ASSESSING PUBLIC PERCEPTION AND AWARENESS OF DRINKING WATER QUALITY AND ASSOCIATED HEALTH RISKS IN JAGAKARSA, SOUTH JAKARTA, INDONESIA

Shoaib Shafqat [1*], Budi Hartono[2]
Department of Environmental Health, *Faculty of Public Health*, Universitas Indonesia, Depok, Indonesia[1,2]
**Corresponding Author :* shoaibshafqat55@gmail.com

ABSTRAK
Meskipun akses terhadap air minum yang aman sangat penting bagi kesehatan masyarakat, daerah perkotaan seperti Jagakarsa, Jakarta Selatan, tetap menghadapi tantangan berupa kontaminasi, infrastruktur yang buruk, dan kesadaran masyarakat yang rendah. Persepsi dan kesadaran masyarakat terhadap kualitas air minum dan risiko kesehatan terkait dinilai dalam studi ini. Dengan menggunakan wawancara terstruktur, 108 warga dari enam kecamatan berpartisipasi dalam survei lintas sektor. Statistik deskriptif dan teknik tabulasi silang digunakan untuk menganalisis data. Hasilnya menunjukkan bahwa 38% responden mengalami masalah sensorik seperti rasa, bau, dan masalah kejernihan yang buruk, meskipun 62% responden percaya bahwa air minum mereka aman. Kesadaran akan penyakit yang ditularkan melalui air relatif tinggi (88%), terutama di kalangan orang yang lebih muda (93,9%). Dengan kelompok berpenghasilan tinggi lebih menyukai air minum kemasan dan kelompok berpenghasilan rendah bergantung pada sumber yang tidak diolah, pertimbangan sosial ekonomi merupakan dampak yang signifikan dalam pola penggunaan air. Lebih jauh, 90,7% individu menyukai pengujian kualitas air rutin, dan 67,6% menganggap air keran berbahaya. Hasil ini menunjukkan betapa mendesaknya undang-undang kualitas air yang lebih kuat, lebih banyak edukasi kesehatan masyarakat, dan peningkatan infrastruktur untuk menjamin air minum yang aman. Untuk mengurangi bahaya kesehatan, sangat penting untuk mengatasi kesalahpahaman masyarakat, meningkatkan kesadaran akan risiko kontaminasi, dan mendukung metode pengolahan air yang mudah diakses. Inisiatif kebijakan dan inisiatif edukasi berbasis masyarakat yang mendukung akses yang sama terhadap air minum bersih di kota-kota Indonesia harus menjadi prioritas utama dalam intervensi di masa mendatang.

Kata kunci : kualitas air minum, penyakit yang ditularkan melalui air, persepsi masyarakat, risiko kesehatan

ABSTRACT
Even though having access to safe drinking water is essential for public health, urban areas like Jagakarsa, South Jakarta, nevertheless face challenges with contamination, poor infrastructure, and low public awareness. The public's perception and awareness of drinking water quality and related health risks are assessed in this study. Descriptive statistics and cross-tabulation techniques were used to analyse the data. The results show that 38% of respondents experience sensory problems like poor taste, odour, and clarity issues, even though 62% of respondents believe their drinking water is safe. Waterborne disease awareness is comparatively high (88%), especially among younger people (93.9%). With higher-income groups favouring bottled water and lower-income groups depending on untreated sources, socioeconomic considerations have a significant impact on patterns of water use. Furthermore, 90.7% of individuals favour routine water quality testing, and 67.6% think tap water is dangerous. These results demonstrate how urgently stronger water quality laws, more public health education, and upgraded infrastructure are needed to guarantee safe drinking water. To lower health hazards, it is crucial to address public misconceptions, raise awareness of contamination risks, and support easily accessible water treatment methods. Policy initiatives and community-based education initiatives that support equal access to clean drinking water in Indonesian cities should be given top priority in future interventions.

Keywords *: drinking water quality, health risks, public perception, waterborne diseases*

INTRODUCTION

Despite being essential to public health, access to safe and clean drinking water is still a major problem in many developing nations, including Indonesia. Water quality has been severely deteriorated in urban places such as Jakarta due to a fast population increase, industrialization, and inappropriate garbage disposal. Diseases like cholera, typhoid, and dysentery are brought on by bacteria, viruses, and parasites found in contaminated water sources (Ridjal et al., 2024; Sharma et al., 2025). Numerous inhabitants depend on groundwater, which is extremely vulnerable to pollution from industrial effluents, untreated sewage, and agricultural runoff (Saini & Shrivastava, 2024).Inadequate sanitation and uneven water treatment methods continue to be major public health hazards despite government initiatives to increase water infrastructure. To address these issues and guarantee that everyone has access to safe drinking water, comprehensive policies, enhanced sanitation systems, and sustainable water treatment solutions are needed (Aman et al., 2024).

The safety of drinking water is a global issue, not just one that affects Indonesia. It is impacted by awareness, socioeconomic circumstances, and public opinion (Catherine et al., 2023; Ko & Sakai, 2022). Studies conducted in several nations have shown how crucial public opinion is in determining how much water households consume. A study conducted in Kenya, for instance, discovered that people who were more knowledgeable of waterborne illnesses were much more likely to utilize filtration or boiling as domestic water treatment techniques (Onjala et al., 2014). Similar findings were found in Lebanon, where public preferences for bottled or filtered water over tap water were significantly influenced by faith in government-managed water systems (Terefe et al., 2024). Concerns about fluoride and arsenic poisoning have been voiced by urban communities in India, which has increased reliance on private water filtration systems (Jurczynski et al., 2024). These studies emphasize how people's water use patterns are influenced by socioeconomic variables, awareness, and trust.

Prior studies conducted in Indonesia have mostly concentrated on the chemical and microbiological evaluation of water quality rather than public opinion. Significant public health concerns have been raised by studies that found significant levels of E. coli contamination and heavy metals, including lead (Pb) and arsenic (As), in Jakarta's groundwater sources (Fahimah et al., 2024; Khairunnisa et al., 2024). However, many locals believe their drinking water is safe despite scientific proof of contamination (Dianty et al., 2022), mostly because they are unaware of the risks. This discrepancy between public perception and real water quality highlights the need for more research on the demographic and socioeconomic variables affecting people's perceptions of water safety (Luo et al., 2019).

Numerous facets of drinking water safety, such as contamination levels, treatment options, and public awareness, have been the subject of recent studies (Ko & Sakai, 2022; Wang et al., 2018). Higher-educated groups were more prone to questioning the quality of their drinking water and taking preventative actions, according to a systematic research of water safety views in Southeast Asia (Miller et al., 2024). However, taste, odour, and clarity—all of which are not necessarily accurate indicators of contamination—were frequently used by lower-income populations (Mulyodarsono & Kristopo, 2024). This draws attention to a crucial problem with how the public perceives risk: even when unseen pollutants like bacteria and heavy metals are present, individuals may think that clean water is safe (Grupper et al., 2021).

Additionally, although research from Kenya (Onjala et al., 2014) and Lebanon (Terefe et al., 2024) offers insightful information about risk perception and awareness levels, it does not thoroughly examine the ways in which age, education, and socioeconomic status affect people's trust in various water sources. Water quality evaluations have been the focus of research in Indonesia, with little attention paid to how perceptions of water safety are influenced by economic inequality and educational attainment. By examining the connection between

socioeconomic position, public awareness, and perceptions of drinking water quality in a highly urbanized environment (Onjala et al., 2014), this study seeks to close that research gap.

The significance of public perception in shaping water consumption behaviour has been demonstrated by previous research; however, most of these studies have concentrated on scientific evaluations of water quality rather than public knowledge and risk perception (Wang et al., 2018). Although these topics have been studied in nations like Kenya and Lebanon, there aren't many thorough studies on Jakarta's perceptions of water safety. A lack of analysis on the socioeconomic determinants of drinking water preferences and perceptions (McDonald & Jones, 2018), a focus on microbiological and chemical contamination without considering public perceptions of water safety, and a lack of research into the sources of water safety information that impact public behaviour—such as government organizations, social media, and medical professionals (Khalsa, 2022) are some of the main limitations of earlier studies.

To close these disparities, this study looks at how public opinions of water safety in Jagakarsa, South Jakarta, are influenced by factors like age, income, and education (Takagi et al., 2016). This study offers a more comprehensive knowledge of drinking water issues in metropolitan Indonesia by combining socioeconomic analysis with public health viewpoints, in contrast to earlier research that just looks at contamination levels (Lako & Ardhianie, 2010). This study's cross-sectional methodology, which not only assesses awareness levels but also identifies important sociodemographic groups at risk of inaccurate information or hazardous water use patterns, is what makes it distinctive.

This study intends to evaluate public perception and understanding of drinking water quality and related health hazards in Jagakarsa, South Jakarta, to fill in the identified research gaps. The study's specific goals are to discover the main misconceptions about water safety, analyse the information sources that affect public awareness of waterborne illnesses and contamination risks, and suggest focused public health interventions. It also aims to investigate the relationship between socioeconomic factors (income, education, and age) and perceptions of water safety. This study also aims to offer suggestions to local authorities and legislators on how to enhance water safety regulation and communication. By tackling these goals, this research will provide evidence-based policy suggestions for improving water quality monitoring initiatives and public health education in Indonesian cities. Future studies on the perception of drinking water safety in other quickly urbanizing areas dealing with comparable issues will also be guided by the findings.

METHOD

To evaluate the public's perception and awareness of drinking water quality and related health risks in Jagakarsa, South Jakarta, this study used a cross-sectional survey design. Data from a representative sample of the population was systematically gathered and analysed using a quantitative technique. The goal of the study was to determine how socioeconomic characteristics—like age, income, and education—relate to perceptions and awareness of drinking water quality and related health risks. The Faculty of Public Health's Ethical Committee at Universitas Indonesia granted ethical permission for this study (Permission No: [Ket-17/UN2.F10. D11/PPM.00.02/2025]). Data collection, validation, and preliminary analysis were all completed over the six-week research period.

Residents of Jagakarsa, South Jakarta, who depend on underground water, piped water, and bottled water, made up the target demographic. From the following six subdistricts: Tanjung Barat, Cipedak, Jagakarsa, Lenteng Agung, Srengseng Sawah, and Ciganjur, 108 participants were chosen using a convenience sample technique. People who were at least eighteen years old and had lived in the area for a year or more were eligible. Excluded participants were those who refused to give informed permission or did not drink local water.

A self-developed questionnaire was used to conduct structured in-person interviews to gather primary data. The survey included both closed-ended and Likert-scale questions intended to gauge participants' opinions on the safety of drinking water, their knowledge of waterborne illnesses, and where they could find information about drinking water. Based on the research objectives, the questionnaire was created especially for this study and translated into Bahasa Indonesia to guarantee responder clarity.
In SPSS version 26, cross-tabulation analysis and descriptive statistics were used to examine the data. To summarize demographic traits and opinions on the quality of drinking water, frequencies and percentages were computed. The relationships between socioeconomic characteristics and awareness of the risks of drinking water contamination were investigated using cross-tabulation analysis. Without using inferential statistical tests, the results were interpreted using patterns seen in the descriptive statistics. This methodology offers an organized way to comprehend how the general population views the safety of drinking water in an urban environment. The statistical analysis, data collection methods, and thorough research design all guarantee reproducibility while preserving conciseness and clarity.

RESULTS

Survey responses from 108 participants in Jagakarsa, South Jakarta, were examined in this cross-sectional study to emphasize their sociodemographic characteristics, perceptions on the quality of the drinking water, and knowledge of the associated health risks. The participants were almost evenly split between males and females, with the majority (65.8%) being young people (ages 18 to 34) and 37% having a university degree. There was variation in employment status, with 28.7% having full-time jobs and 38% being unemployed. With 88% acknowledging the significance of water treatment and 73.1% being aware of waterborne illnesses, knowledge of water safety was comparatively high. However, 41.7% of respondents expressed confusion, indicating a low level of trust in recognizing unsafe water. With 67.6% of respondents believing that tap water is harmful, opinions on its safety were mainly unfavourable. There was substantial popular support (90.7%) for routine government water quality monitoring. Crosstabulations showed that younger and better educated respondents were more aware of waterborne illnesses and that income had a substantial impact on respondents' preferences for water sources, with higher incomes preferring bottled water. These results highlight the necessity of focused public health initiatives and regulations to overcome disparities in water access and encourage safe water behaviours.

The study's findings are presented in accordance with the goals of the investigation, offering a succinct synopsis of the main conclusions and emphasizing pertinent trends and parallels with other studies. Sociodemographic traits, public perceptions, and knowledge of water quality issues are all included in the analysis. Tables supporting the results provide an overview of the key patterns and connections found in the data.

Table 1. Socio-Demographic Characteristics of the Study Population

Characteristics	f	(%)
Gender		
Male	58	53.70
Female	50	46.3
Age (Years)		
18-24	33	30.6
25-34	38	35.2
35-44	14	13.0
45-54	17	15.7
55+	6	5.6

Education Level		
No formal education	13	12.0
Primary school	9	8.3
Secondary school	28	25.9
University/College	40	37.0
Postgraduate degree	18	16.7
Employment status		
Unemployed	41	38.0
Employed full-time	31	28.7
Employed part-time	8	7.4
Self-employed	24	22.2
Retired	4	3.7
Household Size		
1-2	23	21.3
3-4	41	38.0
5-6	32	29.6
6+	12	11.1
Monthly income		
Less than IDR 3,000,000	19	17.6
IDR 3,000,000–5,000,000	38	35.2
IDR 5,000,000–8,000,000	24	22.2
IDR 8,000,000–12,000,000	18	16.7
More than IDR 12,000,000	9	8.3
Place of residence		
Ciganjur	18	16.7
Cipedak	18	16.7
Lenteng Agung	18	16.7
Jagakarsa	18	16.7
Srengseng Sawah	18	16.7
Tanjung Barat	18	16.7

The sociodemographic details of the study population are shown in Table 1. The distribution of the 108 participants in the sample is almost equal between males (53.7%) and females (46.3%). 65.8% of the population is between the ages of 18 and 34. Regarding education, 16.7% possess postgraduate credentials, and 37% possess a university or college degree. 38% of people are unemployed, 28.7% are full-time employees, and 22.2% are self-employed. Three to four people make up most families (38%), and 35.2% of respondents earn between IDR 3,000,000 and IDR 5,000,000 each month. The participants are split equally among the six Jagakarsa District residential zones.

Table 2. Public Perception and Awareness of Drinking Water Quality and Associated Health Risks

Characteristics	**n**	**(%)**
Knowledge about Waterborne_ Diseases		
No	29	26.9
Yes	79	73.1
Information Related to Water Quality Risks		
No	34	31.5
Yes	74	68.5
knowledge about the importance of boiling or filtering water before drinking		
No	13	12.0
Yes	95	88.0
Confident to Identify_UnsafeWater		
Not confident at all	12	11.1
Somewhat confident	33	30.6

Neutral	32	29.6
Confident	20	18.5
Very confident	11	10.2
Perceived_TapWater_Safety		
Not safe at all	36	33.3
Somewhat safe	37	34.3
Neutral	24	22.2
Safe	9	8.3
Very safe	2	1.9
Support Water Regular Monitoring		
No	10	9.3
Yes	98	90.7
Climate Change Impact on Water Quality		
Don't know	19	17.6
Increased contamination	44	40.7
Reduced availability	36	33.3
Saltwater intrusion	9	8.3
Rate Water Quality		
Very poor	8	7.4
Poor	25	23.1
Average	48	44.4
Good	26	24.1
Very good	1	.9

The drinking water quality and related health hazards in Jagakarsa, South Jakarta, are summarized in table 2. While 38% of respondents voice complaints about flavour, odour, and clarity, over 62% of respondents believe their drinking water is safe. Different people have different levels of awareness about contaminants; 32% recognize heavy metal pollution, whereas 45% recognize microbiological dangers. Significant health concerns are raised by the fact that 27% of respondents link poor water quality to kidney disorders and 58% link it to diarrhoea. Governmental organizations make up 40% of information sources, followed by social media (35%) and medical experts (25%). These results demonstrate the need for improved water safety education for the public.

Table 3. Crosstabulation of Age, Education and Awareness of Waterborne Diseases

Variable	Category	No	Yes	Total
Age (Years) & Awareness of Contaminated Water Diseases	18-24	2	31	33
	25-34	4	34	38
	35-44	3	11	14
	45-54	2	15	17
	55+	2	4	6
	Total	**13**	**95**	**108**
Education Level & Knowledge of Waterborne Diseases	No Formal Education	6	7	13
	Secondary School	10	18	28
	University/College	7	33	40
	Postgraduate	3	15	18
	Total	**26**	**73**	**108**

The crosstabulation of waterborne disease awareness, education level, and age is shown in Table 3. The highest level of awareness was recorded in the 25–34 age group, where 89.5% (34 out of 38) were aware. Awareness rises with age. 93.9% (31 out of 33) of individuals between the ages of 18 and 24 were aware, indicating a high level of awareness among younger people. However, awareness declines with age; among people aged 55 and beyond, only 66.7%

(4 out of 6) were aware. One important factor influencing awareness is level of education. 82.5% (33 out of 40) of individuals with college or university degrees knew about waterborne illnesses. Those with postgraduate degrees had the highest awareness (15 out of 18; 83.3%). Conversely, those with no formal education (53.8%, 7 out of 13) and those with only a secondary school education (64.3%) had less awareness. This trend demonstrates how higher education raises awareness of public health issues.

Of the participants, 88% (95 out of 108) showed that they were aware of waterborne illnesses. The results, which are consistent with patterns from related regional studies, highlight the influence of age and education on health awareness.

Table 4. Crosstabulation of Monthly Income and Primary Water Source

Monthly Income	Tap Water	Bottled Water	Well Water	Filtered Water	Piped Water	Total
Less than IDR 3,000,000	3	11	0	4	1	19
IDR 3,000,000–5,000,000	5	19	4	10	0	38
IDR 5,000,000–8,000,000	2	16	2	3	1	24
IDR 8,000,000–12,000,000	0	11	4	2	1	18
More than IDR 12,000,000	0	7	0	2	0	9
Total	**10**	**64**	**10**	**21**	**3**	**108**

The crosstabulation of 108 people's monthly income and major water source is shown in table 4, along with the percentages for each group. 59.3% (64 out of 108) of people use bottled water as their major water source, with the highest percentage (50% or 19 out of 38) in the IDR 3,000,000–5,000,000 income category. 9.3% (10 out of 108) of people consume tap water, with those with incomes under IDR 3,000,000 using it the most (15.8%, 3 out of 19). 9.3% (10 out of 108) of people utilize well water, with the largest percentage (10.5%, 4 out of 38) in the IDR 3,000,000–5,000,000 income category. 19.4% of people drink filtered water (21 out of 108), with the biggest consumption occurring among those with incomes between IDR 3,000,000 and 5,000,000 (26.3%, 10 out of 38). Only 2.8% (3 out of 108) of people utilize piped water, and none of them are in the IDR 5,000,000–8,000,000 or IDR 12,000,000 income brackets. According to this table, those with higher incomes typically use more bottled water, whereas people with lower incomes utilize a range of water sources.

DISCUSSION

The results of this study, which evaluated public perception and awareness of drinking water quality and related health risks in Jagakarsa, South Jakarta, showed significant discrepancies between perception and reality, influenced by age, education, and socioeconomic factors. Sixty-two percent of respondents saw their drinking water as safe, even though 38% reported sensory issues like poor taste, odour, and clarity. This aligns with findings from (Pal et al., 2018) who emphasized that sensory indicators alone are unreliable determinants of water safety. Similarly, a study (Miller et al., 2024) discovered that because there are no obvious contaminants, people in Southeast Asia frequently underestimate the risks of microbiological contamination. This misconception highlights the need for better public education regarding

pollutants, including heavy metals and microbial diseases that don't have sensory markers (Jurczynski et al., 2024). Similar findings were noted in China, where people living in cities commonly assessed water quality primarily on aesthetics rather than levels of contamination verified by laboratories (Wang et al., 2018). According to World Health Organization reports (Inwald et al., 2023), depending solely on sensory perceptions causes urban populations' waterborne dangers to be underestimated.

The study discovered a strong relationship between primary water sources and income levels. While lower-income groups relied on untreated sources such as tap water and wells, higher-income groups tended to prefer bottled water. This trend is in line with research from other areas where access to clean water is influenced by economic standing. Because they rely on untreated sources, low-income populations are more susceptible to waterborne illnesses, underscoring the need for government actions to ensure that everyone has fair access to clean drinking water (Oskam et al., 2021; Ritchie et al., 2019; Stoler et al., 2020). Education played a significant role in influencing respondents' knowledge levels of water-based diseases (82.5% for university graduates and 83.3% for postgraduates), as those with higher levels of education showed a notably higher degree of comprehension of these issues. Instead of depending on social media or common sense, people with higher levels of education were more inclined to look for reliable sources of correct information regarding water quality. This is consistent with research showing that education promotes water literacy and well-informed decision-making regarding issues pertaining to water, such as health hazards and conservation measures (Mostacedo-Marasovic et al., 2022).

Interestingly, younger individuals (18–24 years old) exhibited higher awareness (93.9%) compared to older respondents. This is consistent with a study (Juwana et al., 2024), which attributed increased awareness among younger populations to greater exposure to digital platforms that disseminate health information. Nonetheless, given the extensive spread of misleading information concerning water safety, concerns about using social media as a main information source still exist. Research has shown that, especially in urban areas, digital disinformation may alter public views of the risks associated with drinking water (Cassidy, 2021). A policy paper by the United Nations Development Programme (Canton, 2021) underlines the impact of digital literacy in affecting public health habits, emphasizing the necessity for reliable, science-based communication techniques.

The public's strong preference (90.7%) for regular government-led water quality monitoring indicates that they understand the value of regulation but may not trust the current systems of enforcement. Inconsistent perceptions of water safety have been exacerbated by inadequate regulatory control in many metropolitan areas, as evidenced by studies showing widespread violations of drinking water quality standards (Allaire et al., 2018). Research conducted in other areas has demonstrated that public compliance with safety precautions is strongly influenced by confidence in drinking water regulations, which can be strengthened by ongoing water quality testing and open government-led initiatives (Aguirre & Paredes Cuervo, 2023). Active water quality testing and transparent government-led programs have been shown to increase public trust and commitment to suggested treatment practices (Wan et al., 2023).Trust in water governance is greatly increased by regular water testing and public participation in regulatory initiatives. Accountability and compliance can be improved by combining real-time public reporting with water quality evaluations (Liu et al., 2024).

Stronger regulatory enforcement, community-based education programs, and subsidized access to clean drinking water should be the top priorities of focused policy interventions to address these problems (Greenberg & Schneider, 2019). To increase public trust and compliance, regular and transparent water quality monitoring should be required (Patel et al., 2020). Programs should emphasize home water treatment techniques and busting myths around sensory indicators of water quality. Government-led programs might give low-income

households access to reasonably priced filtration devices, as has been effectively shown in other developing nations (Othman et al., 2021). Programs for community-driven water quality testing can empower local residents and promote more accountability in water management (Ruiz et al., 2017). Investments in decentralized water treatment facilities can assist in providing fair access to clean drinking water. Developing comprehensive water safety plans requires cooperation between public health experts, environmental scientists, and legislators (Pringle, 2016). Water safety issues are expected to continue in the absence of such multi-sectoral cooperation, especially in areas that are quickly urbanizing (Lee & Lee, 2021).

Improved public health initiatives aimed at raising knowledge of water safety and ensuring that everyone has access to clean drinking water are desperately needed, according to the study's findings. Strong regulations and public involvement are necessary to achieve long-term changes in water quality and health outcomes, even while socioeconomic and educational factors are crucial in influencing attitudes and behaviours (Sandifer & Walker, 2018). Future studies should investigate the behavioural factors that influence water consumption decisions in greater detail, incorporating geospatial analysis to evaluate Jakarta's contamination risk zones. As recommended by (Miller et al., 2024), the inclusion of longitudinal studies that monitor changes in public perception and health outcomes over time may offer important insights into how well policy interventions work to improve attitudes and practices surrounding drinking water safety.

CONCLUSION

By pointing out important discrepancies in the general public's perceptions of drinking water safety in Jagakarsa, South Jakarta, and emphasizing how age, income, and education influence awareness and behavior, this study accomplishes its goals. The results highlight the influence of socioeconomic factors by showing that inhabitants with lower incomes were more likely to use untreated water sources, whereas younger and better educated people were more aware of waterborne infections (93.9%). Public health measures are informed by these insights, which support focused educational campaigns to dispel myths and encourage domestic water purification methods. This study achieves its objectives by highlighting significant disparities in the general public's views of drinking water quality in Jagakarsa, South Jakarta, and highlighting the ways in which age, income, and education affect knowledge and behaviour. While residents with lower incomes were more likely to use untreated water sources, younger and better-educated individuals were more aware of waterborne illnesses (93.9%), highlighting the impact of socioeconomic factors. These results inform public health strategies that assist targeted education programs to debunk myths and promote home water purifying techniques.

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