studies were never implemented, highlighting a gap between policy design and execution. The initiative also highlighted the need for integrated planning, combining water supply development with public health safeguards and community engagement. Future projects should embed surveillance, monitoring, and cross-sector collaboration to ensure long-term public health security.

Effectiveness of Water Resource Management across Different Locations

The examples of Water Demand Management (WDM) in both the Jordan Valley and Amman show not only that WRM can lead to reduced illnesses, but also how it can do so (World Bank, 2022). Better roads and access to markets in the Jordan Valley have likely induced people with higher means to move in, who use less water and probably manage their expenditures better (Jordan Economic Forum, 2021).

Both of these projects involved significant direct intervention, with the building of the wetland employing engineers and the Urine-Diverting Dry Toilet (UDDT) system being implemented in households. However, in the case of the cistern, the initial concern was ensuring that the structure was built properly, as any leakage would lead to contamination of the stored water and defeat the purpose. Finally, the comparison with Amman shows that the effectiveness of WRM can be location-specific, depending on local dynamics and conditions (United Nations Development Program [UNDP], 2022). Compared to other interventions, such as providing better water quality, WDM is particularly advantageous in locations where piped water supplies are unsafe and many inhabitants, especially children, suffer from water-related diseases (WHO, 2020).

In fact, should a WRM intervention be implemented and bring about a reduction in water-related diseases, a parallel reduction in morbidity and mortality costs is likely, further enhancing the attractiveness of that intervention and its appeal to donor agencies (World Bank, 2022). A relatively small investment in anti-contamination measures in the community and facilities can be highly cost-effective in terms of reducing morbidity, given the high health costs of diarrheal diseases in the settlements (WHO, 2021). Hence, the health costs associated with the relatively few remaining cases will not be sufficient to prevent health-based illnesses from considerably improving.

Of course, its exact cost-effectiveness depends on its implementation. To be effective, an anti-contamination program needs to focus on what, where, and how to strategize anti-contamination measures in response to local transmission factors (UNDP, 2021).

Implications for Nursing

This study emphasizes how important it is for nurses to actively participate in environmental health advocacy and education to advance community health. Nurses can more successfully teach people and families about safe water practices, cleanliness, and disease prevention by knowing the connections between water scarcity, contamination, and public health consequences. The results also support the inclusion of environmental

health subjects in nursing curricula and continuing professional development, which equips nurses to use evidence-based practices to address health issues related to water. Additionally, nurses can work with community organizations, legislators, and public health officials to promote better water management systems and fair access to water. In the end, this study highlights how critical it is to broaden the scope of nursing beyond clinical settings to encompass environmental stewardship, public education, and community engagement, particularly in settings with limited resources, like Jordan. In close collaboration with the residents, nurses created mixed-method surveys, such as that conducted by LeClair et al. (2024), which showed a strong correlation between stress, perceived environmental injustice, and poor health outcomes. This shows how nurse-led engagement can highlight local environmental health issues and guide advocacy initiatives.

Environmental health is being incorporated into Jordanian nursing education through relevant frameworks, such as One Health, public health, and disaster preparedness courses. Although there aren't many explicit climate change and environmental curricula currently, institutional support and core aspects are starting to appear. Suggestions for the future consist of: embedding environmental sustainability more overtly in nursing core courses and promoting inter-disciplinary experiential learning (e.g. CBPR, environmental surveillance).

To sum up, nurses can be key players in the early identification of water-related ailments, including skin infections, gastro-intestinal disorders, or possible parasite outbreaks, even in the absence of official epidemiological investigations. Also, nurses could plan for rapid-response surveillance; however, such plans were never carried out. Particularly in rural areas with limited resources, nurses can serve as on-the-ground facilitators, assisting in the implementation of fundamental health monitoring techniques, data collection, and research support. Furthermore, nurses must get training in environmental health, waterborne-illness prevention, and basic epidemiology before they may assume more responsibility for environmental health surveillance and water safety. Long-term public health resilience depends on funding their professional development.

Policy Recommendations and Future Directions

Given the complex interplay between water management and public health, this review underscores the importance of adopting an integrated water resource management approach to ensure clean water access and sustainable hygiene practices, ultimately reducing water-related diseases in Jordan. Based on a synthesis of the literature and field knowledge, the following prioritized recommendations are proposed to guide responsible stakeholders:

1. Strengthening Regulatory Frameworks: The Ministry of Health (MoH) and Ministry of Water and Irrigation (MWI) should collaborate to develop a more holistic and integrated regulatory framework that aligns health, environmental, and water management goals. This would help ensure that policies address both immediate population needs and long-term sustainability objectives.
2. Enhancing Community Engagement in Water Governance: Water governance in Jordan remains highly centralized. Nurses, especially in community health roles, can serve as facilitators of health education, community participation, and water-use monitoring.
3. Investing in Infrastructure and Sanitation Systems: Governments should prioritize investments in water infrastructure, including both expansion and rehabilitation of outdated systems, to reduce disparities in access to safe drinking water and sanitation. Actors should explore public-private partnerships (PPPs) for financing and operating water systems.
4. Conducting Localized Research and Surveillance: There is a need for observational studies to assess the direct links between water resource management and community health outcomes.
5. Adapting and Localizing Global Best Practices: While international best practices exist in water, sanitation, and public health, the MoH should adapt these to Jordan’s social, environmental, and economic conditions.

Conclusion

This review has highlighted the intricate connections between water resource management and community health in Jordan, emphasizing the urgent need for integrated, community-centered, and evidence-informed policies. Community health outcomes are

greatly influenced by the management of water resources, especially in areas with limited water supplies like Jordan. Jordan, one of the most water-insecure nations in the world, is facing more difficulties as a result of population growth, climate change, and rising demand on finite water supplies (Al-Addous et al., 2023). Effective management of water resources has significant ramifications for SDG 3 [good health and well-being]; and is closely related to SDG 6 [clean water and sanitation] , which is to ensure that water and sanitation are available and managed sustainably for everyone (World Bank Group, 2019). Several social determinants of health (SDH), including living and environmental conditions, food security, and access to healthcare services, are directly impacted by limited access to clean and safe water (Al Maaitah & AbuAlRub, 2017).

On the other hand, poor sanitation and inadequate water supplies raise the risk of infectious diseases, have an impact on the health of mothers and children, and worsen health disparities among vulnerable groups, especially in rural and refugee-hosting areas. Sustainable water management techniques, when combined with public health policies, are crucial for boosting community resilience to economic and environmental stressors, advancing social equity, and improving population health (Al Qatarneh et al., 2018; Beithou et al., 2022). The proposed recommendations aim to guide stakeholders—including government ministries, nursing bodies, and community organizations—toward coordinated efforts that promote water security, reduce health disparities, and enhance public health resilience. By addressing regulatory, infrastructural, and participatory gaps, Jordan can move toward a more sustainable and health-oriented water management future

Author Contributions

Study design: **AA**. Data Collection: **AA.** Data analysis: **AA** and **EAA**. Study supervision: **SBH**, **EAA** and **AE**. Manuscript writing: **SBH** and **AE**. Critical revision for important intellectual content: **SBH** and **EAA**.

Conflict of Interests

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