ASSOCIATION BETWEEN DEMOGRAPHIC FACTORS AND KNOWLEDGE OF CHOLERA PREVENTION IN OWERRI NORTH LOCAL GOVERNMENT AREA IN IMO STATE, NIGERIA

Abstract

Cholera continues to pose a serious public health threat in Nigeria, especially in communities with poor access to clean water, sanitation, and hygiene services. This study set out to evaluate association between demographic factors and knowledge of cholera prevention in Owerri North Local Government Area in Imo State, Nigeria. The study employed a cross-sectional design to achieve the study objectives. Structured pretested questionnaire were used to collect data from 412 randomly selected respondents and the result was analyzed using descriptive statistics and chi-square tests to explore any association between knowledge levels and socio-demographic factors.Items used to evaluate knowledge of cholera prevention include demographic factors of the respondents were age,education and occupation play a vital role in the level knowledge of cholera prevention.

The findings of the study reveals that most respondents (69.7%) had heard about cholera, getting their information mainly from local health centers (40.8%) and the media (24.0%). However about (17.7%) didn't know that cholera is a bacterial disease spread through contaminated food and water. Half of the respondents (51.2%) correctly recognized symptoms like severe diarrhea and dehydration, while 38.3% identified the rice-water stool. Only (26.9%) were aware of any cholera prevention programs in their communities. While nearly (60%) felt they were at risk of getting cholera, close to (43%) were not satisfied with the existing preventive efforts. Some of the major obstacles people mentioned included difficulty building toilets in sandy soil (25.2%) and limited financial resources (15.0%). Statistical analysis showed strong links between people's knowledge of cholera and their education level ($p = 0.000$), occupation ($p = 0.001$), age ($p = 0.012$), marital status ($p = 0.025$), religion ($p = 0.001$), and ethnic group ($p = 0.033$). Those with higher levels of education and formal jobs tended to know more about the disease.

In conclusion , even though most people had heard of cholera, many lacked detailed knowledge about how to prevent it. It's essential to invest in targeted education campaigns and practical support that reflect the realities of each community.Tailoring strategies to local challenges like soil type and economic barriers will go a long way in reducing the risk of future outbreaks.

Keywords: Cholera, Perception, Knowledge, Owerri North, Nigeria, Public Health

Introduction

Cholera remains a major global health concern, particularly in regions where basic sanitation and access to clean water are limited. . Transmission typically occurs through the consumption of contaminated water or food, making it especially prevalent in areas with poor hygiene and water

infrastructure. The illness affects individuals of all ages, with symptoms often including sudden onset of watery diarrhea commonly described as "rice-water stool" and vomiting. According to estimates by the World Health Organization [1] and other researchers [2] cholera causes between 1.3 to 4 million cases each year, resulting in up to 143,000 deaths worldwide. The disease disproportionately impacts countries with limited resources and fragile health systems, highlighting broader social and economic inequalities. While nations such as Pakistan, Somalia, Haiti, and several African countries continue to battle recurring outbreaks, industrialized nations have largely eliminated the disease through effective water treatment and sanitation systems.

In Nigeria, cholera continues to present a significant threat to public health. Vulnerable populations including those living in overcrowded settlements, lacking access to clean drinking water, or facing displacement and food insecurity are especially at risk. Despite numerous interventions, outbreaks remain a recurring issue. Studies have pointed out that many cases go unreported due to gaps in surveillance, limited diagnostic capacity, and the similarity of cholera symptoms to other diarrheal diseases [3]. Furthermore, societal and governmental reluctance to acknowledge outbreaks can obscure the true scale of the problem [4]. Cholera is endemic, and recent studies suggest that climate change may create favorable conditions for *Vibrio cholerae* and other related pathogens to thrive [5]. Despite inconsistent reports of cholera outbreaks in Nigeria, the disease's dynamic nature suggests its persistent presence, especially in northern regions.

In Kano State, significant fluctuations in the frequency and distribution of cholera from 2010 to 2019 have been observed, with incidences ranging from hundreds to thousands in a year [6]. The case fatality rate in untreated cholera cases may reach a staggering 30–50%, even though effective treatment focuses primarily on rehydration and, when successfully implemented, can keep the fatality rate below 1% [7].Communities characterized by overcrowding, poor sanitation, and unsafe drinking water face the greatest risk of cholera outbreaks. Mild and asymptomatic cases account for about 80% of infections, with incubation periods typically ranging from two hours to five days. Although completely preventing cholera entry into a community is impossible, early detection and a swift, appropriate response can help mitigate its spread within households and communities.

However a fraction of those infected develop severe symptoms, the consequence for that group can be life-threatening without immediate treatment. These realities underscore the urgent need for improved prevention strategies, particularly in communities like Owerri North in southeastern Nigeria, where environmental and infrastructural conditions heighten the risk of transmission. By understanding local perceptions and knowledge surrounding cholera, more effective and culturally relevant public health responses can be developed. Prompt and adequate treatment is crucial because failure to act swiftly can lead to severe dehydration and death within hours [8].

Materials and Methods

Study Area

Owerri North LGA is one of the 27 local government areas in Imo State, located in southeastern Nigeria. It encompasses 18 autonomous communities and surrounds Owerri Municipal. According to 2024 projections by the National Population Commission (NPC), the area has an estimated population of 333,567 and covers approximately 198 km². The region is semi-urban, with agriculture, trade, and resource extraction (e.g., crude oil and natural gas) constituting key economic activities.

Study design and Sampling

The study employed a cross sectional descriptive design. A pretested questionnaire was used to evaluate knowledge and practices among households in Owerri North LGA in Imo State, South eastern Nigeria. The questionnaire was validated using face and content validation. Forty-five questionnaire were pretested in another non randomly selected communities in the local governments of the state with similar characteristics but not included in the actual study. The questionnaire was tested for reliability using Cronbach Alpha test [9] and a reliability coefficient of 0.75 was obtained. Simple sampling by balloting was adopted to select the samples included in the study.

In the first stage, a total of 9 communities were randomly selected through balloting which covered 50% of communities from the Owerri North LGA. They include Naze, Amakohia, Akwakuma, Ulakwo, Obibiezena, Egbu, Awaka, Oji and Emi. In these selected communities 412 respondents were selected based on the population size of these communities. Sampling started from the community Centre of each community and households were selected at intervals of two households. This process went round the community until the required sample size for each selected communities was reached. Occasion of non-household eligibility, the next household was selected. The next stage involved the selection of eligible study participants from the households.

Data Collection

Data collection processes lasted for 2 months. Data was collected by administering structured pretested questionnaire to the study participants by member of the study group. For the selected participants the study was introduced and written informed consent was gotten from the participant and the questionnaire was then elicited in the local (Igbo) language.

Data Analysis

The method of data analysis was descriptive, data collected were presented in tables of frequency distribution and were all expressed as the percentage of the distribution. Chi square was used to test the association between socio-demographic distribution and knowelge of cholera prevention at 5% significant level. Data analysis was performed on IBM-SPSS Statistics version 23.

Result

112 Table1: Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Age	No response	4	1.0
	15-24	135	32.8
	25-34	87	21.1
	35-44	97	23.5
	45-49	54	13.1
	50 and above	35	8.5
	Total	**412**	**100.0**
Religion	No response	4	1.0
	Christianity	328	79.6
	Islam	31	7.5
	Traditional	36	8.7
	Others	13	3.2
	Total	**412**	**100.0**
Ethnicity	No response	4	1.0
	Fulani	17	4.1
	Hausa	36	8.7
	Igbo	313	76.0
	Yoruba	38	9.2
	Others	4	1.0
	Total	**412**	**100.0**
Marital Status	No response	13	3.2
	Married	207	50.2
	Separated	38	9.2
	Single	142	34.5
	Widowed	12	2.9
	Total	**412**	**100.0**

Number of Children	No response	43	10.4
	1	118	28.6
	2	113	27.4
	3	66	16.0
	4 and above	8	1.9
	None	64	15.5
	Total	**412**	**100.0**
Education Level	No response	12	2.9
	No formal education	117	28.4
	Primary	52	12.6
	Secondary	109	26.5
	Tertiary	114	27.7
	Others	8	1.9
	Total	**412**	**100.0**
Occupation	Artisan	188	45.6
	Civil servant	28	6.8
	Others	41	10.0
	Professional	4	1.0
	Self-employed	103	25.0
	Unemployed	48	11.7
	Total	**412**	**100.0**

The largest age category was 15–24 years, encompassing 135 (32.8%) respondents. The second largest group comprised those aged 35–44 years, 97 (23.5%) respondents. Respondents aged 25–34 years accounted for 87(21.1%), while the 45–49 age bracket included 54 (13.1%) respondents. The smallest age group comprised those aged 50 and above, numbering 35 (8.5%). Additionally, a very small proportion of 4 (1.0%) respondents did not disclose their age. In terms of religion, majority identified as Christian 328(79.6%) respondents. Traditional religious accounted for 36 (8.7%), while 31 (7.5%) respondents identified as Muslims.

The ethnic composition highlighted a strong representation of the Igbo ethnic group, with 313 r(76.0%) respondents. Other ethnic groups included Yoruba 38(9.2%), Hausa 36 (8.7%), and Fulani 17 (4.1%). In terms of marital status, over half of the respondents were married 207,

(50.2%)respondents The single population included 142 (34.5%) respondents, while 38 (9.2%) were separated. A few respondents were widowed 12(2.9%). Data on the number of children indicated some diversity in family size; 118 (28.6%) respondents had one child, 113 (27.4%) had two children, and 66 (16.0%) had three children. Few households reported having four or more children 8 (1.9%), whereas 64 (15.5%) indicated they had no children.

In terms of education, 117 (28.4%) reported having no formal education, while 109(26.5%) attained secondary education. Tertiary education was achieved by 114 (27.7%), while 52 (12.6%) completed primary education. *:* In terms of Occupation, the distribution among respondents revealed that artisans were 188 (45.6%). Self-employed individuals made up 103 (25.0%), while 48 (11.7%) were unemployed. Civil servants constituted 28 (6.8%), with the professional category being the smallest at only 4(1.0%) respondents, while other occupations accounted for 41 (10.0%)respondents.(Table 1)

Table 2: Knowledge of Cholera

Variable	Category	Frequency (n)	Percentage (%)
Heard about cholera	No response	24	5.9
	No	101	24.5
	Yes	287	69.7
	Total	**412**	**100.0**
Source of Information	No response	76	18.4
	Friends/Family	24	5.8
	Health center	168	40.8
	Media/Publication	99	24.0
	Not aware	25	6.1
	Others	20	4.9
	Total	**412**	**100.0**
Cholera is a bacterial disease spread through water/food	No response	76	18.4
	Aware	263	63.8
	Not aware	73	17.7
	Total	**412**	**100.0**
Cholera causes severe diarrhea and dehydration	No response	89	21.6
	Aware	211	51.2
	Not aware	112	27.2
	Total	**412**	**100.0**
Diseases resulted from unsafe water/food	No response	96	23.3
	Cholera	125	30.3
	Diarrhea	126	30.6
	Malaria	61	14.8
	Scabies	4	1.0

	Total	**412**	**100.0**
Signs and symptoms of cholera	No response	113	27.4
	Loss of skin elasticity	24	5.8
	Rice watery diarrhea	158	38.3
	Severe vomiting	101	24.5
	Sunken eyes	16	3.9
	Total	**412**	**100.0**
Cholera can be dangerous	No response	203	49.3
	It brings death	101	24.5
	It brings sickness	108	26.2
	Total	**412**	**100.0**
Programs for cholera prevention in your area	No response	132	32.0
	No	169	41.0
	Yes	111	26.9
	Total	**412**	**100.0**
Sponsorship of the programs	No response	229	55.6
	Center for disease control	28	6.8
	Ministry of health	78	18.9
	Water aid	20	4.9
	WHO	57	13.8
	Total	**412**	**100**
Interventions of these Programs	No response	212	51.5
	Having and properly using the toilet	97	23.5
	Washing hands after using the toilet	71	17.2
	Washing hands before eating	20	4.9
	Washing raw food before eating	12	2.9
	Total	**412**	**100.0**

Knowledge of Cholera Awareness of cholera was reported by 69.7% of respondents. Health centers (40.8%) and media (24.0%) were the primary sources of information. However, 17.7% were unaware that cholera is caused by bacteria and spread via contaminated water or food. Although 51.2% correctly identified symptoms such as severe diarrhea and dehydration, only 38.3% recognized the hallmark "rice watery stool."

When asked about the cause of illness from unsafe water or food, responses included cholera (30.3%) and diarrhea (30.6%), while 14.8% incorrectly identified malaria. Regarding knowledge

of interventions, 26.9% reported awareness of cholera prevention programs in their area, and 23.5% indicated proper toilet usage as a promoted intervention. (Table 2)

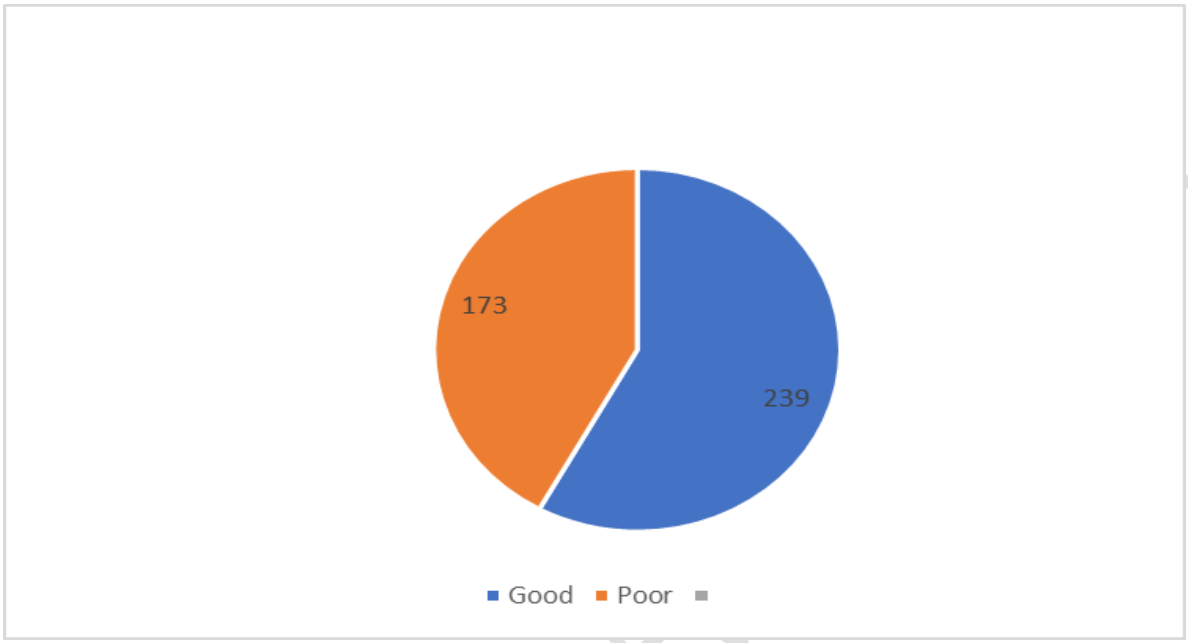

Figure 1: Knowledge level of respondents on Cholera Prevention

Table 3: Perception Of Cholera Prevention Among Households

Variable	Category	Frequency (n)	Percentage (%)
Risk of suffering from cholera	No response	33	8.0
	No	134	32.5
	Yes	245	59.5
	Total	**412**	**100.0**
Satisfaction with cholera prevention practices	No response	111	26.9
	No	176	42.7
	Yes	125	30.3
	Total	**412**	**100.0**
Challenges in adopting recommended interventions	No response	206	50.0
	Difficult to construct latrines in sandy soil	104	25.2
	Insufficient resources	62	15.0
	Lack of firewood for boiling water	20	4.9
	Unpleasant taste of	20	4.9

	chlorinated water		
	Total	**412**	**100.0**
Eradicate cholera in your area	No response	216	52.5
	Constant water treatment	76	18.4
	Improvement of water facilities	120	29.1
	Total	**412**	**100.0**
Distance of water source from your home	No response	65	15.8
	Between 100-500 meters	16	3.9
	Between 50-100 meters	168	40.8
	Less than 50 meters	155	37.6
	Over 500 meters	8	1.9
	Total	**412**	**100.0**
Treatment of drinking water	No response	69	16.7
	Boiling	225	54.6
	Chlorination	8	1.9
	Nothing special	110	26.7
	Total	**412**	**100.0**
Ongoing community activities related to water and sanitation	No response	53	12.9
	I don't know	4	1.0
	No	251	60.9
	Yes	104	25.2
	Total	**412**	**100.0**
Preparedness to handle a cholera outbreak in your Community	No response	65	15.8
	No	207	50.2
	Unsure	8	1.9
	Yes	132	32.0
	Total	**412**	**100.0**
What can be improved to prevent cholera in your community?	No response	172	41.8
	Maintain proper hygiene	159	38.6
	Public awareness	81	19.7
	Total	**412**	**100.0**

Perception of Cholera Risk and Community Preparedness Approximately 59.5% believed they were at risk of contracting cholera, but only 30.3% were satisfied with current prevention efforts. Main challenges to implementing preventive measures included difficulty constructing latrines in sandy soil (25.2%) and lack of resources (15.0%).

In terms of community preparedness, 50.2% felt their community was not ready for a cholera outbreak, and 60.9% reported no ongoing water and sanitation activities. Regarding perceived

needs to prevent cholera, respondents emphasized the improvement of water facilities (29.1%) and consistent water treatment (18.4%).(Table 3)

Table 4: ASSOCIATION BETWEEN SOCIO- DEMOGRAPHIC FACTORS AND LEVEL OF KNOWLEDGE ON CHOLERA PREVENTION AMONG HOUSEHOLDS IN OWERRI NORTH LGA, IMO STATE, NIGERIA

Socio-demographic features	Knowledge level		χ^2	df	(p-value)	Decision
	Good	Poor				
Age	239	173	24.985	5	**0.010**	S
Religion	239	173	20.101	4	**0.001**	S
Ethnicity	239	173	16.525	5	**0.005**	S
Marital status	239	173	10.203	4	**0.037**	S
Education level	239	173	30.603	5	**0.000**	S
Occupation	239	173	10.849	5	**0.054**	NS

The chi-square (χ^2) test was conducted to determine the association between socio-demographic factors and the level of knowledge on cholera prevention among households in Owerri North LGA, Imo State. The results indicate that some of the tested socio-demographic variables have a statistically significant association with knowledge levels, as all p-values are below the conventional significance level of 0.05. There is a statistically significant association between age and knowledge level on cholera prevention. This suggests that knowledge levels may vary across different age groups, possibly due to differences in exposure to health information and experience with cholera-related issues. ($\chi^2 = 24.985$, df = 5, $p = 0.010$) Religion also shows a significant association with knowledge of cholera prevention. This may be linked to the role of religious institutions in disseminating public health information and promoting hygiene practices within communities. ($\chi^2 = 20.101$, df = 4, $p = 0.001$) Marital status significantly influences knowledge of cholera prevention. Married individuals might have greater exposure to health information due to responsibilities for family health, while single individuals may rely on different sources for information. ($\chi^2 = 10.203$, df = 4, $p = 0.037$) Education level shows the strongest association with knowledge level ($p < 0.001$), indicating that individuals with higher educational attainment are more likely to have better knowledge of cholera prevention. ($\chi^2 = 30.603$, df = 5, $p = 0.000$) Occupation appears not to have a significant impact on knowledge levels. Professionals and individuals in health-related occupations may not have more exposure to cholera prevention information compared to those in informal employment sectors. ($\chi^2 = 10.849$, df = 5, $p = 0.054$) (Table 4)

Discussion

This study investigated the knowledge, perception, and practices related to cholera prevention among households in Owerri North LGA, Imo State, Nigeria. The findings highlight both strengths and gaps in cholera awareness and preventive behavior within the study population. Knowledge of cholera was moderately high, with 69.7% of respondents reporting prior awareness of the disease. Health centers and the media served as the most common sources of information, aligning with previous studies in similar settings [10]. However, a substantial portion of respondents (17.7%) remained unaware of the bacterial origin and transmission pathway of cholera. The result of this findings was consistent with the study conducted by [11] in Northern Nigeria, where a significant proportion of respondents incorrectly attributed cholera to supernatural causes. Such misconceptions can contribute to poor adoption of preventive measures and underscore the need for improved health education

Symptom recognition was suboptimal. While half of the respondents identified severe diarrhea and dehydration as key symptoms, only 38.3% recognized rice watery stool as a distinguishing sign of cholera. These findings are consistent with [12]who noted limited community-level understanding of cholera symptomatology in rural Nigerian settings. Improved symptom recognition is crucial for early detection, timely treatment, and effective outbreak containment. We also focus on the perception of households towards cholera prevention in Owerri North.

The findings of this study indicate a relatively high awareness among households regarding the severity and risks associated with cholera. A significant proportion of respondents recognized cholera as a serious health threat, with 88.8% accurately identifying its common symptoms and 86.9% having received information about cholera prevention. This aligns with the Health Belief Model, which posits that individuals are more likely to engage in preventive behaviors when they perceive a disease as severe and believe they are personally at risk however similar study by [13] in Lagos State, Nigeria, where 84.5% of respondents perceived cholera as a deadly disease, leading to higher adoption of preventive practices.

The result of this study also revealed the misconceptions that influence perceptions of cholera prevention. while 87.1% of respondents knew how to prepare oral rehydration solutions (ORS), 9.7% did not respond, indicating a possible knowledge gap. Additionally, a small percentage of respondents (2.4%) stated they had never received information on cholera prevention, which could foster misconceptions and non-compliance with preventive measures. Barriers such as perceived cost, limited access to clean water, and cultural beliefs likely contribute to these gaps. In a study by [11] in rural Nigeria, cultural myths surrounding cholera, such as beliefs that it is caused by a spiritual force which led to delayed health-seeking behavior and reduced adherence to prevention guidelines.

The findings of this study also revealed that the "unsure" responses and instances of non-compliance suggest that similar misconceptions may exist within certain households in Owerri North. Comparing these findings with similar studies shows the importance of addressing perception in public health strategies. A similar study conducted by [14] found that in Northern Nigeria, cholera prevention efforts were more effective when community perceptions were considered in intervention planning, leading to improved hygiene practices and reduced incidence rates. The findings of this study show that socio-demographic factors such as age, religion, ethnicity, marital status, and education level significantly influence knowledge levels on cholera prevention, while occupation does not. The strongest association was observed with education level, emphasizing the importance of formal education in public health awareness.

Conclusion

The findings underscore the critical need for enhanced public health initiatives in Owerri North LGA to reduce cholera incidence. A disparity between knowledge of cholera and actual preventive practices was evident, suggesting that educational interventions alone may not suffice. Socio-demographic factors such as education level and occupation significantly influence knowledge and awareness, highlighting the need for targeted strategies to mitigate cholera risk.

Recommendations

There is a critical need to implement comprehensive and community-specific strategies to bridge the gap between cholera knowledge and preventive practices in Owerri North LGA. Public health education campaigns should be intensified and tailored to the demographic characteristics of the population, particularly targeting individuals with low or no formal education. These campaigns should employ culturally sensitive messaging and be delivered in local languages such as Igbo through trusted sources, including religious leaders and local health workers. Given that health centers and the media were the most common sources of information, there is an opportunity to leverage these platforms more effectively by integrating cholera education into regular clinic visits and broadcasting preventive messages via radio and mobile channels.

Funding

Funding is by the researchers.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Chairman Ethics and Research Committee of Abia State University Teaching

Hospital (Under the Chairmanship of Prof.Chigbu, *FICS,FWACS*). Informed consent was obtained from all the respondents involved in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests

References

1. **World Health Organization. (2019).***Cholera – Global surveillance summary, 2019.* Geneva: WHO.https://www.who.int/publications-detail/9789240012473

2. Elimian, K. O., Musah, A., Mezue, S., Oyebanji, O., Yennan, S., Jinadu, A., ... & Shadrach, M. (2019). Descriptive epidemiology of cholera outbreak in Nigeria, January–November 2018: Implications for the global roadmap strategy. *BMC Public Health, 19,* 1264. https://doi.org/10.1186/s12889-019-7609-8

3.Ganesan, D., Gupta, S. S., & Legros, D. (2020**).**Cholera surveillance and estimation. *The Journal of Infectious,221*(Supplement_3),S140S146.https://doi.org/10.1093/infdis/jiz671

4. Ali, M., Nelson, A. R., Lopez, A. L., & Sack, D. A. (2015). Updated global burden of cholera in endemic countries. PLOS Neglected Tropical Diseases, 9(6), e0003832.

5. Adagbada, A. O., Adesida, S. A., Nwaokorie, F. O., Niemogha, M. T., & Coker, A. O. (2012). Cholera epidemiology in Nigeria: An overview. Pan African Medical Journal, 12(1), 59.

6. Ngwa, M. C., Liang, S., Mbam, L. M., Kang, L., Teta, I. N., Nsah, B., & Njem, P. N. (2021).Cholera outbreaks in the Far North region of Cameroon: Challenges and prospects for elimination. *BMC Public Health, 21*(1), 1203.https://doi.org/10.1186/s12889-021-11241-2

7.World Health Organization. (2004). *First steps for managing an outbreak of acute diarrhoea.* Geneva: WHO.

8. Dan-Nwafor, C., Ipadeola, O., Smout, E., Nguku, P., Waziri, N., Mba, N., & Adeoye, O. (2019)**.**A cholera outbreak in a rural north-central Nigerian community: An unmatched case–control study. *BMC Public Health, 19,* 1126.https://doi.org/10.1186/s12889-019-7452-x

9. CronbachLJ; Coefficient alpha and the internal structure of tests.Psychometrika,,1951,16: 297-334

10 .Oloruntoba, E. O., Fawole, O. I., & Kayode, O. T. (2014). Perceptions and practices of cholera prevention in Ibadan, Nigeria. BMC Infectious Diseases, 14(1), 546.

11.Egbere, O. J., Nwankwo, O. C., & Oguntade, J. B. (2019). Myths and misconceptions about cholera in rural Nigeria: Implications for prevention. Journal of Public Health in Africa, 10(1),29.

12.Iriemenam, N. C., Nwaokorie, F. O., Olawale, O., & Ogbonna, G. (2020). Knowledge, attitudes, and practices regarding cholera in Nigerian rural communities. African Journal of Health Sciences, 30(4), 1123-1135.

13.Adewale, B., Akinbodewa, A., & Olowu, A. O. (2018)**.**Perception and prevention practices of cholera in selected slums of Lagos State, Nigeria. *Nigerian Journal of Health Sciences*, *18*(2), 57–66.

14.Dairo, M. D., & Ibrahim, T. F. (2020). Effectiveness of community-based interventions on cholera knowledge and practice in rural Nigeria. BMC Public Health, 20(1), 724.