



Assessment of Environmental Sanitation Issues on Digital Media in Mangu Local Government Area, Jos, Plateau State, Nigeria

Herbert Batta^a, Joseph Jonah^{b*}

^aDepartment of Information and Media Studies, University of Uyo, Uyo, Akwa Ibom State, Nigeria

^bDepartment of Development Communication, University of Uyo, Uyo, Akwa Ibom State, Nigeria

*Corresponding email: jonahjoseph44@gmail.com

Abstract

This study assessed environmental sanitation issues on digital media in Mangu Local Government Area, Plateau State. The study was anchored on Knowledge, Attitude and Practice (KAP) model. A descriptive survey design was adopted. The population of the study comprised adults aged 18 years and above in Mangu LGA, with a projected population of 442,160 (National Bureau of Statistics, 2023). The accessible population was limited to those with access to smartphones and internet connection. A sample of 384 was determined using Krejcie and Morgan's table. Multistage sampling was employed: four wards were purposively selected from Mangu LGA, three communities were randomly selected from each ward, and 32 respondents were conveniently selected from each community to make 384. A structured questionnaire validated by two experts in the field of Mass Communication was used. Pilot study was conducted in Jos North LGA (n=30), Cronbach Alpha = 0.81. Data were analyzed using frequency, percentage and mean score with criterion mean of 2.5. Findings showed exposure levels as everyday 37.5%, once a week 15.6%, once a month 17.2% and rarely 29.7%. On attitudes, all items were accepted with grand mean of 3.23, indicating digital media messages were perceived to positively influence attitudes towards promoting clean environment (M=3.46), proper waste disposal (M=3.16), disapproval of open defecation (M=3.14) and participation in sanitation day (M=3.17). The study concludes that digital media shape positive attitudes but recommended integration of digital campaigns with provision of sanitation infrastructure.

Keywords: attitude, digital media, environmental sanitation, exposure, Plateau State

Introduction

Globally, unsafe water, sanitation and hygiene (WASH) accounts for 1.4 million preventable deaths annually, with sub-Saharan Africa bearing the highest burden (WHO & UNICEF, 2023). Despite global campaigns, environmental abuse through indiscriminate waste disposal and open defecation persists in low and middle-income countries, contaminating water sources and farmlands. In Nigeria, environmental sanitation crisis is acute. The WASH NORM 2021 report indicates 46 million Nigerians practice open defecation, 14% in Plateau State, while solid waste management remains poor in rapidly urbanizing towns (Federal Ministry of Water Resources et al., 2021). In Plateau State, urban slums and semi-urban LGAs like Mangu suffer from heaps of refuse in markets, blocked drainages during rainfall, and contaminated wastewater (WHO, 2021).

Environmental sanitation is one of the components of water sanitation and hygiene (WASH). It is about water, air and land pollution. It deals with waste collection, safe disposal of waste water, human excretion, and keeping gutters and drains clean to avoid blocked drainages (WHO, 2021). The WHO and UNICEF (2023) define environmental sanitation as the hygienic



management and disposal of wet and solid human wastes, protection of water sources, maintenance of a clean physical environment to prevent diseases, and to promote sound health. Also, the Federal Ministry of Environment (2023) notes that improper waste disposal and open defecation are key drivers of environmental contamination in Nigeria. The Ministry identifies both practices as major sources of pollution to water bodies, soil, and agricultural lands. In many low-income settings, human wastes and solid wastes are washed into streams and rivers during rainfall, which communities depend on for drinking and domestic use (WHO & UNICEF, 2023).

Poor environmental sanitation leads to outbreaks of diseases; and many rural areas in Nigeria including villages, slums and towns such as Mangu LGA still records poor waste disposal cases (WHO, 2021). Mangu LGA is one of the largest LGAs in Plateau State, with markets and communities characterized by heaps of refuse, blocked drainages and indiscriminate dumping. Plateau State still records open defecation prevalence of 14% (WASH NORM, 2021). While studies have examined environmental sanitation in Lagos (Ichipi & Senekane, 2023) and Abuja (Sadiq et al., 2018), little attention has been paid to Plateau State and specifically Mangu LGA regarding how digital media exposure relates to attitudes. This study fills that gap.

Statement of the Problem

Environmental sanitation culture prevents diseases, protects water sources, promotes environmental cleanliness, and increases economic development. However, poverty and lack of sanitation facilities, low awareness, weak enforcement of sanitation laws, and some cultural factors or attitudes to environmental sanitation lead Nigeria, Plateau and Mangu LGA to where they are today. Many residents of Mangu LGA still live in dirty surroundings and throw wastes indiscriminately. This is evidenced in blocked drainages, heaps of refuse in some parts of the LGA, and indiscriminate waste disposal.

Some residents of Mangu LGA are digital media users. These citizens read, share, post and even re-post environmental sanitation messages online. In spite of this exposure, some of the residents of Mangu LGA attitude towards environmental sanitation show a disconnection between exposure and practice. This signals a gap in behaviour and this study of Mangu LGA examined the extent to which exposure to digital media messages on environmental sanitation influences the residents' attitude to water, sanitation and hygiene matters.

Objectives

The objectives of this study were:

- i. To find out the level of exposure of Mangu residents towards environmental sanitation messages on digital media;
- ii. To examine how exposure to digital media messages influence the attitude of Mangu residents towards environmental sanitation practices

Research Questions

- i. What is the level of exposure of Mangu residents to environmental sanitation messages on digital media?
- ii. How does the exposure to digital media messages influence the attitudes of Mangu residents?

Literature Review

Digital media as tools for promoting Environmental Sanitation

The advent of digital media channels has transformed communication and sanitation practices. Hajri and Daife (2024) assessed the role of social media in engaging young people in



environmental issues in Morocco. The study found that campaign on Facebook and WhatsApp increased youth knowledge and participation in environmental programmes; similarly, WHO (2021) and Ajisafe and Babaleye (2024) note that digital media campaigns during disease outbreaks helped disseminate preventive messages faster than radio and posters.

Platforms such as websites, Facebook, WhatsApp, and TikTok are now widely used by government agencies and civil society groups to promote environmental issues. Studies have confirmed that individuals actively use digital media not only to receive but also to post, repost, and share environmental sanitation messages. Ajisafe and Babaleye (2024) found that community members disseminate sanitation advocacy messages through WhatsApp and Facebook, with peer sharing amplifying campaign reach; while Mukherjee and Ghosh (2022) report that in LMICs, citizens use platforms such as WhatsApp, Facebook, and TikTok to share personal sanitation experiences and NGO materials, thereby reinforcing social norms. Similarly, WHO and UNICEF (2023) further document peer-to-peer forwarding of hygiene messages as a core mechanism for scaling WASH communication. This shows that the digital media have shifted sanitation promotion from top-down dissemination to networked and user-driven sharing, while WHO (2018) states that digital media videos and infographics on hand washing and toilet use leads to higher adoption than text messages alone.

Digital media has transformed environmental sanitation promotion from top-down messaging to networked, user-driven sharing where individuals receive, post, repost and share sanitation messages via Facebook, WhatsApp and TikTok, with peer-sharing amplifying campaign reach (Ajisafe & Babaleye, 2024) and reinforcing social norms around toilet use and handwashing in low- and middle-income countries (Mukherjee & Ghosh, 2022; WHO & UNICEF, 2023); while these studies confirm that such platforms increase knowledge and accelerate WASH communication, they were conducted in South-West Nigeria and across LMICs generally and focused on knowledge and dissemination rather than attitudinal disposition, leaving untested whether exposure to these tools translates into positive attitude towards proper waste disposal and toilet use in a semi-urban northern context like Mangu LGA where heaps of refuse, blocked drainages and indiscriminate dumping persist (Federal Ministry of Water Resources, National Bureau of Statistics & UNICEF, 2021), which is the specific empirical gap between digital media exposure and attitude that the present study addresses.

Attitude, Exposure and Environmental Sanitation Practices

Exposure deals with frequency and attentiveness with which residents view or read environmental sanitation messages on platforms such as Facebook or Whatsapp (Adikpo, Achakpa-Ikyo, 2022). Exposure is the degree to which a person views and pays attention to environmental sanitation contents. How often the resident of Mangu LGA of Plateau State read or watch digital videos messages on environmental sanitation issues is the rationale for this study. Exposure to environmental sanitation communication without positive attitude leads to weak practice. Studies from different scholars have demonstrated a significant relationship between exposure to digital media messages and attitude change toward environmental sanitation. In their study, Ajisafe and Babaleye (2024) reported a statistically significant association between frequency of exposure to media advocacy and improved attitudes toward ending open defecation. Similarly, Linus (2023) found that exposure to broadcast media contents significantly shaped audience attitudes toward environmental sanitation in Nigeria; Nwaerema et al. (2023) reported that perception of environmental sanitation communication practices was linked to waste



management attitudes among Port Harcourt residents; and Erubami (2022) demonstrated that increased exposure to mass media messages was significantly associated with positive attitudes toward disease prevention and hygiene. Collectively, these studies confirm that exposure to environmental sanitation messages on media platforms was a predictor of pro-environmental attitudes.

Exposure to environmental sanitation messages on digital media is expected to generate positive attitude towards environmental practice. Aderibigbe et al. (2021) revealed that increased knowledge should lead to positive attitude which in turn should translate into positive behaviours. An attitude deals with an individual or community mindset to environmental sanitation. Adoga, et al. (2023) noted a significant gap involving knowledge, attitude, and practice. The study revealed that having good knowledge and positive attitude did not automatically lead to good environmental sanitation culture. It was found in the study that 89.7% of the respondents had high level of knowledge, 72.3% had positive attitudes towards environmental sanitation, while 32.2% of the respondents had low practice of environmental sanitation. Many people had or held positive attitudes towards waste disposals. Onazi et al. (2018) appraised waste management practices in peri-urban communities in North Central Nigeria (Karu, Nasarawa State), revealing high exposure to improper waste disposal and low community infrastructure, and attributing poor sanitation to lack of sustained government commitment and enforcement.

Similarly, Aderibigbe et al. (2021) found that 65% of respondents in North-Central Nigeria agreed that sanitation was important, but practice remained poor, and Adoga et al. (2023) revealed a significant knowledge-attitude-practice gap where 89.7% had high knowledge and 72.3% had positive attitude, but only 32.2% had good practice, which collectively suggests that exposure alone may not automatically translate into positive attitude and practice in a context like Mangu LGA where heaps of refuse and 14% open defecation persist (Federal Ministry of Water Resources et al., 2021), and this inconsistency between exposure, attitude and practice is precisely the relationship this study seeks to test.

Theoretical Framework

Knowledge, Attitude and Practice (KAP) model was originated from health education research in the 1960s and was systematized by Schwartz (1976). The model postulates that knowledge is the foundation for attitude formation and practice change, but positive attitude does not automatically translate to practice without enabling factors (Kang and Bagaoisan, 2024). This suggests that knowledge is the foundation for accepting a change. Hence, KAP model is relevant to this study because information (knowledge) and education are the way out of ignorance, and through educating people about environmental issues, the digital media help in strengthening their understanding of the dangers that come with lack of adherence to environmental standards. This pushes them to accept active and effective prevention behaviours. Also, KAP is important to this study because it explains the pathway through which digital media influences sanitation behaviour in Mangu LGA. Also, it tests whether knowledge acquired through digital media in Mangu LGA translates to positive attitude and whether that attitude translates to practice or is hindered by infrastructural and economic factors.

Methodology

This study adopted a descriptive survey research design. The choice of design was informed by its suitability for collecting data from a large population. The population of the study

comprised adults aged 18 years and above in Mangu Local Government Area, Plateau State, with a projected population of 442,160 (National Bureau of Statistics, 2023). The accessible population was limited to those with smartphones and internet access because only residents who had online presence could provide the information needed for the study. The Sample size was 384. The sample size was determined by Krejcie and Morgan (1970) formula for calculating sample size. Multistage sampling technique was used. At the first stage, purposive sampling of four wards (Mangu I, Mangu II, Panyam, Kerang) due to high population density was employed. Secondly, random sampling of three communities per ward (12 communities total), and thirdly, convenience selection of 32 respondents per community = 384. The study used questionnaire as the instrument for the data collection. The questionnaire had two (2) sections. Section A (Demographics) and Section B (Exposure, Attitude, Factors). Measured on 4-point Likert Scale (SA=4, A=3, D=2, SD=1). Face and content validity was established by two lecturers, from the Department of Development Communication, University of Uyo. Pilot study was conducted in Jos North LGA (n=30), Cronbach Alpha = 0.81. For the data analysis, frequency, percentage and mean were used. Criterion mean = $(4+3+2+1)/4 = 2.5$. Mean ≥ 2.5 = Accepted.

Result and Discussion

Table 1. *Demographic Characteristics of Respondents*

Item	Response	n	%
Gender	Male	210	54.7
	Female	174	45.3
	Total	384	100.0
Age	18–27 years	96	25.0
	28–37 years	120	31.3
	38–47 years	98	25.5
	48 years and above	70	18.2
	Total	384	100.0
Marital status	Single	145	37.8
	Married	205	53.4
	Divorced/separated	20	5.2
	Widowed	14	3.6
	Total	384	100.0
Educational qualification	No formal education	35	9.1
	Primary education	62	16.1
	Secondary education	125	32.6
	Tertiary education	162	42.2
Occupation	Civil/public servant	78	20.3
	Business/trading	105	27.3
	Farming	112	29.2
	Student	49	12.8
	Other occupations	40	10.4

Note: $N = 384$

The demographic distribution of respondents provides context for understanding digital media exposure and attitudes towards environmental sanitation in Mangu Local Government Area, Plateau State. Males constituted 210 respondents (54.7%), while females accounted for 174 (45.3%), indicating a relatively balanced gender distribution, although men were slightly more represented. Regarding age, respondents aged 28–37 years formed the largest group, with 120 (31.3%), followed by those aged 38–47 years, with 98 (25.5%), those aged 18–27 years, with 96 (25.0%), and those aged 48 years and above, with 70 (18.2%). This suggests substantial

representation of adults aged 28–47 years. In terms of marital status, married respondents constituted the majority, with 205 (53.4%), followed by single respondents, with 145 (37.8%), divorced or separated respondents, with 20 (5.2%), and widowed respondents, with 14 (3.6%). Educationally, respondents with tertiary education represented the largest category, with 162 (42.2%), followed by those with secondary education, with 125 (32.6%), primary education, with 62 (16.1%), and no formal education, with 35 (9.1%). This indicates that most respondents had secondary or tertiary education, which may be relevant to their engagement with digital information. Occupationally, farmers constituted the largest group, with 112 (29.2%), followed by businesspeople and traders, with 105 (27.3%), civil and public servants, with 78 (20.3%), students, with 49 (12.8%), and other occupations, with 40 (10.4%). The distribution reflects variation in respondents' backgrounds, providing a basis for examining the study variables.

Table 2. *Distribution Frequency of Exposure to Environmental Sanitation Messages on Digital Media*

Exposure Level	Frequency	Percentage (%)
Everyday	144	37.5
Once a week	60	15.6
Once a month	66	17.2
Rarely	114	29.7
Total	384	100

The data in Table 2 above shows that 144 (37.5%) of the respondents were exposed to digital media messages on environmental sanitation everyday, 60 (15.6%) were exposed once a week, 66 (17.2%) were exposed once a month, while 114 (29.7%) rarely exposed themselves to such information. This means that the majority of Mangu LGA were reasonably exposed to digital media messages on environmental sanitation.

Table 3. *Perceived Influence of Digital Media Messages on Attitudes*

S/N	Item Description	SA	A	D	SD	Total	Mean	Decision
i	Digital media messages make me value clean environment	224	130	12	18	384	3.46	Accepted
ii	Digital media messages increase my willingness to dispose waste properly.	158	154	46	26	384	3.16	Accepted
iii	Digital messages make me disapprove open defecation	144	172	46	22	384	3.14	Accepted
iv	Digital messages motivate me to participate in sanitation day	138	192	34	20	384	3.17	Accepted

Table 2 reveals respondents' perceived influence of digital media messages on attitudes towards environmental sanitation in Mangu LGA. Item i shows 224 (58.3%) strongly agreed and 130 (33.9%) agreed that digital media messages make them value clean environment, while only 12 (3.1%) disagreed and 18 (4.7%) strongly disagreed. With a mean of 3.46 above the criterion mean of 2.5, the item was accepted.

Item ii reveals 158 (41.1%) strongly agreed and 154 (40.1%) agreed that digital media increases willingness to dispose waste properly, while 46 (12.0%) disagreed and 26 (6.8%) strongly disagreed (M=3.16). Item iii shows 144 (37.5%) strongly agreed and 172 (44.8%) agreed that digital messages make them disapprove open defecation (M=3.14). Item iv shows 138 (35.9%) strongly agreed and 192 (50.0%) agreed that digital messages motivate participation in sanitation day (M=3.17). Cumulatively, the grand mean of 3.23 indicates that majority of residents in Mangu LGA (over 80%) perceived that digital media messages positively influenced their attitudes



towards environmental sanitation. This suggests that digital media are viable tools for attitude change.

Discussion of Findings

Research question 1. *What is the level of exposure of Mangu residents to environmental sanitation messages on digital media?*

Finding one analysed the level of exposure of Mangu residents to environmental sanitation messages on digital media. Cumulatively, the study found that 270 (70.3%) of the respondents showed high level of exposure to environmental sanitation contents of digital media from daily to monthly, while (29.7%) rarely exposed themselves to environmental sanitation messages on digital media. This suggests that a good number of the respondents in Mangu LGA occasionally exposed themselves to environmental messages on digital media. The finding agrees with Adoga et al. (2023) who found high knowledge (89.7%) among residents exposed to sanitation information. This finding supports KAP model that knowledge is foundation for attitude change. The frequency of exposure to environmental sanitation messages on digital media aligns with the first stage of the Knowledge-Attitude-Practice model that posits regular knowledge input is prerequisite for attitude change. However, 29.7% of the respondents rarely exposed themselves to environmental sanitation messages.

Research Question 2. *How does the exposure to digital media messages influence the attitudes of Mangu residents?*

Table 2 examined the perceived influence of digital media messages on attitudes towards environmental sanitation in Mangu LGA. The result shows that all four items were accepted with means above the criterion mean of 2.5, with a grand mean of 3.23. This indicates that majority of respondents (over 82%) perceived digital media messages to positively influence their attitudes. Item i recorded the highest mean of 3.46 with 224 (58.3%) strongly agreeing that digital media messages make them value clean environment. This implies that digital media exposure has enhanced appreciation for clean surroundings among residents. This finding corroborates Ajisafe and Babaleye (2024) who reported a statistically significant association between frequency of exposure to media advocacy and improved attitudes toward ending open defecation, and Linus (2023) who found that exposure to broadcast media contents significantly shaped audience attitudes toward environmental sanitation in Nigeria. Similarly, Nwaerema et al. (2023) reported that perception of environmental sanitation communication practices was linked to waste management attitudes among Port Harcourt residents. Item ii (M=3.16) and Item iii (M=3.14) show that digital messages increase willingness to dispose waste properly and make residents disapprove open defecation. This aligns with Erubami (2022) who demonstrated that increased exposure to mass media messages was significantly associated with positive attitudes toward disease prevention and hygiene. Item iv (M=3.17) reveals that digital messages motivate participation in sanitation day, which is consistent with Hajri and Daife (2024) and Adikpo and Achakpa-Ikyo (2022) who noted that digital media campaigns increase youth participation in environmental programmes.

In relation to the theoretical framework, this finding validates the Knowledge, Attitude and Practice (KAP) theory as propounded by Schwartz (1976) and discussed by Kang and Bagaoisan (2024) in this study. The KAP theory postulates that knowledge is the foundation for attitude formation and practice change, but positive attitude does not automatically translate to practice without enabling factors. The positive attitudinal scores in Table 2 represent the second stage of



KAP formation resulting from knowledge gained through digital media exposure as reported in Table 1. As explained in this study, KAP is relevant because through educating people about environmental issues, digital media help in strengthening their understanding of the dangers of poor sanitation, which pushes them to accept positive attitudes.

Conclusion and Recommendations

The study found a high level of exposure to environmental sanitation messages on digital media and positive perceptions of their influence on attitudes towards sanitation. However, poor sanitation practices persist due to structural barriers. The study recommends that the Plateau Environmental Protection and Sanitation Agency intensify its digital campaigns through Facebook and WhatsApp; Mangu Local Government Area provide adequate waste bins and enforce sanitation laws; and non-governmental organisations subsidise toilet facilities for low-income households.

References

- Aderibigbe, S.A., Ayinde, O.G., Aluko, O.O., & Olorunfemi, O. (2021). Knowledge, attitude and practice of environmental sanitation among the residents of semi-urban community in North- Central of Nigeria. *Journal of Public Health and Epidemiology*, 13(1),45-53.
- Adikpo, J.A., & Achakpa-Ikyo, N. P. (2022). Social media alternative for health communication in Nigeria. In research Anthology on Health Literacy through Patient Communication and Mass Media (pp.453-468).
- Adoga, G. I., Adebowale, S. A., & Okafor, I. P. (2023). Knowledge, attitude and practice of environmental sanitation among secondary school students in Makurdi, Benue State, Nigeria. *Journal of Public Health in Africa*, 14(2), 2341. <https://doi.org/10.4081/jphia.2023.2341>
- Ajisafe, O., & Babaleye, T. (2024). Assessment of media advocacy against open defecation in South-West Nigeria. *British Journal of Mass Communication and Media Research*. <https://doi.org/10.52589/BJMCMR-QCDQVJNW>.
- Daramola, O., & Olowoporoku, O. (2016). Environmental sanitation practices in Osogbo, Nigeria: An assessment of residents' sprucing-up of their living environment. *Economic and Environmental Studies*, 16(4), 699-716.
- Erubami, J. A. (2022). Mass media exposure and Lassa fever knowledge, attitudes and practices in rural Nigeria. *Journal of Public Health and Development*, 20(1), 244-253. <https://doi.org/10.55131/jphd/2022/200119>
- Federal Ministry of Environment. (2023). *National Environmental Sanitation Policy*. Abuja: Federal Ministry of Environment.
- Federal Ministry of Water Resources, National Bureau of Statistics, & United Nations Children's Fund. (2021). Water, Sanitation and Hygiene: National Outcome Routine Mapping (WASH NORM) 2021 - A report of findings. Abuja: Federal Government of Nigeria.



- Hajri, O., & Daife, Y. (2024). The role of social media in engaging young people in environmental issues. *E3S Web of Conferences*, 477, 00079. <https://doi.org/10.1051/e3sconf/202447700079>
- Ichipi, E. B., & Senekane, M. F. (2023). An evaluation of the impact of illegal dumping of solid waste on public health in Nigeria: A case study of Lagos State. *International Journal of Environmental Research and Public Health*, 20(22), 7069. <https://doi.org/10.3390/ijerph20227069>
- Kang, K., & Bagaoisan, M. P. (2024). Research Status of the Knowledge-Attitude-Practice Theory Model in Gastric Cancer Prevention. *Cureus*, 16(7), 1-5. DOI 10.7759/cureus.64960.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610.
- Linus, E. O. (2023). Broadcast media contents in shaping audience attitude towards environmental sanitation in Nigeria. *Path of Science*. <https://doi.org/10.22178/pos.88-1>
- Mukherjee, S., & Ghosh, S. (2022). Role of social media in water, sanitation and hygiene behaviour change: A systematic review. *BMC Public Health*, 22, 1123. <https://doi.org/10.1186/s12889-022-13485-1>.
- National Bureau of Statistics. (2023). *Population projections for Plateau State: Mangu LGA estimate (2006 census base with annual growth rate)*. Abuja: National Bureau of Statistics.
- Nwaerema, P., Ikoro, J. N., Fred-Nwagwu, W. F., Jiya, S. N., Oye, I., Dangana, K., & Adama, C. K. (2023). Perception of environmental sanitation and communication practice in Port Harcourt, Rivers State, Nigeria. *British Journal of Multidisciplinary and Advanced Studies*, 4(2), 12-22. <https://doi.org/10.37745/bjmas.2022.0125 ff4e>
- Onazi, O., Gaiya, N. S., Ola-Adisa, E. O., & Mangden, Y. P. E. (2018). An appraisal of waste management practices in selected peri-urban communities in North Central Nigeria. *Journal of Scientific and Engineering Research*, 5(6), 349-359.
- Sadiq, Q. O., Ezeamaka, C. K., Daful, M. G., Anjide, T. W., Sani, H., & Ogbole, M. (2018). Sanitation practices in Kuchigworo and Garamajiji along airport road, Abuja. *Journal of Geography and Regional Planning*, 11(11), 172-182. <https://doi.org/10.5897/JGRP2018.0712>
- Schwartz, N. E. (1976). Nutrition knowledge, attitudes and practices of Canadian public health nurses. *Journal of Nutrition Education*, 8(1), 28-31. [https://doi.org/10.1016/S0022-3182\(76\)80055-8](https://doi.org/10.1016/S0022-3182(76)80055-8)
- WHO (2021). Drinking-water. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/drinking-water>



WHO and UNICEF. (2023). *Progress on household drinking water, sanitation and hygiene 2000-2022: Special focus on gender*. Geneva: World Health Organization. <https://washdata.org>.

WHO. (2018). *Guidelines on sanitation and health*. Geneva: WHO. WHO.int

AI Use Disclosure:

This study used Meta AI for enhancing clarity, paraphrasing sections of the literature review, and formatting references in APA 7th edition. However, AI tools were not employed for data collection, data analysis, or generation of research findings; all substantive content, interpretations, and conclusions remain the authors' own, and the authors assume full responsibility for the manuscript's accuracy, originality, integrity, and overall content.
