© APR 2026 | IRE Journals | Volume 9 Issue 10 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I10-1715973

Knowledge, Attitude, And Health Education Prevention Practices on Cholera Infection Prevention Among Food Vendors in Two Local Government Areas of Osun State, Nigeria.

SALAMI, SARAFADEEN KUNLE[1], JAMES EBUN ATOLAGBE[2], BODE KAYODE[3], ELIZABETH FOLASADE ADENIRAN[4], PETER OLUMUYIWA OLUYIDE[5]

[1,2,3]*Department of Public Health, Adeleke University, Ede, Osun State*
[4,5]*Department of Community Medicine, Osun state University Teaching Hospital, Osogbo, Osun State*

Abstract- ***Cholera is a severe bacteria disease of Public health concern that has the potential to kill a large number of people, with propensity for swift spread. Vibrio cholerae the causative organism has two serogroups, O1 and O139 that are linked to pandemic and epidemic in humans, contaminated water and food are the main routes of transmission and in 2024 Nigeria has 3.3% CFR. This study compared the effects of Health Education intervention programme on cholera prevention and strategies among food vendors in the Osogbo metropolis. A multistage sampling procedure was adopted after which a two groups simple randomized experimental design was used for this study; it was carried out in two Local Government Areas using three stages, namely, pre-intervention, intervention, and post-intervention stages. The study population comprised of about three hundred food vendors from which a sample size of one hundred and sixteen (116) were drawn. The questionnaire were administered using interviewed administered questionnaire approach, data were analyzed using the IBM Statistical Package for Service Solutions (SPSS) version 22. Most of the respondents 35 (30.2%) fall within age range 41 – 50 years of age. Majority 106 (91.4%) were females, most 98 (84.5%) of the respondents were Yoruba. Most 55 (47.4%) of the respondents has senior secondary certificate. Most 41 (33.3%) of the respondents have been vending for between 5-10years. Majority 112 (96.6%) of the respondents were aware of the cholera infection and the major sources of their information's were radio 81(72.3%) at (χ 2 = 10.036, P = 0.002) and television 68 (60.7%) at (χ 2 = 5.390, P = 0.014). Forty five 45 (80.4%) of the respondents believed that drinking contaminated water and 40 (71.4%) believed that consuming contaminated food were routes of cholera infection transmission. Most of the respondents 79 (70.5%) at (χ 2 = 1.074, P = 0.300) believed that boiling water for five minutes is a way to prevent cholera infection. Moreover, 66 (58.9%) at (χ 2 = 0.148, P = 0.701) believed that avoiding uncooked food can prevent cholera infection. Meanwhile 74 (66.1%) at (χ 2 =1.434, P =0.231) in the control and study groups believed that cooking food thoroughly can prevent cholera infection and 78(69.6%) at (χ 2 = 1.520, P = 0.216) in the control and study groups believed that washing food with uncontaminated water could prevent cholera infection.Majority 78.60% believed that health education is a tool to reduce cholera infection. Twenty-four (35.8%) of the respondents in the control group and 43 (64.2 %) of the respondents in the study group have good practice towards cholera infection after health education intervention.Fifty four (93.1%) of the respondents in the study group were of opinion that proper hand washing before handling food can prevent cholera infection after health education. In conclusion from this study that health education intervention had improved the cholera prevention strategies among the respondents and there are needs for continuous health education.***

Index Terms- ***Cholera, Health Education, Food vendors, Osogbo metropolis***

I. INTRODUCTION

Cholera is a severe bacteria disease of Public health concern that has the potential to kill a large number of people, with propensity for swift spread and has a major impact on trade and travel (Fagbamila et al., 2023). Vibrio cholerae the causative organism is a facultative anaerobic, comma-shaped, motile, non-spore-forming Gram-negative rod that is a member of the Vibrionaceae family. The bacteria was isolated from both fresh and saltwater due to its capacity to withstand elevated concentrations of sodium chloride (Willey et al. 2014). Bivalves, protozoa, water birds,

animals with chitin exoskeletons, aquatic plants, and abiotic substrates like sediments have all been linked to V. cholerae in water bodies. (Salako et al., 2021). Vibrio cholerae is divided into over 200 distinct serogroups based on the structure of the O antigen in lipopolysaccharide. Two of these serogroups, O1 and O139, are linked to pandemic and epidemic cholera in humans. Several biochemical assays and susceptibility to particular bacteriophages are used to further classify Serogroup O1 into Classical and El Tor biotypes. There are three primary serotypes in these biotypes: Ogawa, Inaba, and Hikojima (Ramamurthy & Ghosh, 2021).

The prevention and control of cholera can be accomplished by the provision of safe drinking water, improving sanitation, food hygiene, personal cleanliness, and clinical case management. To stop cholera from spreading during outbreaks, an oral cholera vaccine has been developed and implemented (Olu et al., 2023). Eighty percent of cases of cholera are mild and asymptomatic, with an incubation period varying from two hours to five days. The spread of cholera can be stopped by early discovery, confirmation, and proper action (Fagbamila et al., 2023). The route of transmission is the fecal-oral route; cholera outbreaks are mainly caused by internal displacement caused by natural and man-made calamities, which results in unstable living conditions (Dan-Nwafor et al., 2019).

An estimated 28,000 to 150,000 people die from cholera each year, and there are 3 to 5 million cases worldwide. However, emerging nations with high human poverty indices in the tropics and subtropics are more likely to contract the illness. In South and Central America, Africa, and portions of Asia and the Middle East, cholera is endemic. Recurrent cholera epidemics with high case-fatality rates and a significant disease burden have occurred throughout Africa (Dan-Nwafor et al., 2019). Cholera is prevalent in Nigeria, according to historical statistics, with significant outbreaks occurring since 1970, including significant ones in 1991, 1999, 2010, 2018, and 2024 (Eneh et al., 2024).

Cholera was responsible for ninety-five thousand (95,000) fatalities, and 2.9 million cases are estimated to occur each year in 69 endemic nations globally. In 69 endemic nations, cholera poses a threat to one billion and three hundred thousand people, and each year, around 7.50 deaths per 100,000 people are in danger of dying from the disease (Nasr et al., 2024). The case fatality ratio (CFR) in Africa has persistently surpassed the recommended 1% by the WHO, averaging 2.2% annually and affecting an average of 23 different countries (Amisu et al., 2024).

The WHO African region recorded, on average, 28 cholera outbreaks per year since 2000, with an average of 113,632 cases per year and 2,633 deaths every year. A total of 2,727172 cases and 63182 deaths were recorded from 2000 to 2023, an average case fatality rate (CFR) of 2.3%. (Koua et al., 2025). Cholera has been endemic in Africa since the 1970s. About 1.7 million cases of cholera are reported each year, putting an estimated 550 million people in sub-Saharan Africa (SSA) in danger. (Zerbo et al., 2020).

In east African region the WHO Regional Office for Africa (AFRO) reported that from January to December 2023, about 667,000 cases and 4,000 deaths occurred across Malawi, Zimbabwe, the Democratic Republic of the Congo, Zambia, and Mozambique (Amisu et al., 2024). As of January 2024, six African nations—Burundi, Ethiopia, Kenya, the United Republic of Tanzania, Zambia, and Zimbabwe—had reported a total of 5,796 new cases of cholera with active transmission in 13 countries. In southern African nations, particularly Malawi and Mozambique. Outbreaks were expanding throughout the region, reaching South Africa, Tanzania, Zambia, and Zimbabwe. Malawi had the continent's largest active cholera outbreak, with 54,841 cases and 1,684 fatalities (Smith et al., 2024) (Baltazar et al., 2022).

In 2021, the African region experienced its first, most severe, and deadliest outbreak in decades, with a total of 137,125 cases and 4,065 deaths reported. This situation was driven by the unprecedented high burden from cholera outbreaks reported in West Africa that led to at least 108,859 cases and 3,711 deaths. Since 2021, the number of affected countries has increased, leading to 193,000 cases reported in 2023 (Koua et al., 2025). In West Africa sub-region the CFR has increased by 0.4% in Cameroon, 1.2%

in Liberia, 2.2% in Benin, and 3.5% in Nigeria, despite the fact that the CFR from the African area has fallen. (Elimian et al., 2022). In addition to taking lives, cholera illness results in significant financial losses, which further impedes Africa's socioeconomic progress, the cost of treating cholera in 44 African nations is estimated to be US$130 million. (Olu et al., 2023).

In Nigeria, cholera was first notified in December 1970, which led to an epidemic of 22,931 cases and 2,945 deaths with intermittent outbreaks occurring since then (Asaolu and Abiona, 2024). Kano State has seen yearly outbreaks with high case fatality ratios ranging from 4.98% in 2010 to 5.10% in 2018 (Ngwa et al., 2021). By September 29, 2024, 36 states in Nigeria had reported 10,837 suspected cases, with 359 deaths (CFR 3.3%). Age groups under five years old are most impacted by suspected cases since the start of the year. Of all suspected cases, 48% are female and 52% are male. Of the 36 states where cholera cases have been documented, Lagos has 43% of all suspected cases in the nation (4,667 cases). Sixty-two percent of the suspected cases this year (2024) are from other states. The number of suspected cholera cases and dearth this year has climbed by 220% and 239% respectively (NCDC, 2024). Research on cholera among Nigerian food sellers is very essential because of the risk of food and water contamination, which can result in outbreaks and public health emergencies. Food sellers, particularly street food vendors, frequently work in unsanitary and unhygienic conditions, which raises the possibility that food and water may be contaminated with cholera bacteria. Food vendors might not know how to handle food properly, which could lead to cholera outbreaks. Vendors' poor personal cleanliness, inadequate waste disposal, and lack of access to clean water are major contributors to cholera outbreaks. (Nneoma, U. C. 2024).

Cholera is a dangerous diarrhoeal disease that can be lethal, particularly in places with inadequate sanitation and little access to medical care. Outbreaks of foodborne cholera have the potential to overwhelm healthcare systems and impact huge populations due to their fast spread. To prevent extensive outbreaks and lessen the disease's burden, research on cholera among food vendors is crucial for detecting and reducing risks. The creation and execution of focused interventions, such food vendors' cleanliness training programs, can be guided by research findings. In order to fill in those gaps, studies might be used to pinpoint specific areas where food safety procedures are lacking. Effective interventions and long-lasting effects depend on cooperation with stakeholders, including governmental organisations and medical professionals. (Emmanuel, I., O et al. 2025).

Research on cholera in food sellers can be used to assess advancements in food safety procedures and evaluate the success of treatments. To spot new issues and modify plans to deal with them, regular study and surveillance are required. Public health officials can more effectively distribute resources and put preventative measures in place if they have a better grasp of the dynamics of cholera transmission in connection to food vending. In essence, studies on cholera among food vendors in Nigeria are vital for protecting public health, preventing outbreaks, and promoting safer food practices within the community. Research on cholera among Nigerian food sellers is essential because of the risk of food and water contamination, which can result in outbreaks and public health emergencies. Food sellers, particularly street food vendors, frequently work in unsanitary and unhygienic conditions, which raises the possibility that food and water may be contaminated with cholera bacteria. Food vendors might not know how to handle food properly, which could lead to cholera outbreaks. Vendors' poor personal cleanliness, inadequate waste disposal, and lack of access to clean water are major contributors to cholera outbreaks. (Eneh, S. et al. 2024)

Cholera is a dangerous diarrhoeal disease that can be lethal, particularly in places with inadequate sanitation and little access to medical care. Outbreaks of foodborne cholera have the potential to overwhelm healthcare systems and impact huge populations due to their fast spread.

Despite all these statistics and prevention practices on cholera prevention strategies, to prevent extensive outbreaks and lessen the disease's burden, research on cholera among food vendors is crucial for detecting and reducing risks. The creation and execution of focused interventions, such as food vendors'

cleanliness training programmes, can be guided by research findings. In order to fill in those gaps, studies might be used to pinpoint specific areas where food safety procedures are lacking. Effective interventions and long-lasting effects depend on cooperation with stakeholders, including governmental organisations and medical professionals. (Eneh, S. et al. 2024)

Research on cholera in food sellers can be used to assess advancements in food safety procedures and evaluate the success of treatments. Regular study and surveillance are necessary to identify new issues and adjust plans to address them. Public health officials can more effectively distribute resources and put preventative measures in place if they have a better grasp of the dynamics of cholera transmission in connection to food vending. (Ejomarie and Ernest, 2022).

In essence, studies on cholera among food vendors in Nigeria are vital for protecting public health, preventing outbreaks, and promoting safer food practices within the community. (Nneoma, U. C. 2024).

II. MATERIALS AND METHODS

Study Design

The study employed an experimental study design (Two groups simple randomized experimental design) was used for this study; it was carried out in three stages, namely, pre-intervention, intervention, and post-intervention stages.

Study Population:

Food vendors in Osogbo metropolis who are between the ages of 21-60 years. They were identified through their various LGA Waste Environmental and sanitation (WES) department, a department in charge of food inspection and environmental sanitation.

The multi-stage sampling method was used for this study due to the large size of the study area. There are three LGAs that make up the Osogbo metropolis.

Stage 1: Two out of the 3 LGAs that makes up Osogbo metropolis were selected using a simple random sampling method by balloting.

Stage 2: One of the LGAs were selected from two of the LGAs selected in stage 1, using a simple random sampling method by balloting as the study LGA, while the second LGA was the control LGA.

Equal allocation of samples were carried out, half of the sample size was allocated to the study group while remaining half was allocated to the control group.

Stage 3: Two-thirds of the wards were selected from the list of the wards in the study LGA and Control LGA using a simple random sampling method by balloting.

Stage 4: Two streets were selected from the list of the wards selected in stage 3 above for both study and control groups using simple random sampling by balloting.

Stage 5: Ten food vendor shops/outlets were selected using simple random sampling by balloting from the list of food vendors shops/outlet on each streets selected in stage 4.

Stage 6: Eligible respondents were selected using simple random sampling by balloting from the list of food vendors in the food vendors shops/outlet selected in stage 5 above.

Ethical Considerations:

Ethical clearance certificates were obtained from both the Adeleke University ethical review committee with the number (AUERC/2025/33PH/28) and the Osun State Ministry of Health (OSHREC/PRS/569T/1154). Individual consents to participate in the study were obtained before the study is carried out.

Data Collection Methods

Recruitment of research assistant:

Research assistants were recruited from Osun State University Teaching Hospital, Osogbo, among the residents' doctors in the department of community medicine. It will also include the nurses, CHEW, medical students, and nursing students from the same institution. The training will take place in the department of community medicine and will last

three days between the hours of 10am and 1pm. The training includes an overview of the topic, aim, and specific objectives of the study, and ethics of research. Using a sample of the questionnaire, a detailed explanation of each question was made, and confidentiality and privacy of the study was emphasized. An understanding of the survey procedure, methodology, and coordination of the project, logistics, and standardization of the process was emphasized during the training. Training methods will include lectures, group discussion, simulation, and role play. After the pre-test of the questionnaire, a one-day refresher training was done to consider the changes that were made to the questionnaire.

Quantitative data collection

The study questionnaire was an interviewer-administered and research assistant helped in data collections.

Data Management

Assessment of variables

Socio-demographic characteristics—it was assessed based on the questionnaire. The variables were expressed in proportions and percentages, and the urban and rural respondents were compared using chi-square. Continuous variables were expressed as means. Associations with cholera prevention was assessed for statistical significance.

Knowledge on cholera prevention and control: 13 questions were used to assess respondents' knowledge on cholera prevention; each correct response was scored 1-point, incorrect responses were scored zero points, and don't know will also be scored zero points. The maximum score possible for knowledge were 13, and the mean score was 6.5. The respondents who score below the mean was regarded as having poor knowledge, while those who scored up to or above the mean score was regarded as having good knowledge.

Attitude of the respondents on cholera prevention and control:

The Likert scale was used to assess attitude; questions were on the scale points: strongly agree, agree, undecided, disagree, and strongly disagree. They were scored 5, 4, 3, 2, and 1 points, respectively 5 absolute, 4 near absolute, 3 fair absolute, 2 poorly absolute, 1 not absolute. Twelve (12) questions were asked in relation to attitude.

For each of the respondents, its attitude was graded as

$12 \times 5 = 60$ most favorable attitude

$12 \times 3 = 36$ neutral attitudes

$12 \times 1 = 12$ most unfavorable attitude

An individual with a score of 30 and above is said to have positive attitude.

An individual with a score of less than 30 is said to have negative attitude.

Data analysis

Completed questionnaires were sorted, the data was clean, and thereafter carefully entered into a computer using Epidata software. The information obtained were analyzed using the IBM Statistical Package for Service Solutions (SPSS) version 22. Analysis included both univariate and bivariate

III. RESULTS

One hundred and sixteen participants were enrolled from two Local Government Areas of Osogbo metropolis. Data were collected from the two LGAs at pre-intervention phase. Health education intervention was conducted at the study LGA while the health education intervention at the control LGA was delayed until after post intervention data were collected. Post intervention data were collected from both study and control LGA 24 weeks after health education intervention on the study LGA only.

IV. SOCIO-DEMOGRAPHIC INFORMATION OF PARTICIPANTS

Table 4.1 Respondents Socio-demographic characteristics, most of the respondents 35 (30.2%) fall within age range 41 – 50 years of age. Majority 106 (91.4%) were females, most 98 (84.5%) of the respondents were Yoruba, while majority 73 (62.9%)

© APR 2026 | IRE Journals | Volume 9 Issue 10 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I10-1715973

of the respondents practice Christianity as a religion. Most 55 (47.4%) of the respondents has senior secondary certificate. Most 41 (33.3%) of the respondents have been vending for between 5-10years.

Section A: Socio-demographic characteristics

Table 4.1: Frequency distribution and Chi square values of the Socio-demographic characteristics of respondents

Variable	Control Group		Study Group		Total		Statistics
	Freq (n=58)	%	Freq (n=58)	%	Freq	%	
Age group							
21-30 years	12	20.7	14	24.1	26	22.4	χ^2 =1.261
31-40 years	15	25.9	16	27.6	31	26.7	*p* =0.868
41-50 years	18	31.0	17	29.3	35	30.2	
51-60 years	13	23.4	11	18.9	24	20.6	
Gender							
Male	5	8.6	5	8.6	10	8.6	χ^2 =<0.001
Female	53	91.4	53	91.4	106	91.4	*p* =1.000
Ethnicity							
Yoruba	49	84.5	49	84.5	98	84.5	χ^2 =5.545
Igbo	7	12.1	7	12.1	14	12.1	*p* =0.136
Others	0	0.0	2	3.4	2	1.7	
Benue	2	3.4	0	0.0	2	1.7	
Religion							
Christianity	41	70.7	32	55.2	73	62.9	χ^2 =2.993
Islam	17	29.3	26	44.8	43	37.1	*p* =0.084
Highest level of Education							
No formal education	7	12.1	8	13.8	15	12.9	χ^2 =8.569
Primary	13	22.4	11	19.0	24	20.7	*p* =0.101
Junior Second	4	6.9	9	15.5	13	11.2	
Senior Second,	26	44.8	29	50.0	55	47.4	
Tertiary	8	13.8	1	1.7	9	7.8	
Duration vending business							
Less than 5	12	20.7	15	25.9	27	23.3	X 2=1.220
5-10	22	37.9	19	32.8	41	35.3	*p* =0.875
10-15	8	13.8	8	13.8	16	13.8	
15-20	5	8.6	3	5.2	8	6.9	
More than 20	11	19.0	13	22.4	24	20.7	

Knowledge of respondents at baseline towards cholera infection

Table 4.3: Respondents Knowledge at baseline towards cholera infection

Variable	Control Freq (n=58)	%	Study Group Freq (n=58)	%	Total Freq	%	Statistics
Awareness of cholera infection							
Yes	56	96.6	56	96.6	112	96.6	χ^2 <0.001 *p* =1.000
Sources of information on cholera infection							
Family member	31	55.4	24	42.9	55	49.1	χ^2 =1.751 *p* =0.186
Neighbor/friend	33	58.9	27	48.2	60	53.6	χ^2 =1.292 *p* =0.256

Clinician/healthcare worker	39	69.6	22	39.3	61	54.5	χ^2 =10.404 p =0.001
Radio	48	85.7	33	58.9	81	72.3	χ^2 =10.036 p =0.002
Television	40	71.4	28	50.0	68	60.7	χ^2 =5.390 p =0.020
Community meeting	33	58.9	20	35.7	53	47.3	χ^2 =6.053 p =0.014
Community health workers on outreach	32	57.1	19	33.9	51	45.5	χ^2 =6.084 p =0.014
Brochures, posters printed materials	25	44.6	18	32.1	43	38.4	χ^2 =1.850 p =0.174
Magazines	28	50.0	16	28.6	44	39.3	χ^2 =5.390 p =0.020
Religious house	25	44.6	16	28.6	41	36.6	χ^2 =3.116 p =0.078
Others	3	5.4	7	12.5	10	8.9	χ^2 =1.757 p =0.185

Knowledge on route of transmission of cholera infection

Majority 92 (82.1 %) of respondents at ($\chi2$ = 0.243, p = 0.622) for both control and study groups believed that drinking contaminated water is the main route of transmission of cholera infection also 86 (76.8%) of respondents at ($\chi2$ = 1.803, p = 0.179) for both control and study groups believed that consuming contaminated food is one the routes of transmission of cholera infection

Forty-seven (83.9 %) of the respondents in the control group and 45 (80.4%) of the respondents in the study group believed that drinking contaminated water is a route of cholera infection. Also 46 (82.1%) of the control group and 40 (71.4%) believed that consuming contaminated food is a route of cholera infection.

Table 4.4: Respondents knowledge on the route of transmission of cholera infection

Variable	Control Freq (n=58)	%	Study Group Freq (n=58)	%	Total Freq	%	Statistics
Drinking contaminated water							
Yes	47	83.9	45	80.4	92	82.1	χ^2 =0.243
No	9	16.1	11	19.6	20	17.9	p =0.622
Eating contaminated food							
Yes	46	82.1	40	71.4	86	76.8	χ^2 =1.803
No	10	17.9	16	28.6	26	23.2	p =0.179
Infected fruits and vegetables							
Yes	40	71.4	37	66.1	77	68.8	χ^2 =0.374
No	16	28.6	19	33.9	35	31.3	p =0.541
Flies/insects contamination							
Yes	43	76.8	38	67.9	81	72.3	χ^2 =1.115
No	13	23.2	18	32.1	31	27.7	p =0.291
Personal and hands hygiene							
Yes	42	75.0	35	62.5	77	68.8	χ^2 =2.036
No	14	25.0	21	37.5	35	31.3	p =0.154
Others							

© APR 2026 | IRE Journals | Volume 9 Issue 10 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I10-1715973

Yes	1	1.8	4	7.1	5	4.5	χ^2 =1.884
No	55	98.2	52	92.9	107	95.5	*p* =0.170

4.5 Knowledge on signs and symptoms of cholera infection

Ninety-one (81.3%) of the respondents believed that vomiting is a sigh of cholera at ($\chi2$ = 0.527, p = 0.668) for both control and study groups. Eighty-two (73.2%) of the respondents at ($\chi2$ = 1.639, p = 0.200) for both control and study groups believed that diarrhea is a sign of cholera, while 71 (63.4%) at ($\chi2$ = 0.346, p = 0.556) for both study and control groups believed that fever was a sign of cholera. Sixty-seven (59.8%) of the respondents at ($\chi2$ = 1.820, p = 0.77) for both study and control groups believed that stomach pain is a sign of cholera.

Forty-seven (83.9%) of respondents in the control group and 44 (78.6%) of respondents in the study group believed that vomiting is a sign of cholera, Meanwhile, 44 (78.6%) of respondents in the control group and 38 (67.9%) of respondents in the study group believed that Diarrhea is a sign of cholera.

Table 4.5: Respondents knowledge on signs and symptoms of cholera infection

Variable	Control Freq (n=58)	%	Study Group Freq (n=58)	%	Total Freq	%	Statistics
Fever							
Yes	37	66.1	34	60.7	71	63.4	χ^2 =0.346
No	19	33.9	22	39.3	41	36.6	*p* =0.556
Vomiting							
Yes	47	83.9	44	78.6	91	81.3	χ^2 =0.527
No	9	16.1	12	21.4	21	18.8	*p* =0.468
Watery diarrhea							
Yes	44	78.6	38	67.9	82	73.2	χ^2 =1.639
No	12	21.4	18	32.1	30	26.8	*p* =0.200
Stomach pain							
Yes	37	66.1	30	53.6	67	59.8	χ^2 =1.820
No	19	33.9	26	46.4	45	40.2	*p* =1.77
Bloody stool							
Yes	32	57.1	28	50.0	60	53.6	χ^2 =0.574
No	24	42.9	28	50.0	52	46.4	*p*=0.449
Dehydration							
Yes	30	53.6	35	62.5	65	58.0	χ^2 =0.917
No	26	46.4	21	37.5	47	42.0	*p* =0.338
Others							
Yes	1	1.8	3	5.4	4	3.6	χ^2 =1.037
No	55	98.2	53	94.6	108	96.4	*p* =0.309

Knowledge on mode of prevention of cholera infection

Seventy-nine 79 (70.5%) of the respondents at ($\chi2$ = 7.260, p = 0.007) in the control and study groups believed that washing household with clean water is a necessary mode of prevention of cholera infection. Most of the respondents 79 (70.5%) at ($\chi2$ = 1.074, p = 0.300) in the control and study groups believed that boiling water for five minutes is a way to prevent cholera infection and 80 (71.4%) of respondents at ($\chi2$ = 1.575, p = 0.209) in the control and study groups believed that storing water in a clean container is a way to prevent cholera infection. Moreover, 66 (58.9%) at ($\chi2$ = 0.148, p = 0.701) in the control and study groups believed that avoiding uncooked food can prevent cholera infection. Meanwhile 74 (66.1%) at ($\chi2$ =1.434, p = 0.231) in

the control and study groups believed that cooking food thoroughly can prevent cholera infection and 78(69.6%) at ($\chi 2$ = 1.520, p = 0.216) in the control and study groups believed that washing food with uncontaminated water could prevent cholera infection.

Forty-two (75%) of the control group and 35 (62.5%) of the study group believed that hand washing can prevent cholera infection and 46 (82.1%) in the control and 33 58.9% in the study group believed that washing household surface with clean water can prevent cholera. Forty two (75%) of the respondents in the control group and 37 (66.1%) of the respondents in the study group believed that boiling water for at least 5 minutes can prevent cholera infection.

Table 4.6: Respondents knowledge on mode of prevention of cholera infection

Variable	Control Freq (n=56)	%	Study Group Freq (n=56)	%	Total Freq	%	Statistics
Boiling water for at least five minutes							
Yes	42	75.0	37	66.1	79	70.5	χ^2 =1.074
No	14	25.0	19	33.9	33	29.5	*p* =0.300
Storing water in a clean container							
Yes	43	76.8	37	66.1	80	71.4	χ^2 =1.575
No	13	23.2	19	33.9	32	28.6	*p* =0.209
Using clean toilets							
Yes	40	71.4	36	64.3	76	67.9	χ^2 =0.655
No	16	28.6	20	35.7	36	32.1	*p* =0.418
Washing hands thoroughly							
Yes	42	75.0	35	62.5	77	68.8	χ^2 =2.036
No	14	25.0	21	37.5	35	31.3	*p* =0.154
Drinking water only from an uncontaminated source							
Yes	38	67.9	33	58.9	71	63.4	χ^2 =0.962
No	18	32.1	23	41.1	41	36.6	*p* =0.327
Washing food with uncontaminated water							
Yes	42	75.0	36	64.3	78	69.6	χ^2 =1.520
No	14	25.0	20	35.7	34	30.4	*p* =0.218
Disposing human waste							
Yes	34	60.7	35	62.5	69	61.6	χ^2 =0.038
No	22	39.3	21	37.5	43	38.4	*p* =0.846
Cooking food thoroughly							
Yes	40	71.4	34	60.7	74	66.1	χ^2 =1.434
No	16	28.6	22	39.3	38	33.9	*p* =0.231
Washing household surfaces with clean water							
Yes	46	82.1	33	58.9	79	70.5	χ^2 =7.260
No	10	17.9	23	41.1	33	29.5	*p* =0.007
Avoiding uncooked food unless it can be peeled or shelled							
Yes	34	60.7	32	57.1	66	58.9	χ^2 =0.148
No	22	39.3	24	42.9	46	41.1	*p* =0.701
Eating food when it still hot							
Yes	38	67.9	28	50.0	66	58.9	χ^2 =3.689
No	18	32.1	28	50.0	46	41.1	*p* =0.055
Praying							
Yes	11	19.6	14	25.0	25	22.3	χ^2 =0.463

No	45	80.4	42	75.0	87	77.7	p =0.496
Consulting a healer							
Yes	3	5.4	9	16.1	12	10.7	χ^2 =3.360
No	53	94.6	47	83.9	100	89.3	p =0.067

Attitude of respondents at baseline towards cholera infection

Most 61 (54.5%) of the respondents at ($\chi2$ = 20.443, p = 0.001) thought that cholera is contagious, sixty three 63 (56.3%) at ($\chi2$ = 19.747, p = 0.001) thought that cholera can be fatal. 57 (50.9%) at ($\chi2$= 12.456, p = 0.0014) thought that cholera infection can be prevented. However, 28 (25%) at ($\chi2$ = 5.515, p= 0.229) of the respondents agreed that cultural practices may affects cholera infection which was statistically insignificant compare to others that were statistically significant.

Forty one (73.2%) of the respondents in the control group and 20 (35.7%) of the respondents in the study group strongly thought that cholera is contagious. Thirty seven (66.1%) of the respondents in the control group and 26 (46.4%) of respondents in the study group thought that cholera is fatal and 34 (60.7%) of respondents in the control group and 23 (41.1%) respondents in the study group thought that cholera is preventable.

Section C: Respondents attitude at baseline towards cholera infection

Table 4.8 Respondents attitude at baseline towards cholera infection

Variable	Control		Study Group		Total		Statistics
	Freq (n=58)	%	Freq (n=58)	%	Freq	%	
Cholera is contagious							
Strongly disagree	0	0.0	2	3.6	2	1.8	χ^2 =20.443
Disagree	3	5.4	8	14.3	11	9.8	p=0.001
Indifferent	4	7.1	16	28.6	20	17.9	
Agree	8	14.3	10	17.9	18	16.1	
Strongly agree	41	73.2	20	35.7	61	54.5	
Cholera is fatal							
Strongly disagree	0	0.0	2	3.6	2	1.8	χ^2 =19.747
Disagree	0	0.0	7	12.5	7	6.3	p=0.001
Indifferent	5	8.9	13	23.2	18	16.1	
Agree	14	25.0	8	14.3	22	19.6	
Strongly agree	37	66.1	26	46.4	63	56.3	
Cholera is preventable							
Strongly disagree	0	0.0	1	1.8	1	0.9	χ^2 =12.456
Disagree	0	0.0	4	7.1	4	3.6	p=0.014
Indifferent	6	10.7	14	25.0	20	17.9	
Agree	16	28.6	14	25.0	30	26.8	
Strongly agree	34	60.7	23	41.1	57	50.9	
Travelling to an area with cholera outbreak can increase spread of the disease							
Strongly disagree	1	1.8	0	0.0	1	0.9	χ^2 =10.657
Disagree	2	3.6	9	16.1	11	9.8	p=0.031
Indifferent	4	7.1	10	17.9	14	12.5	
Agree	23	41.1	16	28.6	39	34.8	
Strongly agree	26	46.4	21	37.5	47	42.0	
Cultural practice may influence the spread of cholera							
Strongly disagree	18	32.1	8	14.3	26	23.2	χ^2 =5.515
Disagree	6	10.7	9	16.1	15	13.4	p=0.229
Indifferent	8	14.3	8	14.3	16	14.3	
Agree	13	26.8	15	26.8	28	25.0	

Strongly agree	11	28.6	16	28.6	27	24.1	
Drinking contaminated water increase the spread of cholera							
Strongly disagree	3	5.4	4	7.1	7	6.3	χ^2 =17.443
Disagree	0	0.0	8	14.3	8	7.1	*p*=0.002
Indifferent	5	8.9	10	17.9	15	13.4	
Agree	15	26.8	16	28.6	31	27.7	
Strongly agree	33	58.9	18	32.1	51	45.5	
Poor hand washing habits will promote the spread of cholera							
Strongly disagree	0	0.0	4	7.1	4	3.6	χ^2 =17.321
Disagree	0	0.0	6	10.7	6	5.4	*p*=0.002
Indifferent	6	10.7	10	17.9	16	14.3	
Agree	16	28.6	13	23.2	29	25.9	
Strongly agree	34	60.7	23	41.1	57	50.9	
Unhygienic environment in Osogbo metropolis will encourage the spread of cholera							
Strongly disagree	4	7.1	2	3.6	6	5.4	χ^2 =18.764
Disagree	1	1.8	15	26.8	16	14.3	*p*=0.001
Indifferent	15	26.8	10	17.9	25	22.3	
Agree	14	25.0	7	12.5	21	18.8	
Strongly agree	22	39.3	22	39.3	44	39.3	
Inappropriate use of latrines will encourage the spread of cholera							
Strongly disagree	1	1.8	2	3.6	3	2.7	χ^2 =18.559
Disagree	0	0.0	8	14.3	8	7.1	*p*=0.001
Indifferent	8	14.3	15	26.8	23	20.5	
Agree	17	30.4	7	12.5	24	21.4	
Strongly agree	30	53.6	24	42.9	54	48.2	
Presence of animal faeces will encourage the spread of cholera							
Strongly disagree	0	0.0	2	3.6	2	1.8	χ^2 =25.879
Disagree	1	1.8	11	19.6	12	10.7	*p*<0.001
Indifferent	9	16.1	13	23.2	22	19.6	
Agree	23	41.1	5	8.9	28	25.0	
Strongly agree	23	41.1	25	44.6	48	42.9	
Government is doing anything to prevent cholera							
Strongly disagree	2	3.6	6	10.7	8	7.1	χ^2 =14.639
Disagree	2	3.6	7	12.5	9	8.0	*p*=0.006
Indifferent	12	21.4	20	35.7	32	28.6	
Agree	21	37.5	7	12.5	28	25.0	
Strongly agree	19	33.9	16	28.6	35	31.3	
Vaccination can prevent cholera							
Strongly disagree	3	5.4	1	1.8	4	3.6	χ^2 =12.303
Disagree	1	1.8	7	12.5	8	7.1	*p*=0.015
Indifferent	13	23.2	23	41.1	36	32.1	
Agree	13	23.2	10	17.9	23	20.5	
Strongly agree	26	46.4	15	26.8	41	36.6	

Practice of respondents at baseline towards cholera infection

Majority 91 (81.3%) at ($\chi2$ = 13.34, p= 0.001) of the respondents covers there food from flies as a way to protect them from cholera, 98 (87.5%) at ($\chi2$ = 5.224, p= 0.022) of respondents wash their hands before handling food in protecting themselves from cholera infection. Majority 88 (78.6%) at ($\chi2$ = 7.79, p= 0.010) of the respondents said the prevent cholera by appropriate toilet usage.

Thirty-eight (67.9%) of the respondents in the control group and 35 (62.5%) of the respondents in the study group preserved their food in the refrigerator, also 29 (51.8%) of the respondents in the control group and 18 (32.1%) of the respondents in the study group disposes their refuse by open dumping. Forty two

(75.0%) of the respondents in the control and 38 (67.9%) of the respondents in the study group said they will go to the hospital if the suspect cholera infection.

Forty-five (80.4%) of the respondents in the control and 36 (64.35%) of the respondents in the study group will store water in clean container when they suspect cholera. Furthermore, 31 (55.4%) of the respondents in the control group and 25 (44.6%) of the respondents in the study group will stop eating in the public places when they suspect cholera.

Section D: Practice of respondents at baseline

Table 4.10 Respondents baseline practices towards cholera infection prevention

Variable	Control		Study Group		Total		Statistics
	Freq (n=58)	%	Freq (n=58)	%	Freq	%	
Food preservation							
Fridge	38	67.9	35	62.5	73	65.2	χ^2 =3.155
Salting	10	17.9	12	21.4	22	19.6	*p*=0.532
Sundry	7	12.5	6	10.7	13	11.6	
Canning	0	0.0	2	3.6	2	1.8	
Bottling	1	1.8	1	1.8	2	1.8	
Methods of waste disposal							
Wastebin	22	39.3	33	58.9	55	49.1	χ^2 =4.774
Open dump	29	51.8	18	32.1	47	42.0	*p*=0.092
Burning	5	8.9	5	8.9	10	8.9	
Flies protection							
Cover the food	39	69.6	52	92.9	91	81.3	χ^2 =13.340
Window net	5	8.9	3	5.4	8	7.1	*p*=0.001
Insecticulator	12	21.4	1	1.8	13	11.6	
Hands washing when handling food							
Yes	53	94.6	45	80.4	98	87.5	χ^2 =5.224
No	3	5.4	11	19.6	14	12.5	*p*=0.022
Action taken when cholera infection is suspected							
Go to hospital							
Yes	42	75.0	38	67.9	80	71.4	χ^2 =0.704
No	11	19.6	14	25.0	25	22.3	*p* =0.703
Don't know	3	5.4	4	7.1	7	6.3	
Prayer							
Yes	20	35.7	19	33.9	39	34.8	χ^2 =0.785
No	31	55.4	29	51.8	60	53.6	*p*=0.675
Don't know	5	8.9	8	14.3	13	11.6	
Seek traditional medicine							
Yes	8	14.3	14	25.0	22	19.6	χ^2 =2.136
No	39	69.6	33	58.9	72	64.3	*p*=0.344
Don't know	9	16.1	9	16.1	18	16.1	
Consume OTC							
Yes	10	17.9	21	37.5	31	27.7	χ^2 =5.824
No	37	66.1	26	46.4	63	56.3	*p*=0.054
Don't know	9	16.1	9	16.1	18	16.1	
Use of toilets properly							
Yes	50	89.3	38	67.9	88	78.6	χ^2=9.79
No	2	3.6	12	21.4	14	12.5	*p*=0.010
Don't know	4	7.1	6	10.7	10	8.9	
Always wash your hands with soap and water							

Yes	41	73.2	37	66.1	78	69.6	χ^2=1.538
No	11	19.6	11	19.6	22	19.6	*p*=0.463
Don't know	4	7.1	8	14.3	12	10.7	
Drink chlorinated water or boiling water only							
Yes	32	57.1	26	46.4	58	51.8	χ^2 =1.291
No	13	23.2	16	28.6	29	25.9	*p*=0.524
Don't know	11	19.6	14	25.0	25	22.3	

V. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Socio-demographic Characteristics

Most of the respondents fall within the age range of 41–50 years of age and were not statistically significant with either the control or study group, p= (0.868). The majority were females, and gender was not statistically significant with either the control or study group at p= (1.000). The predominant ethnic group was Yoruba. Furthermore, they are mostly Christian by faith. Most attain a senior secondary certificate in education. However, there is no statistical relationship between socio-demographic factors and the cholera prevention strategies. In a similar study carried out by Emmanuel et al. (2019), the findings were similar in age, gender, ethnicity, and religion; the findings also did not find any relationship between socio-demographic factors and cholera prevention strategies. The findings by Emmanuel et al. were slightly different from study findings; this could be due to different cultural backgrounds and beliefs. Moreover, it was carried out five years ago, in which perceptions and beliefs might have changed. The findings from this study imply that food vendor business was seen as female work; the implication of these findings was that most unemployed males can venture into the food vending business.

In another study carried out by Adebayo et al. (2023) in Ogun State, Nigeria. The mean age was 36.68 ± 9.09 years. The majority of the study's food vendors were women. Most had some kind of education. More than half were Christians. The majority of responders were Yorubas. The majority have received food handling training of some kind. The study found no relationship between socio-demographic factors and cholera prevention strategies. There were similarities in the findings from Adebayo et al.; this could be due to the fact that both studies were carried out in the same southwest geopolitical zone of Nigeria.

Knowledge of cholera prevention strategies among food vendors

The level of awareness of cholera infection was high among the respondents, and the major sources of their information were radio, television, clinicians/health workers, community meetings, and community health workers on outreach. In a similar study carried out by Di Gennaro et al. (2023), the level of awareness was equally high on cholera infection. These similarities could be due to the fact that cholera infection is not a noble disease and its nature of morbidity and fatality. In another study carried out in Calabar municipality by Okon et al. (2022), the findings confirm that a greater number of respondents were aware of cholera infection as a foodborne illness; the similarity could be due to the fact that both studies were carried out in Nigeria. It implies that the media houses and health educators were working assiduously. The findings from the study show a slight increase in the level of awareness compared to what was reported by both Di Gennaro et al. (2023) and Okon et al. (2022); this could be due to persistent health education information dissemination in Osun State and a robust health system in Osun State. It could also be due to the high level of civilization and education in southwestern Nigeria. The implication of the above findings is that an outbreak of cholera in Osun State could easily be curtailed. It was reported by Lokoja et al. that the major sources of information on cholera infection were radio, newspapers, television, and medical journals.

The study found out that the major ways to strategise to prevent cholera were boiling water and storing water in a clean container; the majority of respondents believed that storing water in a clean

container is a way to prevent cholera infection. In addition, most believed that avoiding uncooked food can prevent cholera infection, and more than half believed that cooking food thoroughly can prevent cholera infection. Furthermore, most believed that washing food with uncontaminated water could prevent cholera infection; equally, most believed that hand washing can prevent cholera infection, and the majority of the respondents believed that boiling water for at least 5 minutes can prevent cholera infection.

In a similar study by Emmanuel et al. (2019) on food hygiene knowledge and cholera prevention, some believed in cooking food separately, and some cooked food completely. Most use safe uncontaminated water. The majority believed that safe food preparation is crucial. The majority believed properly prepared food prevents food poisoning. In another study by Okon et al. (2022) among food handlers, the majority knew that raw and cooked food should be kept apart, and less than half believed that cutting fruits and vegetables with the same board that was used to cut raw food could lead to cross-contamination. Respondents were not statistically significant at a p-value < 0.05 for the following signs and symptoms of cholera: fever, vomiting, watery diarrhoea, stomach pain, bloody stool and dehydration. It was found from the study that boiling water for 5 minutes, storing water in a clean container, using a clean toilet, drinking water from uncontaminated sources, and washing hands thoroughly were not statistically significant at a p-value of < 0.05. The findings were similar in believing in clean water, avoidance of contamination, and proper food preparation. The reasons for the similarities may be due to the fact that the studies were carried out in Nigeria and imply that the Nigerian populace are now more sensitive to cholera infection. Good knowledge on cholera infection from various studies on signs and symptoms and various ways of prevention aids easy cholera control and probably eradication in the future.

Attitude towards cholera prevention strategies among food vendors

The findings find out that there was a good attitude toward cholera prevention strategies. Attitudes on whether cholera is contagious, cholera is fatal, cholera is preventable, travelling to an area with a cholera outbreak can increase the spread of the disease, cultural practices may influence the spread of cholera, drinking contaminated water increases the spread of cholera, and poor hand washing habits will promote the spread of cholera were statistically significant at a p-value of 0.05.

In a similar study carried out in Bangladesh, the majority had a good attitude towards cholera prevention. There are slight variations and differences with the study findings, which could be due to differences in the region where the study was carried out; the implication may be that they have a better health system in Bangladesh. In another study it was found that about half strongly agreed that hand washing can prevent cholera infection, in a study on food safety knowledge, attitudes, and practices of street food vendors in the Jashore region, Bangladesh. In the same study, 30.1% strongly agreed that hand washing is crucial before and after handling food. This finding is lower than the study findings, and it could be due to personal habit and low level of awareness among the Bangladeshi. The implication is that faeco-oral diseases can easily break out in Bangladesh.

It was reported by Okon et al. that about half agreed that the water used to wash utensils has to be changed often. Also, most strongly agreed that raw and cooked food should be stored apart. Additionally, less than half highly agreed that food handlers should cover their hair when preparing and serving food.

Moreover, in a study carried out on food safety knowledge, attitudes, and practices of street food vendors in the Jashore region, Bangladesh, most strongly agreed that knowing about food safety would improve their personal lives. An attitude toward food cleanliness was derived from the significance placed on hand washing both before and after handling food, learning about food safety, regularly changing the water used to wash utensils, and separating raw from cooked food. It was found that some of the respondents strongly agreed that vaccination can prevent cholera infection. In a study by Elimian et al. (2023) among healthcare workers in Bauchi State, it was reported that most strongly agreed that vaccination can prevent cholera infection.

There were no similarities in the findings, and this could be due to the difference in the regions where the studies were carried out. In general, there were better attitudes towards cholera prevention strategies than what was reported in various literature. The high level of awareness and knowledge among the study group could be responsible for a better attitude. This implies that people in Osun State are likely to take positive action towards cholera infection.

Assess and compare preventive practices of cholera prevention strategies.

From the study it was found that half of the respondents drink potable water to prevent cholera. It was reported by Timothy et al. (2023) that water is a resource that cannot be replaced; its usage by humans in a variety of contexts, including residential, agricultural, and industrial operations, cannot be disregarded. For the purposes of drinking, cooking, bathing, washing, and preventing diseases like cholera, households must have clean water. The similarity could be due to the importance of potable water in human life; it implies that man will always look for portable water for day-to-day activities. In Nigeria, most households had access to water by the end of 2015, and home connections to the pipe-borne water network had decreased to nearly zero. A similar scenario was equally found by WHO among other developing nations such as Togo, Turkey, and Mauritania (Timothy, 2023). The findings from this study are lower than the 69% found in 2015; it could be due to the fact that infrastructures have decayed over time and the shift from pipe-borne water to boreholes, which are more popular nowadays and equally expensive. The implication of the findings is that the populace are prone to waterborne diseases.

It was found out from the study that most of the respondents store their food in the refrigerator. Lokoja et al. (2024) reported in a similar study on knowledge, attitude, and practice of food hygiene among food vendors in Lafia, Nasarawa State, Nigeria, that the majority of the food vendors agree that improperly prepared food can lead to illness, health professionals should monitor food vending establishments, and refrigerators should be cleaned for food storage on a regular basis. These findings were slightly higher than the study findings, and the reasons could be due to differences in the methodology employed for the study. The implication is that refrigeration is a popular mode of food preservation, and an irregular power supply can easily lead to food spoilage and poisoning. The government should improve the power supply for better food storage in the refrigerator.

From the study, open dumping as a way of refuse disposal was reported in less than half of the respondents. In another study carried out by Emmanuel et al. (2019), it was reported that half of food vendors dispose of their solid waste in the open. Our findings are slightly lower than what was reported by Emmanuel et al. (2019). The difference might be due to improved health education and level of education of the respondents. The implication of the findings is that open dumping can be a breeding site for flies and rodents, which may in turn contaminate food. Faeces and food debris from the open dumping sites may be washed into nearby streams or contaminate surface water and plants like water lettuce, cabbage, carrots, fruits and vegetables, which could lead to a large-scale cholera outbreak.

It was found from the study that the majority of respondents protect their food from flies by covering it. In a study in other parts of Africa, like Kenya and Ghana, by Girma et al. (2025), food vendors were less likely to wear gowns when handling food, and most of the vendors prepared their food in hazardous conditions with a lot of flies around, increasing the possibility that the food could become contaminated. Flies are a major problem for most food vendors. The findings were not similar, and it could be due to the seasons of the year when the study was carried out. The implication is that food can easily be contaminated where flies are many because flies can serve as a vector for foodborne diseases.

The study found out that the majority of respondents wash their hands to prevent cholera, in a study aimed at assessing factors associated with the cholera outbreak in a cholera-prone region in Al-Mahweet, Yemen, by Dureab et al. (2021). Findings show that cholera was more common in large houses, families with children under five, and residents. WASH activities such as frequent hand washing, open defecation, using a clean water source, and having better sanitation facilities were statistically

unimportant. (Dureab et al., 2021). This finding is not similar to our findings; it could be due to poor health education in Yemen, and the disparity could also be due to the lower level of education of the respondents. Poor hand washing implies that faecal-oral route diseases like cholera can easily break out. In another study by Devine Carneal-Frazer et al., it was found that prevention of cholera depends on hand washing and good hygiene; inappropriate personal hygiene habits can spread cholera, especially through sexual activity. Activities like bathing and washing with polluted water can increase transmission of cholera infection if adequate hygiene measures are not followed (Devine Carneal-Frazer, et al.).

Health education intervention programme on cholera prevention strategies

From the findings from the study, health education had improved cholera prevention strategies like washing hands with soap before handling food, cooking food thoroughly before eating, and washing vegetables. Moreover, it had increased appropriate refuse disposal, appropriate sewage disposal, and proper handling of the human waste. Strategies like boiling water before drinking, cleaning cooking utensils, treating water with chlorine products, keeping food away from flies and the cholera vaccine were all positively affected. Studies also find out that media for health education were radio, television, magazines, pamphlets and newspapers.

It was reported by Barnabas et al. (2024) that health education has a big influence on how society is shaped and impacted in terms of knowledge, attitudes, and practices. Through a variety of media, such as radio, television, newspapers, magazines, and the Internet, it significantly influences the dissemination of information and the shaping of public opinion. Because it actively shapes people's worldview, attitudes toward certain topics, and new actions, its power extends beyond simply disseminating knowledge. As a result, the media is an important source of information that facilitates the sharing of ideas and information. Current events, scientific advancements, and strategies for preventing disease outbreaks are disseminated via news organisations and educational initiatives. (Barnabas et al., 2024).

Bankole et al. (2022) reported that the frontline healthcare professionals who communicate health education to the public and carry out cholera prevention and management protocols are typically primary health care (PHC) workers. In order to improve health outcomes, it has been suggested that health workers receive training on a regular basis to improve their knowledge. Primary Health Care (PHC) personnel are in charge of frontline cholera surveillance, health education and awareness among community members, and, in many situations, cholera control and case management. The closest medical professionals to the community are primary care practitioners (Bankole et al.).

In the same study by Bankole et al. (2022), it was reported that continued health education, training and retraining of food vendors through workshops and seminars, as well as health education interventions, were necessary to improve food vendors knowledge and, in turn, improve the food hygiene practices among food vendors and hence reduce the chances of a cholera outbreak in Nigeria. The National Cholera Plan (NCP) addresses the unique local context of cholera transmission in hotspots and concentrates on enhancing health education to promote appropriate behavioural, social, and interpersonal changes in order to assist community-level prevention and control over the long term.

It was reported by Baltazar et al. (2022) that health education programmes that are tailored to the customs and values of the community should encourage the adoption of proper hygiene habits, such as washing hands with soap, preparing and storing food safely, and disposing of children's waste in a safe manner. To keep guests from becoming infected, funeral customs for cholera victims must also be modified (Baltazar et al., 2022). In a study by Fagbamila et al. (2023), it was reported that better health-seeking behaviour at treatment facilities resulted from the mass media's dissemination of health education messages throughout the cholera outbreak in the impacted populations. (Fagbamila et al., 2023). Health education initiatives are still regarded as a cornerstone of infectious disease prevention. (Di Gennaro et al., 2023).

There were similarities in both the findings and the literature review on the importance of health education on cholera prevention strategies; the media for disseminating information were similar, and the contents of the health education messages were similar. The similarity could be due to improved technological infrastructures, mass mobilisation and sensitisation. The implication of the above findings is that health education information can be easily disseminated and that health education has greatly increased and improved cholera prevention strategies.

CONCLUSION

It can be concluded from the following findings of this study that health education intervention has improved the cholera prevention strategies among the respondents. Food vendors have good knowledge on the route of transmission of cholera infection, the signs and symptoms of cholera infection, and the mode of prevention of cholera infection. It can be concluded that the knowledge on cholera infection improved among the study group after health education intervention.

There were positive attitudes towards cholera prevention strategies, cholera vaccines, and government involvement in cholera prevention, disposal of animal waste, usage of latrines, environmental sanitation, and hand washing. The control group have positive attitudes towards cholera prevention strategies, and the study group have negative attitudes towards cholera prevention strategies before health education intervention. It can be concluded that the control group have a better positive attitude than the study group before the health education intervention.

It can also be concluded that the majority of the food vendors have demonstrated better preventive practices towards cholera prevention strategies, and the control group is better than the study group on cholera prevention strategies at the baseline.

It can also be concluded that knowledge has improved to 75% after intervention. The study group has a better knowledge than the control group post intervention. Health education intervention had improved attitude to 61.21% generally. Attitude towards cholera prevention strategies among the study group had improved to 66.2%. Furthermore, it can be concluded that health education interventions have increased cholera prevention strategies; good cholera prevention practices among the study group were 64.2%, and 35.8% among the control group post intervention.

Age, gender, ethnicity, religion and level of education don't have effects on cholera prevention strategies among the study group. Age and ethnicity don't have effects on cholera prevention strategies among the control group, while gender, religion and level of education have effects on cholera prevention strategies among the control group.

RECOMMENDATIONS

Based on the findings from this research, the following recommendations are made:

To the food vendors

1. Food vendors need to improve on their level of personal and hand hygiene practices.
2. Training and retraining are important for food vendors in Osun state and can be anchor by the food inspection unit of each Local Government area of Osun state
3. Food vendors should be encouraged by the food inspection unit of each Local Government Area of Osun state to store water in a clean container in their respective food outlet.
4. Food vendors should wash raw food, vegetables and fruits with uncontaminated water during food preparation stage.
5. Owners of restaurants and canteens should provide window blinds and insecticulators at food restaurants and canteens
6. Food vendors, and managers of restaurants and canteen should dispose refuse and sewage appropriately and wash their hands properly after using the toilet.

REFERENCES

[1] Adebayo, Y. O., Lasabi O. T., A kinsanya, O. B. and Ogunleye, A. E. (2023). Food Hygiene Practices among Food Vendors in Odeda Local. Nigerian Journal of Nutrition Sciences 44(2), 241–252.

[2] Adeleke, M. A., Adebimpe, W. O., Hassan, A. W. O., Oladejo, S. O., Olaoye, I., Olatunde, G. O., & Adewole, T. (2013). Larval habitats of mosquito fauna in Osogbo metropolis, Southwestern Nigeria. Asian Pacific Journal of Tropical Biomedicine, 3(9), 673–677. https://doi.org/10.1016/S2221-1691(13)60137-9.

[3] Agbaje, W. B., Fadunmade, E. O., Azeez, L. A., Awojide, S. H., & Adewale, O. O. (2024). Quality parameter assessment of water, accessible for drinking and general purpose in some selected local government areas in Osun. 15(1), 25–41.

[4] Ahmed, S. K. (2024). How to choose a sampling technique and determine sample size for research: A simplified guide for researchers. Oral Oncology Reports, 12, 100662. https://doi.org/10.1016/j.oor.2024.100662.

[5] Akel, M., Sakr, F., Haddad, C., Hajj, A., Sacre, H., Zeenny, R. M., Safwan, J., & Salameh, P. (2023). Knowledge, Attitude, and Practices of the General Population toward the Old-New Outbreak of Cholera in a Developing Country. Tropical Medicine and Infectious Disease, 8(4). https://doi.org/10.3390/tropicalmed8040236

[6] Akinola, O., Oyinloye, D. O., Enwerem, D. E., Orji, I. G., Mosimabalem, M., & Mustaphar, O. (2018). Food HYGEINE Practices Among Selected Food Vendors In. 7(5), 80–83. https://doi.org/10.9790/1959-0705038083

[7] Akpo, E., Dougnon, T. V., Klotoe, J.-R., Agbankpe, A. J., & Bankole, H. S. (2021). Appraisal of the Knowledge, Attitudes and Practices of the Populations on Cholera in Benin. Open Journal of Applied Sciences, 11(01), 72–92. https://doi.org/10.4236/ojapps.2021.111006

[8] Albitar, L., & Almasri, I. A. (2023). Cholera in Syria, a crisis following crises: Assessment of knowledge, attitude, and practice in a cohort of syrian population. Heliyon, 9(7), e18278. https://doi.org/10.1016/j.heliyon.2023.e18278

[9] Amisu, B. O., Okesanya, O. J., Adigun, O. A., Manirambona, E., Ukoaka, B. M., Lawal, O. A., Idris, N. B., Olaleke, N. O., Okon, I. I., Ogaya, J. B., & Prisno, D. E. L. (2024). Cholera resurgence in Africa: assessing progress, challenges, and public health response towards the 2030 global elimination target. Infezioni in Medicina, 32(2), 148–156. https://doi.org/10.53854/liim-3202-4

[10] Amos, O. O., Ademola, A., Abiodun, O. A., Olalekan, O. E., Opeodu, Oi. T., & Bode, A. M. (2024). An assessment of municipal solid waste management system in Oshogbo, Osun State Nigeria: Challenges and prospects. International Journal of Multidisciplinary Research and Growth Evaluation, 5(1), 687–696. https://doi.org/10.54660/.ijmrge.2024.5.1.687-696

[11] Asaolu, S., & Abiona, M. M. (2024). Epidemiology and Burden of Cholera in Nigeria. 27(May).

[12] Awojobi, A. T., Oladokun, O. J., & Oladele, O. I. (2014). Food service providers' attitudes towards nutrition and food handling practices in Osogbo, Osun State, Nigeria. Mediterranean Journal of Social Sciences, 5(27), 1106–1111. https://doi.org/10.5901/mjss.2014.v5n27p1106

[13] Ayodele, V., & Emmanuel, T. O. (2024). Geospatial population modelling for OSOGBO local government area , Osun state , south western Nigeria. 7(5), 2657–2664.

[14] Baltazar, C. S., Pezzoli, L., Baloi, L. D., Luiz, N., Chitio, J. E., Capitine, I., Sitoe, M., Mala, S., & Langa, J. P. (2022). Conditions to eliminate cholera in Mozambique-the pathway for the development of the national cholera plan. Pan African Medical Journal, 42. https://doi.org/10.11604/pamj.2022.42.279.36368

[15] Bankole, O. T., Abbass, G., Obembe, T. A., & Ajayi, I. O. (2021). Knowledge of Health Workers on Cholera Management in Oyo State: Results of a Training Intervention. Annals of Ibadan Postgraduate Medicine, 19(2), 103–111. http://www.ncbi.nlm.nih.gov/pubmed/36159040%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC9484319

[16] Bankole, O. T., Abbass, G., Obembe, T. A., & Ajayi, I. O. (2022). Knowledge of health workers on cholera management in Oyo State: Results of a training intervention. Annals of Ibadan Postgraduate Medicine, 19(2), 103–111. https://www.ajol.info/index.php/aipm/article/view/233201

[17] Barnabas, B., Bavorova, M., Yakubu, M., & Kächele, H. (2024). Food safety knowledge, attitudes, and practices of food vendors participating in Nigeria's school feeding program. Journal of Consumer Protection and Food Safety, 199–212. https://doi.org/10.1007/s00003-023-01476-3

[18] Benabaye, R. M., White, F. M., Dayrit, M. M., & White, M. E. (1994). Cholera in metropolitan Manila : foodborne transmission via street vendors. 745–749.

[19] Buliva, E., Elnossery, S., Okwarah, P., Tayyab, M., Brennan, R., & Abubakar, A. (2023). Cholera prevention, control strategies, challenges and World Health Organization initiatives in the Eastern Mediterranean Region: A narrative review. Heliyon, 9(5), e15598. https://doi.org/10.1016/j.heliyon.2023.e15598

[20] Coast, G. (1995). Epidemic Cholera in the New World : Translating Field. 1(4), 141–146.

[21] Collins, O. C., & Duffy, K. J. (2023). The 2021 Cholera Outbreak in Nigeria, Data and Models Used to Explore Controls and Challenges. Communication in Biomathematical Sciences, 6(2), 189–204. https://doi.org/10.5614/cbms.2023.6.2.8

[22] Condon-Paoloni, D., Yeatman, H. R., & Grigonis-Deane, E. (2015). Health-related claims on food labels in Australia: Understanding environmental health officers' roles and implications for policy. Public Health Nutrition, 18(1), 81–88. https://doi.org/10.1017/S1368980013003078

[23] D'Mello-Guyett, L., Gallandat, K., Van Den Bergh, R., Taylor, D., Bulit, G., Legros, D., Maes, P., Checchi, F., & Cumming, O. (2020). Prevention and control of cholera with household and community water, sanitation and hygiene (WASH) interventions: A scoping review of current international guidelines. PLoS ONE, 15(1), 1–26. https://doi.org/10.1371/journal.pone.0226549

[24] Dan-Nwafor, C. C., Ogbonna, U., Onyiah, P., Gidado, S., Adebobola, B., Nguku, P., & Nsubuga, P. (2019). A cholera outbreak in a rural north central Nigerian community: An unmatched case-control study. BMC Public Health, 19(1), 1–7. https://doi.org/10.1186/s12889-018-6299-3

[25] Danimoh, M. A., Etukudo, J. A., Mohammed, A., Difa, J. A., Ainavi, I. I., Odunze, P., & Manga, M. M. (2022). Food Safety And Hygiene Practices Among Food Handlers Involved In School Feeding Programme In Kaduna State, Northwest, Nigeria. Jewel Journal of Medical Sciences, 3(2), 76–89. https://doi.org/10.56167/jjms.2022.0302.01

[26] Devine Carneal-Frazer, N. (n.d.). ScholarWorks Analysis of Control Measures Used During Cholera Outbreaks among Internally Displaced Persons. https://scholarworks.waldenu.edu/dissertations

[27] Di Gennaro, F., Occa, E., Chitnis, K., Guelfi, G., Canini, A., Chuau, I., Cadorin, S., Bavaro, D. F., Ramirez, L., Marotta, C., Cotugno, S., Segala, F. V., Ghelardi, A., Saracino, A., Periquito, I. M., Putoto, G., & Mussa, A. (2023). Knowledge, Attitudes and Practices on Cholera and Water, Sanitation, and Hygiene among Internally Displaced Persons in Cabo Delgado Province, Mozambique. American Journal of Tropical Medicine and Hygiene,

108(1), 195–199. https://doi.org/10.4269/ajtmh.22-0396

[28] Dossou Sodjinou, V., Talisuna, A., Braka, F., Barboza, P., Alberti, K., FORTIN, A., Mulombo Kazadi, W., Melanga Anya, B., Harouna Djingarey, M., & Fatou, B. (2022). The 2021 Cholera Outbreak in West Africa: Epidemiology and Public Health Implications. Archives of Clinical and Biomedical Research, 06(02), 296–307. https://doi.org/10.26502/acbr.50170245

[29] Dureab, F., Al-Qadasi, Y., Nasr, H., Al-Zumair, M., & Al-Mahbashi, T. (2021). Knowledge on and preventive practices of cholera in Al-Mahweet – Yemen, 2018: A cross-sectional study. Journal of Water and Health, 19(6), 1002–1013. https://doi.org/10.2166/wh.2021.139

[30] Ebob, T. J. (2020a). An Overview of Cholera Epidemiology: A Focus on Africa; with a Keen Interest on Nigeria. International Journal of TROPICAL DISEASE & Health, 40(3), 1–17. https://doi.org/10.9734/ijtdh/2019/v40i330229

[31] Ebob, T. J. (2020b). Cholera Prevention and Control Strategies; A Global Overview. Journal of Advances in Medicine and Medical Research, 32(12), 27–53. https://doi.org/10.9734/jammr/2020/v32i1230540

[32] Ejomarie, L., & Ernest, A. (2022). The Effect of Health Education on Food Vendors Behaviour towards Food Safety in Universities in Rivers State. International Journal of Innovative Social & Science Education Research, 10(1), 62–70.

[33] Elimian, K., Musah, A., Dewa, O., King, C., Crawford, K., Pembi, E., Ike, I., Myles, P., Pritchard, C., Forsberg, B. C., & Alfven, T. (2023). Resource availability and capacity to implement multi-stranded cholera interventions in the north-east region of Nigeria. BMC Global and Public Health, 1(1), 1–16. https://doi.org/10.1186/s44263-023-00008-3

[34] Elimian, K. O., Mezue, S., Musah, A., Oyebanji, O., Fall, I. S., Yennan, S., Yao, M., Abok, P. O., Williams, N., Omar, L. H., Balde, T., Ampah, K., Okudo, I., Ibrahim, L., Jinadu, A., Alemu, W., Peter, C., & Ihekweazu, C. (2020). What are the drivers of recurrent cholera transmission in Nigeria? Evidence from a scoping review. BMC Public Health, 20(1), 1–13. https://doi.org/10.1186/s12889-020-08521-y

[35] Elimian, K., Yennan, S., Musah, A., Cheshi, I. D., King, C., Dunkwu, L., Mohammed, A. L., Ekeng, E., Akande, O. W., Ayres, S., Gandi, B., Pembi, E., Saleh, F., Omar, A. N., Crawford, E., Olopha, O. O., Nnaji, R., Muhammad, B., Luka-Lawal, R., … Adetifa, I. (2022). Epidemiology, diagnostics and factors associated with mortality during a cholera epidemic in Nigeria, October 2020-October 2021: a retrospective analysis of national surveillance data. BMJ Open, 12(9), 1–16. https://doi.org/10.1136/bmjopen-2022-063703

[36] Emmanuel, I., Obinna, G., Adaeze, C., Favour, I., Chinenye, O., Nneka, C., Ogechukwu, C., & Lilian, E. (2025). Recurrent cholera outbreaks in Nigeria : A review of the underlying factors and redress. Decoding Infection and Transmission, 3(February), 100042. https://doi.org/10.1016/j.dcit.2025.100042

[37] Emmanuel, O. I., Ibe Sally, N. O., Emmanuel, N., & Sule, O. C. (2019). Knowledge and Practice of Food Hygiene Among Food Vendors in Ihiagwa, Owerri West Local Government Area, Imo State. Texila International Journal of Public Health, 7(2), 1–13. https://doi.org/10.21522/TIJPH.2013.07.02.Art021

[38] Eneh, S., Onukansi, F., Anokwuru, C., Ikhuoria, O., Edeh, G., Obiekwe, S., Dauda, Z., Praise-God, A., & Okpara, C. (2024). Cholera outbreak trends in Nigeria: policy recommendations and innovative approaches to prevention and treatment. Frontiers in

Public Health, 12(1). https://doi.org/10.3389/fpubh.2024.1464361

[39] Fagbamila, I. O., Abdulkarim, M. A., Aworh, M. K., Uba, B., Balogun, M. S., Nguku, P., Gandi, A. Y., Abdullahi, I., Okolocha, E. C., Kwaga, J. K. P., & Waziri, N. E. (2023). Cholera outbreak in some communities in North-East Nigeria, 2019: an unmatched case–control study. BMC Public Health, 23(1), 1–11. https://doi.org/10.1186/s12889-023-15332-4

[40] Gile, D. (2015). Experimental research. Researching Translation and Interpreting, January, 220–228. https://doi.org/10.30574/wjarr.2022.16.3.1152

[41] Girma, Z., Temesgen, K., & Dubale, A. (2025). Food handling practices among street food vendors and their associated factors in the town administration of Gamo Zone ,. February, 1–9. https://doi.org/10.3389/frfst.2025.1445910

[42] Hamed Taherdoost. (2016). Sampling Methods in Research Methodology: How to Choose a Sampling Technique for Research Hamed Taherdoost To cite this version : HAL Id : hal-02546796 Sampling Methods in Research Methodology ; How to Choose a Sampling Technique for. International Journal of Academic Research in Management (IJARM), 5(2), 18–27.

[43] Health education: theoretical concepts, effective strategies and core competencies. (n.d.).

[44] Hossen, T., Ferdaus, J., Hasan, M., Lina, N. N., Das, A. K., Barman, S. K., Paul, D. K., & Roy, R. K. (2021). Food safety knowledge, attitudes and practices of street food vendors in Jashore region, Bangladesh. 2061(June), 226–239.

[45] Ibrahim, U. M., Zubairu, Z., Sadiq, A. A., & Abdullahi, S. (2024). A comparative study of food safety knowledge among mobile food vendors and canteen food handlers in markets in Kano Metropolis, Northwest Nigeria.

[46] Idoga, P. E., Toycan, M., & Zayyad, M. A. (2019). Analysis of factors contributing to the spread of cholera in developing countries. Eurasian Journal of Medicine, 51(2), 121–127. https://doi.org/10.5152/eurasianjmed.2019.18334

[47] Igwe, G. (2017). Determinants of knowledge, attitude and preventive practices relating to Cholera in Wadata-a sub-urban slum of Makurdi, Benue State, North Central Nigeria. International Research Journal of Public and Environmental Health, 4(10), 277–282.

[48] Ihua, N., Amadi-Wali, O., Onosakponome, E. O., Ndukwu., C. L. C., Ikpeama, R. A., & Okorocha, C. U. (2024). Public Health Implications of Cholera- a Water Sanitation and Hygiene (WASH) Related Infectious Disease in the Era of Climate Change: The Nigeria Experience. International Journal of TROPICAL DISEASE & Health, 45(6), 32–49. https://doi.org/10.9734/ijtdh/2024/v45i61537

[49] Iluku-ayoola, F. O. M. O. (2020). Prevalence and Causes of Cholera among Children in Ekiti State, Nigeria. Journal of Health, Medicine and Nursing, 76, 56–62. https://doi.org/10.7176/jhmn/76-07

[50] Joanah Moses, I., Ogban, O., Offiong, I., Nnete, E., & Caleb, U. (2020). Attitude towards Infant Feeding Among Health Workers in Calabar, Nigeria. American Journal of Pediatrics, 6(3), 368. https://doi.org/10.11648/j.ajp.20200603.43

[51] Joshua, I. A., Nmadu, A. G., Usman, N. O., Nwankwo, B., Woje, C. S., Akabe, J., & Dahiru, M. (2023). Environmental Health Officers in Nigeria in the 21St Century: Advocacy and Raising Public Awareness. African Journal of Health, Safety and Environment, 4(1), 24–33. https://doi.org/10.52417/ajhse.v4i1.327

[52] Kiama, C., Okunga, E., Muange, A., Marwanga, D., Langat, D., Kuria, F., Amoth, P., Were, I., Gachohi, J., Ganda, N., Valiente, M. M., Njenga, M. K., Osoro, E., & Brunkard,

J. (2023). Mapping of cholera hotspots in Kenya using epidemiologic and water, sanitation, and hygiene (WASH) indicators as part of Kenya's new 2022–2030 cholera elimination plan. PLoS Neglected Tropical Diseases, 17(3), 1–17. https://doi.org/10.1371/journal.pntd.0011166

[53] Koua, E. L., Moussana, F. H., Sodjinou, V. D., Kambale, F., Kimenyi, J. P., Diallo, S., Okeibunor, J., & Gueye, A. S. (2025). Exploring the burden of cholera in the WHO African region: patterns and trends from 2000 to 2023 cholera outbreak data. BMJ Global Health, 10(1). https://doi.org/10.1136/bmjgh-2024-016491

[54] Legros, D. (2018). Global cholera epidemiology: Opportunities to reduce the burden of cholera by 2030. Journal of Infectious Diseases, 218(Suppl 3), S137–S140. https://doi.org/10.1093/infdis/jiy486

[55] Lokoja, R. B., Esievo, J. N., & Ingwu, J. A. (2024). Knowledge, Attitude and Practice of Food Hygiene among Food Vendors in Lafia, Nasarawa State, Nigeria. International Journal of Medical Science and Dental Health, 10(05), 35–53. https://doi.org/10.55640/ijmsdh-10-05-03

[56] Lukacsovics, A., Nesbitt, A., Marshall, B., Asplin, R., Stone, J., Embree, G., Hurst, M., & Pollari, F. (2014). Using environmental health officers' opinions to inform the source attribution of enteric disease: Further analysis of the "most likely source of infection." BMC Public Health, 14(1). https://doi.org/10.1186/1471-2458-14-1258

[57] Malaeb, D., Sallam, M., Younes, S., Mourad, N., Sarray El Dine, A., Obeid, S., Hallit, S., & Hallit, R. (2022). Knowledge, Attitude, and Practice in a Sample of the Lebanese Population Regarding Cholera. International Journal of Environmental Research and Public Health, 19(23). https://doi.org/10.3390/ijerph192316243

[58] Model, T. H. E., & Health, F. O. R. (1993). Planning a Continuing Education Program. 430–434.

[59] Mienur, M., Afrin, M., Kumar, A., & Haider, G. (2022). Heliyon Knowledge, attitudes and practices (KAP) of street food vendors on food safety in selected areas of Bangladesh. Heliyon, 8(October), e12166. https://doi.org/10.1016/j.heliyon.2022.e12166

[60] Mike-ogburia, M. I., Eze, C. C., Okoli, M. O., & Ekada, I. (n.d.). Review Cholera in Nigeria : A review of outbreaks , trends , contributing factors , and public health responses. 65(6), 824–843.

[61] Mulisa, F. (2022). Sampling techniques involving human subjects: Applications, pitfalls, and suggestions for further studies. International Journal of Academic Research in Education, 8(1), 74–83. https://doi.org/10.17985/ijare.1225214

[62] NAFDAC and its structural defects. (2023). 1, 1993–2002.

[63] Nasr, H., Al-Zumair, M., Al-Mahbashi, T., & Dureab, F. (2024). Factors associated with the cholera outbreak in Al-Mahweet-Yemen: Analytic Study. Journal of Infection in Developing Countries, 18(1), 66–74. https://doi.org/10.3855/jidc.17571

[64] N. C. D. C (2024). Cholera Situation Report. monthly epidemiological report 22 Epidemiological Week 39: (23 September 2024 – 29 September 2024, Epi Week 39, 1–6.

[65] N. C. D. C. (2025). Cholera Situation Report. monthly epidemiological report 2 Epidemiological Week 9: (3 February – 2 March 2025, Epi Week: 9, 2025, 1–6.

[66] Ndem, S. E., & Okon, E. A. (2023). Patronage of Street Food Vendors and Its Implications on Consumers Health in Nigeria : Study of Ekpo Abasi Community Calabar , Cross River State. 13(4), 4–20.

[67] Ngwa, M. C., Ihekweazu, C., Okwor, T., Yennan, S., Williams, N., Elimian, K., Karaye, N. Y., Bello, I. W., & Sack, D. A.

(2021). The cholera risk assessment in Kano state, Nigeria: A historical review, mapping of hotspots and evaluation of contextual factors. PLoS Neglected Tropical Diseases, 15(1), 1–19. https://doi.org/10.1371/journal.pntd.0009046

[68] Nneoma, U. C. (2024). Understanding the Risk Landscape: Analyzing Factors Impacting Food Vending in Nigeria. INOSR Experimental Sciences, 13(1), 72–79. https://doi.org/10.59298/inosres/2024/1.72.7910

[69] Okon, R. E., Okon, A. J., Inah, S. A., Olanrewaju, O. E., & Nji, E. L. (2022). Food hygiene knowledge, attitude and practices among food handlers in Food hygiene knowledge, attitude and practices among food handlers in Calabar Municipal, Cross River State, Nigeria. October. https://doi.org/10.30574/wjarr.2022.16.1.0980

[70] Okoroiwu, G. I. A. (2022). Cholera and Associated Risk Factors in Gwagwalada Area Council, Fct, Abuja, Nigeria. Noveltyjournals.Com, 10(2), 49–57. https://www.noveltyjournals.com/upload/paper/CHOLERA AND ASSOCIATED-08062023-5.pdf

[71] Olalere, B. D., Ikwuta, B. B., & Tolulope, B. K. (2024). Mothers on the nutritional status of their under-five. 7(4), 147–160. https://doi.org/10.52589/AJHNM-6OKWYZR5

[72] Olaniyi, J., & Ayomaya, I. (2014). Knowledge and Attitudes of People on Monthly Environmental Sanitation Programme in Osun State, Nigeria. Journal of Science and Science Education, 4(1), 137–143.

[73] Olu, O. O., Usman, A., Ameda, I. M., Ejiofor, N., Mantchombe, F., Chamla, D., & Nabyonga-Orem, J. (2023). The Chronic Cholera Situation in Africa: Why Are African Countries Unable to Tame the Well-Known Lion? Health Services Insights, 16. https://doi.org/10.1177/11786329231211964

[74] Olutola Adagbada, A., Adesida, S. A., Nwaokorie, F. O., Niemogha, M.-T., & Coker, A. O. (2012). Cholera Epidemiology in Nigeria: an overview. In Pan African Medical Journal-ISSN (Vol. 12).

[75] Ozabor, T., Oluwajide, O., Oni, j., Owolabi, C., Ajani, A., Jayeola, S., Ayoade, F., & Olaitan, J. (2023). Bacteriological Assessment of Fried-Ready-To Eat (RTE) Vended Foods Sold in Osogbo, Osun State, Nigeria. Food and Environment Safety Journal, 22(4), 238–247. https://doi.org/10.4316/fens.2023.022

[76] Park, S. E., Gedefaw, A., Hailu, D., Jeon, Y., Mogeni, O. D., Jang, G. H., Mukasa, D., Mraidi, R., Kim, D. R., Getahun, T., Getachew, E. M., Yeshitela, B., Abebe, S. A., Hussen, M., Demlie, Y. W., & Teferi, M. (2024). Coverage of Two-Dose Preemptive Cholera Mass Vaccination Campaign in High-Priority Hotspots in Shashemene, Oromia Region, Ethiopia. Clinical Infectious Diseases, 79, S33–S42. https://doi.org/10.1093/cid/ciae233

[77] Rahman, M. M., Tabash, M. I., Salamzadeh, A., Abduli, S., & Rahaman, M. S. (2022). Sampling Techniques (Probability) for Quantitative Social Science Researchers: A Conceptual Guidelines with Examples. SEEU Review, 17(1), 42–51. https://doi.org/10.2478/seeur-2022-0023

[78] Ramamurthy, T., & Ghosh, A. (2021). A Re-look at cholera pandemics from early times to now in the current era of epidemiology. Journal of Disaster Research, 16(1), 110–117. https://doi.org/10.20965/jdr.2021.p0110

[79] Sack, D. A., Debes, A. K., Ateudjieu, J., Bwire, G., Ali, M., Ngwa, M. C., Mwaba, J., Chilengi, R., Orach, C. C., Boru, W., Mohamed, A. A., Ram, M., George, C. M., & Colin Stine, O. (2021). Contrasting Epidemiology of Cholera in Bangladesh and Africa. Journal of Infectious Diseases, 224(Suppl 7), S701–S709. https://doi.org/10.1093/infdis/jiab440

[80] Salako, B., Ajayi, A., & Smith, S. (2021). Cholera in Nigeria: Epidemiology, Risk Factors, and Response - A Review. Proceedings of the Nigerian Academy of Science, 24–33. https://doi.org/10.57046/jybj8296

[81] Samuel Amoo, O., Awoderu, O., Yisau, J., Oladele, D., David, A. N., Raheem, T., Uwandu, M., Bamidele, M., Fesobi, T. W., AbdusSalam, A., Nduaga, S., Oparaugo, C. T., Ajayi, M., Ogbonna, F., Musa, A. Z., Adedeji, A., Ige, F., Ihemanma, O., Nuhu, B., … Smith, S. I. (2021). Assessment of potential factors that support the endemicity of cholera in Nigeria from food handlers, health workers and the environment. Microbiologia Medica, 36(3), 51–58. https://doi.org/10.4081/mm.2021.10058

[82] Schmidt, S. A. J., Lo, S., & Hollestein, L. M. (2018). Research Techniques Made Simple: Sample Size Estimation and Power Calculation. Journal of Investigative Dermatology, 138(8), 1678–1682. https://doi.org/10.1016/j.jid.2018.06.165

[83] Smith, A., Sekwadi, P., Erasmus, L., Lee, C., Ndzabandzaba, S., Alex, V., Nel, J., Thomas, J., Smith, A., Sekwadi, P., Erasmus, L., Lee, C., & Stroika, S. (2024). Imported Cholera Cases, South Africa, 2023 to cite this version : 4–8.

[84] Sola, O., & Oluseyi, S. (2020). Research Article Assessment of provision, adequacy and spatial distribution of green infrastructure in osogbo. 01(01), 6–12.

[85] Sow, A. U., Haruna, U. A., Amos, O. A., Olajide, E. O., Amene, T., Odususi, O. D., Adewusi, B. A., Abia, C., Safari, J., Sorinola, F. W., Alaka, H. O., & Musa, S. M. (2022). Tackling Cholera Outbreak amidst COVID-19 Pandemic in Nigeria: Challenges and Recommendations. Public Health Reviews, 43(September), 1–5. https://doi.org/10.3389/phrs.2022.1604776

[86] Timothy O. Ogunbode, M. O. Owoeye, Afolabi C. O., Oyebamiji V. (2023). Impact of domestic water provision on women in their educational attainment: a case of Iwo, Nigeria o 4. 14–30.

[87] Tomoi, H., MacLeod, C., Moriyasu, T., Simiyu, S., Ross, I., Cumming, O., & Braun, L. (2024). Determinants of Willingness to Pay for Fecal Sludge Management Services and Knowledge Gaps: A Scoping Review. Environmental Science and Technology, 58(4), 1908–1920. https://doi.org/10.1021/acs.est.3c06628

[88] Tuglo, L. S., Mishra, S., Mohapatra, R. K., Kortei, N. K., Atindana, J. N., Mulugeta, H., Lu, Q., Kwabla, M. P., Patu, A. T., Chaudhuri, T., Tuglo, J. D., Das, S. N., Sakre, S. M., Affram, K. S., & Doku, A. (2023). OPEN A systematic review and meta - analysis of food handling practices in Ghana vis - a - vis the associated factors among food handlers during 2009 and 2022. Scientific Reports, 1–12. https://doi.org/10.1038/s41598-023-46150-8

[89] Tumuhamye, N., Rutebemberwa, E., Kwesiga, D., Bagonza, J., & Mukose, A. (2013). Client satisfaction with integrated community case management program in Wakiso District, Uganda, October 2012: A cross sectional survey. Health, 05(11), 1889–1898. https://doi.org/10.4236/health.2013.511255

[90] Tunde, A., Ridwan, A., Adesola, O., Ayobami, I., & Raphael, O. (2025). Outbreak of cholera in Nigeria : the role of One Health. Discover Public Health. https://doi.org/10.1186/s12982-025-00526-5

[91] Wada, O. Z. (2020). Assessment of Rural Water Supply in Selected Communities in Osun State, Nigeria. International Journal of Environmental Sciences & Natural Resources, 26(1), 10–17. https://doi.org/10.19080/ijesnr.2020.26.556177

[92] Weldesenbet Hadgu, H., Chane Kasahun, Y., Negash, H., & Jara, D. (2024). Food Hygiene, Safety Measures, and Associated Factors

among Street Food Vendors in Addis Ababa, Ethiopia: Implications for Intervention Activity Design and Implementation. Journal of Food Processing and Preservation, 2024. https://doi.org/10.1155/2024/7567579

[93] Whiley, H., Willis, E., Smith, J., & Ross, K. (2019). Environmental health in Australia: overlooked and underrated. Journal of Public Health (Oxford, England), 41(3), 470–475. https://doi.org/10.1093/pubmed/fdy156

[94] Zerbo, A., Castro Delgado, R., & González, P. A. (2020). A review of the risk of cholera outbreaks and urbanization in sub-Saharan Africa. Journal of Biosafety and Biosecurity, 2(2), 71–76. https://doi.org/10.1016/j.jobb.2020.11.004

s