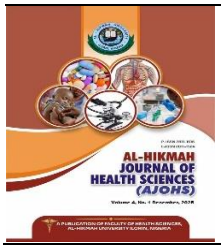
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Original Article

An Epidemiological Study of Cholera Prevalence and Community Preparedness in Ilorin West Local Government Area, Kwara State, Nigeria

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ABSTRACT

Background: Cholera remains a major water- and sanitation-related health problem, yet local evidence linking outbreak patterns to community preparedness in Ilorin West Local Government Area (LGA), Kwara State, is limited.

Objective: To assess the epidemiological characteristics of cholera and community preparedness for cholera prevention and outbreak response in Ilorin West LGA.

Methods: A cross-sectional survey of 394 adult residents, selected by multistage sampling, was combined with a review of 2021–2025 cholera surveillance records and key informant interviews. Data were analyzed using frequencies, chi-square tests, binary logistic regression (outcome: previous household cholera) and thematic analysis.

Results: The largest age group was 25–34 years (39.1%), and 56.3% were female; 94.9% had heard of cholera. Records showed 458 cases, peaking in 2022 (25.3%), mainly among children aged 5–14 years (23.6%) and males (54.6%). Household toilet availability (OR = 0.404, p = .007) and handwashing with soap (OR = 0.358, p = .003) were significant protective predictors. Preparedness was moderate; only 42.1% reported emergency water supply. Informants cited delayed reporting, limited logistics and inadequate laboratory capacity.

Conclusion: Cholera prevention requires sustained improvements in water, sanitation and hygiene, with stronger surveillance, health education and emergency water preparedness.

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Introduction

Cholera is an acute diarrheal infection caused by toxigenic *Vibrio cholerae* and is transmitted predominantly through ingestion of food or water contaminated with faucal matter. The disease can cause profuse watery diarrhea, vomiting, rapid dehydration and death when treatment is delayed. Although cholera is preventable and treatable, it continues to affect populations living in settings characterized by inadequate water, sanitation and hygiene (WASH), overcrowding, environmental contamination and weak public health systems.

Globally, cholera remains concentrated in vulnerable populations with inequitable access to safe water and sanitation. Evidence from Africa has linked recurrent outbreaks to inadequate WASH infrastructure,

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flooding, climate-related environmental disruption, population displacement, poverty and weaknesses in surveillance and response systems. The global cholera elimination agenda therefore emphasizes an integrated approach combining surveillance, case management, oral cholera vaccination where indicated, WASH improvement and community engagement.

Nigeria has experienced recurrent cholera outbreaks since the major outbreak documented in 1971. Subsequent outbreaks have occurred across many states, frequently intensified by rainfall, flooding, contaminated water sources, inadequate sanitation and delayed access to care. Kwara State is among the Nigerian settings that have reported cholera activity, and Ilorin West Local Government Area (LGA) presents environmental and demographic characteristics that may increase vulnerability, including dense settlements, variable water sources, drainage challenges and sanitation gaps.

Community preparedness is an important complement to health-system preparedness. It includes residents' knowledge of cholera, ability to recognize symptoms, adoption of safe water and hygiene practices, access to sanitation, knowledge of reporting channels, participation in environmental sanitation, and availability of resources for emergency response. Understanding these factors alongside the epidemiological pattern of reported cases can help identify practical areas for prevention.

Aim and Objectives

The overall aim of this study was to assess the epidemiological characteristics of cholera and community preparedness for cholera prevention and outbreak response in Ilorin West LGA. The specific objectives were to:

determine the pattern of reported cholera cases in Ilorin West LGA;

assess the relationship between community preparedness and cholera prevention and outbreak response;

identify environmental and socio-economic factors associated with cholera occurrence;

assess residents' knowledge of cholera transmission, prevention and control; and

evaluate the level of community preparedness for cholera prevention and outbreak response.

Methods

Study design and setting

A descriptive cross-sectional community survey was complemented by a retrospective review of cholera surveillance records for 2021–2025 and qualitative key informant interviews. The study was conducted in Ilorin West LGA, a predominantly urban and peri-urban area of the Ilorin metropolis in Kwara State, Nigeria, with substantial population density and heterogeneous water and sanitation conditions.

Study population and sample

The community component targeted adults aged 18 years and above who had lived in Ilorin West LGA for at least six months. Public health personnel involved in cholera surveillance and response constituted the key informants, and cholera records from health facilities and LGA surveillance units were reviewed for the retrospective component.

The minimum sample size was based on Cochran's formula for a cross-sectional study at 95% confidence, 5% precision and an assumed prevalence/proportion of 50%, giving approximately 384 participants before non-response adjustment. A total of 421 questionnaires were administered, of which 394 were retrieved and analyzed.

Sampling and data collection

A multistage sampling approach was used for the community survey. In the first stage, five (5) of the wards in Ilorin West LGA were selected by simple random sampling. In the second stage, households within each selected ward were selected by systematic random sampling. In the third stage, one eligible adult (aged 18 years and above and resident in the LGA for at least six months) was selected from each household by simple random sampling. Key informants were selected purposively.

A structured interviewer-administered questionnaire covered socio-demographic characteristics, water supply, sanitation, cholera knowledge, attitudes and practices, and community preparedness. The questionnaire was reviewed by public health experts and pre-tested in a community outside the study area, and trained research assistants administered it face to face. A standardized abstraction form was used to obtain age, sex, year and other available epidemiological information from surveillance records. Key informants included Disease Surveillance and Notification Officers, Environmental Health Officers and health-facility surveillance focal persons.

Data analysis

Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS). Frequencies and percentages were used for descriptive analysis, and chi-square tests examined selected associations. Binary logistic regression was used to identify independent predictors of previous household cholera (yes or no), the binary dependent variable. The predictors entered into the model were source of drinking water, household water treatment, availability of a toilet facility, household sharing of a toilet and handwashing practice. The reference categories were households without a toilet facility

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and respondents who did not wash their hands with soap, respectively, so an odds ratio (OR) below 1 indicates lower odds of previous household cholera among households with a toilet facility and among respondents who washed their hands with soap. Statistical significance was set at $p < .05$. Qualitative interview data were analyzed thematically.

Ethical considerations

Ethical approval was obtained from the Kwara State Ministry of Health Research Ethics Committee. Participants were informed about the study, and written or oral informed consent was obtained. Confidentiality and privacy were maintained throughout data collection and analysis.

Results

Respondent characteristics

Table 1 presents the characteristics of the 394 respondents. Respondents were predominantly aged 25–44 years, 56.3% were female and 65.0% were married. Secondary education (43.1%) and trading (33.5%) were the most common educational and occupational categories, and 58.4% had lived in their communities for more than five years.

Table 1: Sociodemographic Characteristics of Respondents (N = 394)

Characteristic	Category	*n*	%
Age (years)	18–24	64	16.2
	25–34	154	39.1
	35–44	120	30.5
	≥45	56	14.2
Sex	Male	172	43.7
	Female	222	56.3
Marital status	Single	92	23.4
	Married	256	65.0
	Divorced	20	5.1
	Widowed	26	6.6
Educational level	No formal education	30	7.6
	Primary	82	20.8
	Secondary	170	43.1
	Tertiary	112	28.4
Occupation	Civil servant	92	23.4
	Trader	132	33.5
	Farmer	40	10.2
	Artisan	64	16.2
	Student	34	8.6
	Unemployed	32	8.1
Length of residence	<1 year	38	9.6
	1–5 years	126	32.0
	>5 years	230	58.4

Retrospective pattern of reported cholera cases

Across 2021–2025, 458 reported cholera cases were included in the retrospective dataset (Table 2). The largest annual proportion occurred in 2022 (25.3%), followed by 2024 (21.0%); 2023 had the smallest proportion (16.2%). The 5–14-year group accounted for the largest age-specific proportion (23.6%). Males represented 54.6% of reported cases.

Table 2: Reported Cholera Cases by Year, Age Group and Sex, Ilorin West LGA, 2021–2025 (N = 458)

Characteristic	Category	Cases (*n*)	%
Year	2021	82	17.9
	2022	116	25.3
	2023	74	16.2
	2024	96	21.0
	2025	90	19.7
Age group (years)	<5	76	16.6
	5–14	108	23.6
	15–24	72	15.7
	25–34	84	18.3
	35–44	64	14.0

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	≥45	54	11.8
Sex	Male	250	54.6
	Female	208	45.4

Knowledge, attitudes and preventive practices

Awareness was high, with 94.9% having heard of cholera (Table 3). Most respondents identified contaminated water or food as the cause/transmission route and recognized major cholera symptoms; however, misconceptions were present, as 4.6% attributed cholera to witchcraft and 5.1% to mosquito bites. Handwashing was common but not universal: 64.0% always washed with soap after toilet use and 72.1% always washed before eating. Most respondents would take a person with severe diarrhea to a health facility, although 27.4% would initially use home treatment or consult a traditional healer.

Table 3: Knowledge, Attitudes and Preventive Practices Regarding Cholera (N = 394)

Indicator	**Response**	***n***	**%**
Heard of cholera	Yes	374	94.9
	No	20	5.1
Perceived cause	Contaminated water/food	308	78.2
	Witchcraft	18	4.6
	Don't know	68	17.3
Symptoms identified	Watery diarrhea, vomiting and dehydration	295	74.9
	Fever	99	25.1
Mode of transmission	Contaminated water/food	298	75.6
	Person-to-person contact	38	9.6
	Mosquito bites	20	5.1
	Don't know	38	9.6
Cholera can be prevented	Yes	334	84.8
	No	28	7.1
	Don't know	32	8.1
Handwashing with soap after toilet use	Always	252	64.0
	Sometimes	110	27.9
	Never	32	8.1
Handwashing before eating	Always	284	72.1
	Sometimes	86	21.8
	Never	24	6.1
Response to severe diarrhea	Health facility	286	72.6
	Home treatment	82	20.8
	Traditional healer	26	6.6
Previous household cholera	Yes	58	14.7
	No	336	85.3

Community preparedness

Community preparedness was characterized by relatively strong health education (72.1%) and environmental sanitation activities (76.6%), but important gaps remained in emergency water supply (42.1% reported availability) and knowledge of reporting channels (65.5% knew where to report) (Table 4). Overall, the findings support a moderate rather than uniformly high level of community preparedness.

Table 4: Community Preparedness for Cholera Prevention and Outbreak Response (N = 394)

Preparedness indicator	Yes, *n*	Yes, %	No, *n*	No, %
Health education on cholera available	284	72.1	110	27.9
Aware of where to report suspected cases	258	65.5	136	34.5
Emergency water supply available	166	42.1	228	57.9
Environmental sanitation activities available	302	76.6	92	23.4

Associations and regression analysis

Chi-square analysis showed statistically significant associations for all variables presented (Table 5): educational level with knowledge of cholera, household water treatment with previous household cholera, knowledge of cholera with preventive practices, and environmental sanitation with community preparedness (all $p < .001$).

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Table 5: Chi-Square Tests of Association

Variable	Outcome examined	χ^2	*df*	*p*
Educational level	Knowledge of cholera	72.614	6	<.001
Water treatment	Previous household cholera	31.248	1	<.001
Knowledge of cholera	Preventive practices	68.935	2	<.001
Environmental sanitation	Community preparedness	95.472	4	<.001

Table 6 shows the binary logistic regression model. Availability of a household toilet facility (OR = 0.404, p = .007) and handwashing with soap (OR = 0.358, p = .003) were statistically significant independent predictors. Compared with households without a toilet facility, households with one had 59.6% lower odds of previous household cholera, and respondents who washed their hands with soap had 64.2% lower odds than those who did not. Source of drinking water (OR = 1.035, p = .907), household water treatment (OR = 0.818, p = .574) and toilet sharing (OR = 0.761, p = .484) were not statistically significant.

Table 6: Binary Logistic Regression Predicting Previous Household Cholera

Predictor	*B*	*SE*	Wald	*p*	OR
Source of drinking water	0.035	0.296	0.014	.907	1.035
Household water treatment	−0.200	0.356	0.317	.574	0.818
Availability of toilet facility	−0.907	0.337	7.257	.007	0.404
Household sharing of toilet	−0.273	0.390	0.490	.484	0.761
Handwashing practice	−1.028	0.345	8.880	.003	0.358
Constant	5.860	1.332	19.346	<.001	350.794

Note. Dependent variable: previous household cholera (yes/no). *B* = regression coefficient; *SE* = standard error; OR = odds ratio (Exp[*B*]). Wald statistics have 1 degree of freedom. Reference categories: no toilet facility (availability of toilet facility) and not washing hands with soap (handwashing practice).

Qualitative findings

Key informants described an established cholera surveillance system operating through the Integrated Disease Surveillance and Response framework, supported by health-facility reporting and community alerts. Preparedness activities included community sensitization, environmental sanitation, health-worker training and water-quality monitoring. Reported constraints included delayed reporting from some facilities, transportation and logistics limitations, inadequate laboratory capacity and shortages of surveillance materials. Participants also emphasized poor access to safe water, open defecation, inadequate funding and delayed healthcare seeking. Recommended improvements included stronger surveillance and laboratory capacity, improved water and sanitation infrastructure, sustained community education, regular training and adequate emergency supplies.

Discussion

The study demonstrates that cholera remains an important public health concern in Ilorin West LGA and that epidemiological risk coexists with gaps in community preparedness. The largest proportion of reported cases occurred among children aged 5–14 years. This is consistent with evidence that children and other groups with substantial environmental exposure may carry a considerable diarrheal disease burden, although age patterns vary between outbreaks and settings.

The high level of awareness observed among respondents is encouraging, but awareness alone does not guarantee consistent protective behavior. The presence of misconceptions about cholera causation and transmission, together with incomplete handwashing and delayed professional care among a minority of respondents, indicates a continuing need for practical, repeated and locally appropriate health education.

The significant associations involving education, water treatment, knowledge and environmental sanitation are consistent with the established role of WASH and health literacy in cholera prevention. However, not every association remained significant after adjustment: toilet availability and handwashing with soap were the only independent predictors retained, emphasizing the importance of household sanitation and hygiene behavior.

Community preparedness was neither uniformly poor nor fully adequate. Health education and environmental sanitation activities were relatively common, whereas emergency water supply was reported less frequently, which matters because outbreak response depends on maintaining safe water access during emergencies as well as on knowledge and routine prevention.

The qualitative findings reinforce the quantitative results by identifying system-level constraints

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affecting early detection and response. Delayed reporting, limited transport, laboratory constraints and insufficient logistics can reduce the speed of outbreak investigation even where surveillance structures exist. Consequently, cholera preparedness should be viewed as a continuum linking household practices, community mobilization and health-system readiness.

Conclusion

Cholera remains an important public health challenge in Ilorin West LGA. The study found high awareness of cholera among residents, but persistent gaps in hygiene, sanitation, safe water access, emergency water preparedness and reporting awareness. Reported cases varied substantially from 2021 to 2025. Household toilet availability and handwashing with soap were significant predictors of previous household cholera in the regression model. Overall, effective cholera control in Ilorin West requires an integrated WASH, surveillance, health education and community-engagement approach.

Recommendations

Expand reliable access to safe and affordable potable water, with contingency water supplies incorporated into outbreak preparedness plans.

Strengthen household sanitation and reduce open defecation through improved toilet access, community engagement and sustained environmental health enforcement.

Intensify practical cholera education through health facilities, schools, markets, religious institutions, radio, social media and community leaders, with emphasis on symptoms, transmission, hand hygiene and early care seeking.

Strengthen community-based surveillance and ensure residents know where and how to report suspected cholera cases.

Improve logistics, transport, laboratory capacity, surveillance materials and emergency supplies for rapid outbreak investigation and response.

Maintain regular training for healthcare workers and surveillance personnel on case detection, reporting, infection prevention and outbreak response.

Engage traditional rulers, religious leaders, youth groups, women's groups and community-based organizations in sustained cholera preparedness activities.

Future studies should use standardized case definitions and prospectively linked household and surveillance data to better estimate incidence and determine causal relationships.

Limitations

The cross-sectional component limits causal inference because exposure and outcome measures were assessed at the same time. Retrospective surveillance data may be affected by incomplete reporting, differences in diagnostic capacity and under-ascertainment. Self-reported hygiene and preparedness practices may also be influenced by recall and social-desirability bias.

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