

## **Association Between Cholera Knowledge and Hygiene Practices Among Residents of Informal Settlements in Ibadan, Nigeria**

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### **Abstract**

**Introduction:** Cholera remains a major public health challenge in low-resource urban settings, particularly in informal settlements where poor sanitation, unsafe water, and inadequate hygiene practices increase transmission risk. Knowledge of cholera is considered a key determinant of preventive behaviour, yet its influence on WASH practices in densely populated urban slums remains insufficiently explored in Ibadan, Nigeria.

**Aim:** This study assessed the association between cholera knowledge and WASH practices among residents of informal settlements in Ibadan, Nigeria.

**Methods:** A community-based cross-sectional study design was employed among residents of selected informal settlements. Data were collected using a structured questionnaire and analyzed using descriptive statistics, Chi-square test, and multivariate logistic regression. Statistical significance was set at  $p < 0.05$ .

**Results:** The study found that 66.9% of respondents had good WASH practices, while 49.6% had poor knowledge of cholera. A significant association was observed between cholera knowledge and WASH practices ( $\chi^2 = 24.64$ ,  $p < 0.001$ ), with the proportion of good practices increasing with improved knowledge levels. Multivariate analysis showed that respondents with fair knowledge (AOR = 0.42; 95% CI: 0.29–0.67) and good knowledge (AOR = 0.26; 95% CI: 0.13–0.52) were significantly less likely to exhibit poor WASH practices compared to those with poor knowledge. Other socio-demographic factors were not significant predictors after adjustment.

**Conclusion:** Cholera knowledge is a significant determinant of WASH practices among residents of informal settlements in Ibadan. However, sustained improvements in hygiene behaviour require integrated interventions that combine health education with improvements in water and sanitation infrastructure.

**Keywords:** *Cholera knowledge, WASH practices, informal settlements, hygiene behaviour, Ibadan, Nigeria, water and sanitation.*

## Introduction

### Background of the Study

In many low and middle-income countries, cholera continues to pose a serious public health threat, particularly in communities where access to safe water, adequate sanitation, and proper hygiene is limited. The disease is an acute diarrhoeal infection caused by ingestion of food or water contaminated with *Vibrio cholerae* [1]. It spreads mainly through the faecal-oral route and is strongly associated with poor environmental sanitation and unsafe hygiene conditions [2]. Globally, cholera disproportionately affects populations living in overcrowded and underserved environments. In Africa, recurring outbreaks are driven by weak water and sanitation systems, flooding, rapid urbanisation, and limited access to basic health services [3]. Nigeria has remained one of the countries with a high cholera burden, recording repeated outbreaks over time. These outbreaks are largely linked to poverty, inadequate Water, Sanitation and Hygiene (WASH) infrastructure, and persistent environmental health challenges [4].

In Oyo State, cholera remains a public health concern, with the Nigeria Centre for Disease Control continuing to report cases in recent years. Within Ibadan, informal settlements are particularly at risk due to overcrowding, poor drainage systems, unsafe water sources, improper waste disposal, and inadequate sanitation facilities. These conditions create a favourable environment for the transmission of cholera and other waterborne diseases. Evidence from studies conducted in Ibadan shows that environmental sanitation challenges play a major role in cholera risk. Contaminated water sources, absence of hygienic toilet facilities, and ineffective waste management practices have been identified as key contributors to outbreaks in informal settlements [5]. These risks are often heightened during rainfall periods when flooding increases the spread of contaminants.

Beyond environmental factors, individual behaviour is also critical in cholera prevention. Knowledge of cholera (its causes, transmission routes, symptoms, and preventive measures) has been shown to influence hygiene behaviour and risk perception [6]. Individuals with adequate knowledge are more likely to practice regular handwashing, use safe water sources, maintain food hygiene, and dispose of waste properly [7]. Conversely, poor knowledge may result in unsafe hygiene practices that increase exposure to infection [8]. Although environmental determinants of cholera have been widely studied, less attention has been given to behavioural factors, particularly the relationship between cholera knowledge and hygiene practices among residents of informal settlements. Understanding this relationship is important because knowledge-driven behaviour change is central to disease prevention in high-risk urban settings.

This study therefore examines the association between cholera knowledge and hygiene practices among residents of informal settlements in Ibadan, Nigeria. The findings are expected to provide evidence for strengthening health education strategies and improving WASH interventions aimed at reducing cholera transmission in vulnerable communities.

### Literature Review

#### Global Epidemiology of Cholera

Cholera remains a major public health problem globally, particularly in low- and middle-income countries with inadequate water, sanitation, and hygiene (WASH) services. The World Health Organization estimated that 1.3-4 million cholera cases and 21,000-143,000 deaths occur annually worldwide [9]. The disease is endemic in many countries across Africa and Asia, with recent increases in outbreaks linked to poverty, displacement, flooding, and poor sanitation [10].

#### Cholera Burden in Africa and Nigeria

Africa bears the highest burden of cholera globally, with sub-Saharan Africa accounting for most cholera-

related deaths [11]. Recurrent outbreaks in the region have been associated with overcrowding, unsafe water, poor sanitation, rapid urbanization, and weak healthcare systems [12]. Nigeria remains one of the countries most affected by cholera in Africa, recording repeated outbreaks since 1970 [13]. Recent outbreaks have been linked to inadequate sanitation, flooding, poor waste management, and limited access to safe drinking water [14]. In Oyo State, recurring cholera cases continue to pose public health concerns, particularly within densely populated informal settlements [15].

#### Cholera Knowledge and Hygiene Practices

Cholera is transmitted mainly through the faecal–oral route via contaminated food and water [16]. Poor sanitation, contaminated water sources, and inadequate hygiene practices contribute significantly to disease transmission, especially in informal settlements. Knowledge of cholera plays an important role in shaping preventive behaviours. Individuals with adequate knowledge of cholera causes, symptoms, transmission, and prevention are more likely to adopt proper hygiene practices such as regular handwashing, safe water handling, proper food hygiene, and appropriate waste disposal [17]. Studies in Nigeria have shown that improved cholera knowledge is associated with better hygiene behaviour and increased adoption of preventive practices [18]. However, poor hygiene practices remain common in informal settlements due to inadequate WASH facilities and low health awareness. In Ibadan, overcrowding, poor waste disposal, and limited access to sanitation facilities have been identified as major environmental health challenges [19].

## Materials and Methods

### Study Area

Ibadan is one of the largest cities in West Africa and serves as the capital of Oyo State, Nigeria. It is administratively divided into eleven Local Government Areas (LGAs), with a significant proportion of the population residing in densely populated and unplanned urban settlements [20]. The city is characterized by rapid urbanization, overcrowding, and uneven access to basic urban services, including potable water, sanitation facilities, and waste management systems [21]. These conditions are more pronounced in informal settlements, where infrastructural development is limited and population density is high. Within Ibadan, informal and high-density settlements are particularly concentrated in Ibadan North, Ibadan South-East, and Ibadan South-West LGAs, which form part of the core metropolitan area of the city [22]. These areas are commonly associated with inadequate housing, poor drainage systems, and limited access to improved water and sanitation services, making them highly vulnerable to waterborne diseases.

### Study Design

A community-based cross-sectional study design was employed to assess the association between cholera knowledge and hygiene practices among residents of informal settlements in Ibadan, Nigeria.

### Study Population

The study population comprised residents aged 15 years and above living in selected informal settlements within Ibadan. Only individuals who had resided in the study area for at least six months prior to data collection were eligible to participate.

### Sampling Procedure and Sample size

A multistage sampling technique was used to select study participants. In the first stage, LGAs with a high concentration of informal settlements were identified within Ibadan metropolis, and one LGA was selected through simple random sampling. In the second stage, selected communities within the LGA were randomly chosen. Systematic sampling was subsequently used to select households within each community. One eligible respondent was selected from each household for interview. A minimum sample size of 384 respondents was used for the study.

### Data Collection

Data were collected using a structured interviewer-administered questionnaire. The questionnaire obtained information on socio-demographic characteristics, cholera knowledge, and hygiene practices.

The cholera knowledge section assessed respondents' awareness of cholera, causes, modes of transmission, symptoms, and preventive measures. The hygiene practices section assessed behaviours such as handwashing practices, water treatment and storage, food hygiene, waste disposal methods, and sanitation facility use. Trained research assistants administered the questionnaires to ensure accuracy and consistency of data collection.

#### Ethical Consideration

Ethical approval was obtained from the appropriate health research ethics committee in Oyo State, Nigeria. Informed consent was obtained from all participants prior to data collection, and confidentiality of information was strictly maintained throughout the study.

#### Data Analysis

Data were entered, cleaned, and analyzed using appropriate statistical software. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize the data. Chi-square analysis was used to examine the association between cholera knowledge and hygiene practices among respondents. Logistic regression analysis was further conducted to identify predictors of good hygiene practices. Statistical significance was set at  $p < 0.05$ .

## Result and discussion

### Result

Table 1 presents the socio-demographic, water, sanitation, and environmental characteristics of respondents. Most household heads were aged 35–49 years (33.46%), followed by those aged  $\geq 60$  years (29.92%) and 50–59 years (24.02%), while 12.6% were aged  $\leq 34$  years. The majority were male (65.35%). Regarding education, 46.65% had secondary education, 27.56% primary education, 13.39% had no formal education, and 12.4% had tertiary education. Trading and market vending was the most common occupation (41.54%), followed by artisans (20.47%), while other occupations were less represented. Islam was the dominant religion (58.66%), followed by Christianity (36.22%). About half of the households (50.2%) had 4–6 members, while 28.15% had  $\leq 3$  members and 21.65% had  $\geq 7$  members. Nearly half (44.88%) had no under-five children, while 30.12% had one child and 25% had two or more. Over half of respondents (51.77%) lived in multiple rooms within shared compounds, while 32.68% lived in single rooms.

For water characteristics, borehole/tube wells were the most common source (34.65%), followed by protected wells (30.91%) and piped water (6.3%). Most households (76.97%) used improved water sources, and 83.46% spent less than 30 minutes collecting water. However, 53.54% did not treat their drinking water. Among those who treated water, chlorination was most common (57.2%). Most households (95.28%) stored water in covered containers. In terms of sanitation, pit latrines were most used (46.65%), followed by flush toilets (30.31%), while 8.27% practiced open defecation. Most households (77.76%) shared sanitation facilities [23], [24]. Only 17.91% had handwashing facilities, though 93.41% of those had soap available. Waste disposal was mainly by burning (43.31%), followed by open dumping (24.02%) and formal collection (23.82%). About 66.73% reported functional drainage, while 31.30% observed stagnant water around their homes.

**Table 1: Socio-demographic, Water, Sanitation and Hygiene Characteristics of Respondents**

Variables	Category	Frequency (n=508)	Percentage (%)
Age of Household Head	$\leq 34$ years	64	12.6
	35–49 years	170	33.5
	50–59 years	122	24.0
	$\geq 60$ years	152	29.9
Sex of Household Head	Male	332	65.4

Variables	Category	Frequency (n=508)	Percentage (%)
Level of Education	Female	176	34.6
	No formal education	68	13.4
	Primary	140	27.6
	Secondary	237	46.7
	Tertiary	63	12.4
Occupation	Farming	41	8.1
	Trading	211	41.5
	Artisan	104	20.5
	Civil service	53	10.4
	Private sector	54	10.6
	Others	45	8.9
Household Size	≤3	143	28.2
	4–6	255	50.2
	≥7	110	21.6
Under-five Children	None	228	44.9
	One	153	30.1
	≥2	127	25.0
<b>Water and Hygiene Characteristics</b>			
Main Drinking Water Source	Piped water	32	6.3
	Borehole/tube well	176	34.6
	Protected well	157	30.9
	Unprotected well	41	8.1
	Surface water	12	2.4
	Vendor	90	17.7
Improved Water Source	Yes	391	77.0
	No	117	23.0
Water Treatment	Yes	236	46.5
	No	272	53.5
Storage of Drinking Water	Covered container	484	95.3
	Uncovered container	24	4.7
Handwashing Facility in House	Yes	91	17.9
	No	417	82.1
<b>Sanitation and Environmental Conditions</b>			
Type of Toilet Facility	Flush toilet	154	30.3
	Ventilated improved pit	75	14.8
	Pit latrine	237	46.7
	Open defecation	42	8.3

Variables	Category	Frequency (n=508)	Percentage (%)
Shared Sanitation Facility	Yes	395	77.8
	No	113	22.2
Feces Around House	Yes	52	10.2
	No	456	89.8
Drainage Condition	Functional	339	66.7
	Blocked	71	14.0
	None	98	19.3
Stagnant Water Presence	Yes	159	31.3
	No	349	68.7

Table 2 presents the distribution of respondents by health outcomes, care-seeking behaviour, cholera-related knowledge, and WASH practices. The majority of respondents (81.1%) reported no episode of watery diarrhoea in the preceding three months, while 18.9% reported having experienced diarrhoea. Among those who experienced diarrhoea, 81.25% sought treatment, whereas 18.75% did not seek care. In terms of place of treatment, most respondents (65.38%) utilized public health facilities. Others sought care from pharmacies (20.51%), private clinics (6.41%), traditional healers (3.85%), and other sources (3.85%). Regarding clinical symptoms, 11.81% of respondents reported vomiting. Signs of dehydration were also reported, including sunken eyes (10.83%), thirst (3.74%), and lethargy (0.79%), while the majority (84.65%) reported no such symptoms [25].

WASH assessment showed that 66.93% of respondents demonstrated good hygiene practices, while 33.07% had poor practices. However, cholera knowledge was generally low, as 49.61% had poor knowledge, 33.46% had fair knowledge, and only 16.93% demonstrated good knowledge. Perceived cholera risk was relatively low among respondents, with 63.58% classifying themselves as low risk, while 36.42% perceived a high risk of infection.

Table 2: Health Outcomes, Care-Seeking Behaviour, WASH Practices and Cholera Knowledge of Respondents

Variables	Category	Frequency (n=508)	Percentage (%)
<b>Recent watery diarrhoea (past 3 months)</b>	Yes	96	18.9
	No	412	81.1
<b>Care sought for diarrhoea</b>	Yes	78	81.3
	No	18	18.7
<b>Type of care facility used</b>	Public health facility	51	65.4
	Private clinic	5	6.4
	Pharmacy	16	20.5
	Traditional healer	3	3.9
	Others	3	3.9
<b>Experience of vomiting</b>	Yes	60	11.8
	No	448	88.2
<b>Signs of dehydration observed</b>	Sunken eyes	55	10.8
	Excessive thirst	19	3.7
	Lethargy	4	0.8

Variables	Category	Frequency (n=508)	Percentage (%)
WASH practices	None	430	84.7
	Good practices	340	66.9
	Poor practices	168	33.1
Knowledge of cholera	Poor knowledge	252	49.6
	Fair knowledge	170	33.5
	Good knowledge	86	16.9
Perceived cholera risk	Low risk	323	63.6
	High risk	185	36.4

Table 3 presents the association between cholera knowledge and WASH practices among respondents. The result of the Chi-square test revealed a statistically significant association between level of cholera knowledge and WASH practices ( $\chi^2 = 24.64$ ,  $p < 0.001$ ). Respondents with poor knowledge of cholera had a lower proportion of good WASH practices (57.1%) compared to those with fair knowledge (72.9%) and good knowledge (83.7%). Conversely, poor WASH practices were more common among respondents with poor knowledge (42.9%) than among those with fair (27.1%) and good knowledge (16.3%) [26].

**Table 3: Association between Cholera Knowledge and WASH Practices among Respondents**

Variable	WASH Practice		$\chi^2$	p-value
	Good Practice n (%)	Poor Practice n (%)		
<b>Knowledge of Cholera</b>				
Poor knowledge	144 (57.1)	108 (42.9)	24.64	<0.001
Fair knowledge	124 (72.9)	46 (27.1)		
Good knowledge	72 (83.7)	14 (16.3)		

Table 4 presents the multivariate logistic regression analysis of factors associated with WASH practices among respondents. The findings showed that knowledge of cholera was a strong and statistically significant predictor of WASH practices. Respondents with fair knowledge had significantly lower odds of poor WASH practices compared to those with poor knowledge (AOR = 0.42; 95% CI: 0.29–0.67;  $p < 0.001$ ). Similarly, respondents with good knowledge were even less likely to engage in poor WASH practices (AOR = 0.26; 95% CI: 0.13–0.52;  $p < 0.001$ ). Household head age and sex were not significantly associated with WASH practices in the adjusted model. Although respondents aged 35–49, 50–59, and  $\geq 60$  years showed slightly higher odds of poor WASH practices compared to those aged  $\leq 34$  years, these differences were not statistically significant ( $p > 0.05$ ). Likewise, female-headed households had lower odds of poor WASH practices compared to male-headed households (AOR = 0.80; 95% CI: 0.51–1.27), but this association was not significant ( $p = 0.342$ ).

Level of education did not independently predict WASH practices after adjustment. Although respondents with primary, secondary, and tertiary education showed reduced odds of poor WASH practices compared to those with no formal education, these associations were not statistically significant ( $p > 0.05$ ) [27]. Occupation was a significant determinant of WASH practices. Compared to respondents engaged in farming/agriculture, traders/market vendors had significantly higher odds of poor WASH practices (AOR = 2.51; 95% CI: 1.12–5.60;  $p = 0.025$ ), whereas civil/public servants had significantly lower odds of poor WASH practices (AOR = 0.21; 95% CI: 0.05–0.83;  $p = 0.029$ ). Religion was not significantly associated

with WASH practices in the adjusted model, although respondents in the “other” religious category showed a higher likelihood of poor practices (AOR = 2.45; 95% CI: 0.95–6.31;  $p = 0.064$ ). Household size and number of under-five children were also not significant predictors, with all categories showing  $p$ -values greater than 0.05. Type of dwelling was a significant determinant of WASH practices. Compared to respondents living in single-room accommodations, those in multiple-room shared compounds had significantly lower odds of poor WASH practices (AOR = 0.57; 95% CI: 0.36–0.90;  $p = 0.017$ ) [28]. Similarly, respondents living in self-contained apartments (AOR = 0.12; 95% CI: 0.04–0.38;  $p < 0.001$ ) and detached houses (AOR = 0.32; 95% CI: 0.10–0.98;  $p = 0.046$ ) were significantly less likely to exhibit poor WASH practices.

**Table 4: Multivariate Logistic Regression Analysis of Factors Associated with WASH Practices among Respondents**

Variable	Model I			Model II		
	OR	95% CI	p-value	AOR	95% CI	p-value
<b>Knowledge of cholera</b>						
Poor	1			1		
Fair	0.49	0.32–0.75	0.001	0.42	0.29–0.67	<0.001
Good	0.26	0.14–0.48	<0.001	0.26	0.13–0.52	<0.001
<b>Household head age</b>						
≤34 years				1		
35–49 years				1.37	0.63–2.97	0.429
50–59 years				1.24	0.53–2.91	0.616
≥60 years				1.38	0.61–3.16	0.442
<b>Household head sex</b>						
Male				1		
Female				0.80	0.51–1.27	0.342
<b>Education level</b>						
No formal education				1		
Primary school				0.66	0.33–1.30	0.231
Secondary school				0.90	0.46–1.78	0.767
Tertiary education				0.60	0.22–1.65	0.322
<b>Occupation</b>						
Farming/Agriculture				1		
Trading/Market vendor				2.51	1.12–5.60	0.025
Artisan				1.88	0.78–4.53	0.157
Civil/Public service				0.21	0.05–0.83	0.029
Private sector employment				0.85	0.31–2.35	0.755
Others				1.66	0.60–4.60	0.326
<b>Religion</b>						
Christianity				1		
Islam				1.24	0.78–1.97	0.365
Others				2.45	0.95–6.31	0.064
<b>Household size</b>						
≤3				1		

Variable	Model I			Model II		
	OR	95% CI	p-value	AOR	95% CI	p-value
4–6				0.86	0.50–1.49	0.599
≥7				0.89	0.44–1.82	0.749
<b>Under-five children</b>						
0				1		
1				0.87	0.52–1.45	0.592
≥2				1.41	0.78–2.53	0.257
<b>Type of dwelling</b>						
Single room				1		
Multiple rooms (shared compound)				0.57	0.36–0.90	0.017
Self-contained apartment				0.12	0.04–0.38	<0.001
Detached/whole house				0.32	0.10–0.98	0.046

## Discussion

This study assessed the association between cholera knowledge and WASH practices among residents of informal settlements in Ibadan, Nigeria. The findings provide important insights into the interplay between socio-demographic characteristics, environmental conditions, knowledge levels, and hygiene behaviours in cholera-endemic urban settings. The socio-demographic profile of respondents showed a predominance of male household heads (65.35%) and individuals aged 35–49 years (33.46%). This pattern reflects the patriarchal household structure commonly observed in many Nigerian communities, where men are typically responsible for household decision-making, including health-related behaviours [29]. Similar male dominance among household heads has been reported in cholera-related studies in Ethiopia and other sub-Saharan African settings, reinforcing the role of gendered household structures in WASH-related decision-making [30]. Educational attainment among respondents was relatively high, with the majority having at least secondary education. However, this did not translate into optimal living conditions, as most respondents resided in informal settlements characterized by overcrowding and inadequate sanitation infrastructure. This mismatch between education and living conditions reflects structural constraints limiting socioeconomic mobility in urban Nigeria and aligns with the political ecology perspective, which emphasizes the dominance of environmental and economic structures over individual-level determinants in shaping health outcomes [31]. Housing conditions further highlight the vulnerability of respondents, with more than half living in multiple rooms within shared compounds. This “face-me-I-face-you” housing typology has been widely documented in Nigerian urban centres and is strongly associated with increased risk of fecal-oral disease transmission due to shared sanitation facilities and high population density.

Despite these structural challenges, the study found relatively good WASH practices among respondents (66.93%). This may be attributed to intensified public health sensitization campaigns by government and development partners following previous cholera outbreaks in Ibadan and other Nigerian cities [32]. In addition, the COVID-19 pandemic likely reinforced hand hygiene awareness and behavioural compliance, as reported in other low- and middle-income settings. Water handling practices showed mixed outcomes. Although a considerable proportion of households treated drinking water, more than half did not, suggesting persistent gaps in household water safety behaviour. Chlorination remained the most common treatment method, consistent with findings from Nielsen et al, who identified it as the most accessible and cost-effective household water treatment option in resource-limited settings. However, the high proportion of households storing water in covered containers (95.28%) indicates a good understanding of basic contamination prevention practices. Sanitation conditions revealed continued vulnerability, as most households relied on shared sanitation facilities, with a notable proportion still practicing open defecation.

These findings are consistent with WHO reports indicating that inadequate sanitation infrastructure remains a major driver of cholera transmission in urban informal settlements. Open defecation and poorly maintained shared toilets facilitate direct environmental contamination with *Vibrio cholerae*, thereby sustaining transmission cycles [33]. Waste management practices further compound environmental risk, as a significant proportion of households engaged in open dumping or burning of waste, while some disposed waste into water bodies. Similar findings have been reported in other developing urban contexts where formal waste collection systems are inadequate, leading to environmental contamination and increased disease risk. Environmental drainage conditions also presented notable concerns. Although two-thirds of respondents reported functional drainage systems, the presence of blocked drains and stagnant water in a substantial proportion of households creates favourable conditions for pathogen survival and outbreak propagation, particularly during rainfall and flooding events.

Knowledge of cholera among respondents was relatively high in terms of awareness, with most identifying unsafe water as a major transmission route. This finding is consistent with studies in other cholera-endemic regions where repeated outbreaks and public health campaigns have increased general awareness. However, almost half of respondents still demonstrated poor comprehensive knowledge, highlighting a gap between awareness and accurate understanding of transmission and prevention. This distinction is critical, as superficial awareness alone may not translate into sustained preventive behaviour. A notable finding was the high level of perceived low personal risk despite substantial awareness of cholera. This reflects optimism bias and risk normalization commonly observed in endemic settings, where repeated exposure to outbreaks reduces perceived susceptibility. According to the Health Belief Model, low perceived susceptibility can significantly weaken the adoption of preventive behaviours even when knowledge is adequate.

A key finding of this study was the statistically significant association between cholera knowledge and WASH practices ( $\chi^2 = 24.64, p < 0.001$ ). The proportion of good WASH practices increased progressively with higher levels of knowledge, from 57.1% among those with poor knowledge to 83.7% among those with good knowledge. This finding supports the assumption that knowledge plays a central role in shaping hygiene behaviour by enhancing awareness of transmission pathways and preventive measures.

## Conclusions

The study established a significant association between cholera knowledge and WASH practices among residents of informal settlements in Ibadan, Nigeria. Respondents with higher levels of cholera knowledge were more likely to engage in good hygiene practices, indicating that knowledge plays an important role in shaping preventive behaviour. However, the persistence of suboptimal water treatment, sanitation, and environmental hygiene practices shows that knowledge alone is not sufficient to ensure safe WASH behaviours. Structural challenges such as overcrowded housing, reliance on shared sanitation facilities, poor drainage systems, and inadequate waste management continue to sustain cholera risk in these communities.

The study suggest that effective cholera prevention in informal settlements requires a combined approach that integrates sustained health education with improvements in water and sanitation infrastructure. Behaviour change communication should be strengthened to deepen understanding of transmission pathways and encourage consistent hygiene practices, while government and development partners should prioritize the provision of safe water, improved sanitation facilities, and effective waste management systems. Community participation should also be encouraged, particularly in high-density settlements, to support sustained environmental hygiene and reduce exposure risks.

## Contribution to Knowledge

This study contributes to existing literature by providing empirical evidence that cholera knowledge significantly influences WASH practices in urban informal settlements in Ibadan, Nigeria. It further clarifies that general awareness of cholera does not necessarily equate to comprehensive preventive

knowledge, and that environmental and housing conditions significantly shape hygiene behaviours. The study therefore reinforces the importance of integrated cholera control strategies that address both behavioural and structural determinants of risk in urban slum settings.

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