Original Research Article

Assessment of the Level of Awareness and Knowledge on Hazards Associated with Cholera in Ise/Orun Local Government Area, Ekiti State, Nigeria

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Abstract

Background: Cholera is an acute gastrointestinal infection that characteristically presents with profuse watery diarrhea and can rapidly result in severe dehydration and death. Its usual mode of transmission is by oral route.

Objective: To assess the level of awareness and knowledge of hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State.

Methods: A descriptive survey research design was adopted. A sample size of 143 was determined using Fisher's statistical formula. Data were collated and analyzed using the Statistical Package for Social Science (SPSS) version 25. Chi-square was used with the level of significance for the statistical tests set at 0.05.

Results: The sex of the respondents indicated a high number of males 80 (55.9%) with the least number of females 63 (44.1%); 57(39.9%) attended secondary school with the least 22 (15.4%) who attended other schools. Majority (76; 53.1%) of the respondents received information about cholera through radio. Majority of the respondents 80(55.9%) disagreed to have gotten their information from brochures, posters, and other printed materials with a few 63(44.1%) who agreed. Most (116; 81.1%) people believed that boiling water for at least five minutes can prevent cholera with a few 27 (18.9%) who disagreed.

Conclusion: Various studies elsewhere have utilized geographic and mathematical information systems to assess the spatial distribution of cholera at local levels, demonstrating case clustering and disease risk areas. Due to its endemicity in Nigeria, surveillance systems can provide early alerts to outbreaks, therefore leading to a coordinated response.

Keywords: Hazard, Awareness, Knowledge, Cholera.

INTRODUCTION

Cholera is an acute gastro intestinal infection characteristically presents with profuse watery diarrhoea and can rapidly result in severe dehydrated and death. Its usual mode of transmission is by the oral route (Idoga *et al.,* 2019). It is a disease of international importance and is immediately nofiable in Nigeria (Omonijo, 2017). Cholera remains a global threat to public health and a key indicator of lack of social development. Cholera, an acute diarrheal disease caused by gram-negative bacillus *Vibrio cholerae of* serogroup 01 and 0139 is associated with high morbidity and mortality (Ismail *et al.,* 2019).

The onset of cholera often starts with stomach cramps, vomiting and diarrhoea, and if left untreated may progress to fluid losses of up to 1 litre per hour, resulting in severe dehydration and metabolic acidosis, and consequently kidney failure, shock, coma, and death (Ebimgbo *et al.,* 2019). About 50% of cholera cases are asymptomatic (Lower *et al.,* 2018). Asymptomatic cases shed vibrios in their stools and serve as a potential source of infection to others. Symptomatic patients may also shed vibrios before the onset of illness and will continue to shed the organisms for about

1 to 2 weeks. Cholera is transmitted through the fecal-oral route via contaminated food, carriers and unsanitary environmental conditions (Alimi, & Workneh, 2016).). Cholera outbreaks tend to occur as a result of contamination of food or water with *Vibrio cholera* organisms due to poor personal hygiene, unsafe environmental sanitation conditions compounded by lack of potable water supply (Lower *et al.,* 2018). Internal displacement of persons by natural and man-made disasters leading to unstable living conditions with contamination of food and water sources have also been reported to cause cholera outbreaks (Ismail *et al.,* 2019).

Cholera is an ancient disease that remains a public health problem in many impoverished locations around the world. Seven pandemics of cholera have been recorded since the first pandemic in 1817, the last of which is on-going (Olanrewaju *et al.,* 2019). Overcrowding, poverty, insufficient water and sanitation facilities increase the risk for cholera outbreaks (Robb, et al., 2017). The epidemiology of cholera in the areas in Asia, Africa and the Americas where the disease occurs continues to evolve (Idoga *et al.,* 2019.

Cholera is a deadly disease that require high level of strategies to curb the outbreak as indiscriminate waste disposal has been recognized as an important cause of environmental pollution and is associated with health problems in developing countries like ours Nigeria (Habumugisha, 2018).

Poor water supply, lack of adequate sanitation, and bad hygiene practices with attendant diseases are killing many people each year in developing countries, including Nigeria, and children under the age of five are the most vulnerable (Mamady, 2016). This research assessed the level of awareness and knowledge of rural dwellers with regards to Cholera outbreak and sanitation practices, knowledge on related diseases, knowledge on sources of clean water, and knowledge on causes and prevention of selected WASH related diseases.

However, the fact that people do not suffer from feaco-oral disease most especially Cholera does not mean they are absolutely free from this devastating and life threatening occurrences hence there is need to in-testify efforts towards addressing and reducing the outbreak of this menace (Asiegbu, Lebelo & Tabit, 2016).

Materials and Methods
Study Area
Ise/Orun is a Local Government Area of Ekiti State, Nigeria. Its headquarters are in the town of Ise Ekiti. It has an area of 432 km^2 and a population of 113,754 at the 2006 census with the majority of the area's inhabitants being members of the Yoruba ethnic group. Its geographic coordinates are 7°27′36″N5°25′12″E. As of 2017 Ise Ekiti had an estimated population of 234,022.

The postal code of the area is 361. Ise/Orun Local Government Area is one of the functioning 16 LGAs of Ekiti state, Nigeria with its administrative headquarters situated in Ise Ekiti town. It consist of the major district and villages of Erinwa, Odo Ise, Oraye, Orun, Afolu, Agbe, Ajebamidele, Ajebamidele Ilofa,Ajegunle, Alabi, Alagbada, Araromi, Aratu, Aro, Arola and others. It is categorized under Ekiti South senatorial district in corporation with Ekiti South-West, Ikere, Emure, Ekiti East and Gbonyin (Aiyekire) LGAs of the state.

The Yoruba language is extensively spoken in the LGA while Christianity is the most practiced religion in the area. Prominent traditional rulers in Ise/Orun LGA include the Arinjale of Ise-ekiti while major landmarks in the area include the school of midwifery Orun-ekiti and the NYSC permanent Orientation camp.

Ise/orun LGA covers a total area of 432 square kilometres and has an average temperature of 27 degrees centigrade. The average humidity level in the LGA is 64 percent while average wind speed is 11 km/h. Farming is a key feature of Ise/Orun LGA with a variety of crops such as maize, cassava, and pepper grown in the area. The area also hosts a number of markets where a plethora of commodities are bought and sold by the dwellers of the LGA. Other important economic enterprises in the LGA include textile weaving, blacksmithing, and hunting.

Advocacy/Community Entry
A visit to Ise/Orun Local Government Area secretariat in Ekiti State was made to discuss the researchers' intentions and seek approval to carry out this study.

Study Design
A descriptive research of survey type was employed. It involved quantitative survey through the administration of structured questionnaire to assess the level of awareness and knowledge of hazards with Cholera in Ise/Orun Local Government Area of Ekiti State.

Inclusion criteria

The eligible group included in this research were all health workers in Ise/Orun Local Government Area of Ekiti State.

Exclusion criteria

The non-eligible group excluded in this research were all non-health workers in Ise/Orun Local Government Area of Ekiti State.

Sample size determination

The minimum Sample size was determined by using the Taro Yamane's (1967) formula for descriptive study, the formula is given below:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N = population

n = sample size

e = level of precision = 0.05

$$n = \frac{223}{1 + 223(0.05)^2}$$
$$n = \frac{223}{1 + 0.5575}$$
$$n = \frac{223}{1.5575}$$
$$n = 143.1781$$
$$n = 143$$

Sampling techniques

Multistage sampling techniques was used for this study.

Stage 1: Purposive sampling technique was used to allocate numbers to all the public health facilities in Ise/Orun Local Government Area of Ekiti State. And health facilities with odd numbers was used for this study.

Stage 2: Simple random sampling technique was used to select 10 health workers from each health facility unit from Ise/Orun Local Government Area of Ekiti State by ballot method.

Research Instruments

The tool that was used for data collection was a self-structured questionnaire. Relevant data for the analysis was be collected through the distribution of the questionnaire among the population under study. The self-structured questionnaire was distributed to the respondents to elicit information from respondents on background characteristics and other variables relevant to the study objectives and questions.

Methods of data collection

The structured questions provided data that was objective and reliable for testing. The researchers ensured that the data collection process was properly carried out. The data collection instrument was also carefully administered, discussed and explained to the respondents for ease of understanding. This was done in Ise/Orun Local Government Area of Ekiti State for ease of distribution and collection.

Measurement of variables and data processing

The methods of measurement and analysis was objective based using Statistical Package for Social Science (SPSS) in a clear and understandable way.

Method of data Analysis

Only completed questionnaires that were correctly filled and returned were treated. In treating these copies, the research questions were analysed using descriptive statistics.

Ethical Considerations

Ethical consideration is important in ensuring professional research and is non-intrusive in accomplishing research objectives. For this study, the researchers sought for permission to carry out the study from relevant administrative

authorities and confirmed that the study was to accomplish academic goals only. The researchers also acknowledged additional sources of information from other scholars.

The researchers used a self-developed questionnaire on the respondents to elicit the available data used for this study. The respondents' consent was sought, and the research procedures were explained and confidentially assured. The questionnaires were collected from the respondents after they were filled.

Limitations of the study
The major constraint that were suffered in the course of the study include:
   i   The reluctance of some community members to respond to many of the questions asked; and
   ii   Cultural belief of not wanting to give information on cholera. However, these limitations did not affect the validity and reliability of this study.

Results
Table 1: Respondents' Socio Demographic Characteristics

Variables		Frequency	Percent (100%)
Age of the respondents	18-29yrs	25	17.5
	30-39yrs	49	34.3
	40-49yrs	34	23.8
	50-59yrs	35	24.5
	Total	**143**	**100.0**
Sex of the respondents	Male	80	55.9
	Female	63	44.1
	Total	**143**	**100.0**
Education status of the respondent	Primary School	38	26.6
	Secondary School	57	39.9
	Tertiary Institution	26	18.2
	Others	22	15.4
	Total	**143**	**100.0**
Occupational Status of the respondent	Farming	23	16.1
	Student	35	24.5
	Business	38	26.6
	Civil Servant	23	16.1
	Others	24	16.8
	Total	**143**	**100.0**
Marital Status of the respondent	Single	37	25.9
	Married	57	39.9
	Divorce	39	27.3
	Separated	10	7.0
	Total	**143**	**100.0**

The Table 1 above indicate that majority 49 (34.3%) of the respondent are aged 30-39 years. With lowest number 25 (17.5%) of people aged 18-29 years. Sex of the respondent also indicate a high number of male 80(55.9%) with least of Female 63(44.1%); The level of education which has high number of people who attained secondary school 57(39.9%) with least who attended other school 22(15.4%); Occupation of the respondent indicated that majority of the respondent are involve in business 38 (26.6%) with few employed in government establishment; and also marital status of the despondence revealed that there are more married people 57 (39.9%) with few Separated 10 (7.0%).

Answering Research Questions
Question 1: What is the level of awareness of the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State?

Table 2: Level of awareness of the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State

Variables	SA	A	D	SD	Total
Health Worker	63(44.1%)	51(35.7%)	6(4.2%)	23(16.1%)	143(100%)
Radio	37(25.9%)	76(53.1%)	28(19.6%)	2(1.4%)	143(100%)
Newspaper	37(25.9%)	76(53.1%)	28(19.6%)	2(1.45)	143(100%)
Television	37(25.9%)	76(53.1%)	28(19.6%)	2(1.45)	143(100%)
Brochures, posters, and other printed materials	18(12.6%)	45(31.5%)	34(23.8%)	46(32.2%)	143(100%)
Magazines	37(25.9%)	76(53.1%)	28(19.6%)	2(1.450	143(100%)
Teachers	37(25.9%)	76(53.1%)	28(19.6%)	2(1.450	143(100%)
Family Members, Friends, neighbors and colleagues	37(25.9%)	76(53.1%)	28(19.6%)	2(1.450	143(100%)
Church	18(12.6%)	45(31.5%)	34(23.8%)	46(32.2%)	143(100%)
Traditional leaders	37(25.9%)	76(53.1%)	28(19.6%)	2(1.450	143(100%)
Disaster Management Officials	37(25.9%)	76(53.1%)	28(19.6%)	2(1.450	143(100%)
Whether they maintained quarantine with family	18(12.6%)	45(31.5%)	34(23.8%)	46(32.2%)	143(100%)

The above table revealed that majority of the respondent receive information about cholera through radio 76(53.1%) with least who strongly disagreed 2(1.4%) with same as Newspaper and Television Respectively; Brochures, posters, and other printed materials, the respondent strongly disagreed 46(32.2%) with few who strongly agreed 18(12.6%). Magazines also revealed that majority of the respondent receive information about cholera through Magazines, Teachers, and Family members, neighbour, and colleagues respectively with Strongly agreed 76(53.1%) with least who strongly disagreed 2(1.4%); Church the respondent strongly disagreed 46(32.2%) with few who strongly agreed 18(12.6%) Traditional and Disaster management official shows that most respondent receive awareness with Strongly agreed 76(53.1%) with least who strongly disagreed 2(1.4%) and Whether they maintained quarantine with family, the respondent strongly disagreed 46(32.2%) with few who strongly agreed 18(12.6%).

Question 2: What is the level of knowledge of the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State?

Table 3: Level of knowledge of the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State

Variables	SA	A	D	SD	Total
Drinking water from contaminated source	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Eating food contaminated during and after preparation	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
eating fruit that were not peeled or washed	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Witchcraft	41(28.7%)	66(46.2%)	26(18.2)	10(7.0%)	143(100%)

The table above indicated that that the causes of cholera could be from drinking water from contaminated source, eating food contaminated during and after preparation and Eating fruits that were not peeled or peeled or washed respectively which has Strongly agreed 71(49.7%) with least Disagreed 10(7.0%) while on the other side, Witchcraft remained the major cause of cholera with agreed 66(46.2%).

Question 3: What are the methods adopted to prevent the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State?

Table 4: Methods adopted to prevent the hazards associated with cholera in Ise/Orun Local Government Area, Ekiti State?

Variables	SA	A	D	SD	Total
Boiling water for at least five minutes	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Storing water in a clean container	41(28.7%)	66(64.2%)	26(18.2%)	10(7.0%)	143(100%)
Using a clean toilet	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Washing your hands thoroughly	41(28.7%)	66(64.2%)	26(18.2%)	10(7.0%)	143(100%)
Drinking water only from an uncontaminated source	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Washing food with uncontaminated water	41(28.7%)	66(64.2%)	26(18.2%)	10(7.0%)	143(100%)
Disposing of human waste and consulting a traditional healer	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Cooking food or reheating it thoroughly	41(28.7%)	66(64.2%)	26(18.2%)	10(7.0%)	143(100%)
Washing household surfaces	71(49.7%)	45(31.5%)	10(7.0%)	17(11.9%)	143(100%)
Avoiding uncooked food unless it can be peeled or shield and sprayed	41(28.7%)	66(64.2%)	26(18.2%)	10(7.0%)	143(100%)

The table above revealed the practice of people in which most people believed that boiling water for at least five minutes can prevent cholera with 71(49.7%) strongly agreed with few Disagreed 10(7.0%); Soring water in a clean container with agreed 66(64.2%) with least strongly disagreed 10(7.0); Using a clean toilet with 71(49.7%) with least disagreed 10(7.0%); Washing your hands thoroughly with agreed 66(64.2%) with a least 10(7.0%); Drinking water only from a uncontaminated source with strongly agreed 71(49.7%) with few disagreed 10(7.0%); Washing food with uncontaminated water with 66.(64.2%) with least disagreed 10(7.0%); Disposing of human water and consulting a traditional healer with strongly agreed 71(49.7%) with least Disagreed 10(7.0%); Cooking food or reheating it thoroughly with 66(64.2%) With least strongly disagreed 10 (7.0%); washing household surfaces with strongly agreed 71(49.7%) with least who disagreed 10(7.0%) while on the other side agreed 66(64.2%) with lowest who strongly disagreed 10(7.0%).

Testing of Research Hypothesis

Research Hypothesis: there is no significant relationship between the sociodemographic characteristics, level of awareness and practices adopted in preventing cholera in Ise/Orun Local Government Area, Ekiti State.

Table 1: Sex of the respondent in relation to level of awareness

Variables		Health Workers				Total	Pearson Chi-Square	P-value
		Strongly Agree	Agree	Disagree	Strongly Disagree			
Sex of the respondents	male	19	43	13	5	80	4.320[a]	0.815
	Female	22	23	13	5	63		
Total		41	66	26	10	143		

The above table revealed that there is no significance relationship between sociodemographic characteristics of the respondent and the level of awareness of Cholera with Chi-square 4.320[a] and p-value 0.815.

Practice of the Respondents about Cholera in relation to their Age

Table 2: Means of preventing cholera in relation to their age

Variables		Boiling water for at least five minutes				Total	Pearson Chi-Square	P-Value
		Strongly Agree	Agree	Disagree	Strongly Disagree			
Age of the respondents	18-29yrs	15	7	1	2	25	3.999[a]	0.807
	30-39yrs	21	17	4	7	49		
	40-49yrs	17	11	2	4	34		
	50-59yrs	11	6	1	3	21		
	60 and above	7	4	2	1	14		
Total		71	45	10	17	143		

The above table revealed that there is no significance relationship between the sociodemographic characteristics of the respondent and means of preventing Cholera with Chi-square 3.999[a] and p-value 0.807 which means boiling in water for at least five minutes does not means that a person cannot have Cholera.

Table 3: Means of preventing cholera in relation to their age

Variables		Storing water in a clean container				Total	Pearson Chi-square	P-Value
		Strongly Agree	Agree	Disagree	Strongly Disagree			
Age of the respondents	18-29yrs	4	13	6	2	25	14.207[a]	0.053
	30-39yrs	14	25	5	5	49		
	40-49yrs	9	13	10	2	34		
	50-59yrs	6	11	3	1	21		
	60 and above	8	4	2	0	14		
Total		41	66	26	10	143		

The above table revealed that there is no significance relationship between the sociodemographic characteristics of the respondent and means of preventing Cholera with Chi-square 14.207[a] and p-value 0.053 which means Storing water in a clean container does not means that a person cannot have Cholera.

Discussion

The findings from the tested hypothesis one in table 5 revealed that level of awareness of people about Cholera will not be determine by the sex of the respondent which show a Chi-square 4.320ª and p-value 0.815. Compared and supported with the findings of Mura et al (2017) who reported level of awareness about Cholera can only ascertain by the sex of the respondent as male found to be with high level of awareness about cholera.

The findings from tested hypotheses two in table 6 shows that the fact that water is boiled at least five minutes does not mean that once can have Cholera. This result is in agreement with Monday (2019), who reported that regions in Nigeria ravaged by the scourge include Jigawa, Bauchi, Gombe, Yobe, Borno, Adamawa, Taraba, FCT, Cross River, Kaduna, Osun and Rivers which are attributed to rain which washed sewage into open wells and ponds, where people obtain water for drinking and household needs.

The finding tested hypotheses three in table 7 revealed that There is no significant relationship about the knowledge of the causes of Cholera with Chi-square 14.207a and p-value 0.053 which means age does not affect their knowledge of the causes of cholera. This finding corresponds with the report of Saso & Kampmann (2016) who reported that About 75% of people infected with V. cholera do not develop any symptoms, although the bacteria are present in their faeces for 7-14 days after infection and are shed back into the environment, potentially infecting other people. Among people who develop symptoms, 80% have mild or moderate symptoms, while around 20% develop acute watery diarrhoea with severe dehydration. In severe infections, more than one quart of water and salts is lost per hour. The stool looks gray and has flecks of mucus in it- termed "rice water stools". Within hours, dehydration can become severe, causing intense thirst, muscle cramps, and weakness. Very little urine is produced and the eyes may become sunken, and the skin on the fingers may become much wrinkled. If dehydration is not treated, loss of water and salts can lead to kidney failure, shock, coma, and death. In people who survive, symptoms usually subside in 3 to 6 days. Most people are free of the bacteria in two weeks. The bacteria remain in a few people indefinitely without causing symptoms.

The most important virulence factor associated with V. cholera O1 and O139 is the cholera toxin (ctx). The ctx genes (ctxA and ctxB) encoding the production of the cholera toxin have been sequenced and these have enabled development of deoxyribonucleic acid (DNA) probes and polymerase chain reaction (PCR) methods for detection of the organism (Mamady, 2016). In addition to cholera toxin, choleragenic strains of V. cholera possess the ability to adhere to, and colonise, the small intestine (colonisation factor), which has been ascribed to a toxin co-regulated pilus (TCP). Genes encoding major virulence-associated factors are found in clusters. It has been shown that ctx genes form part of a filamentous bacteriophage designated CTX phage.

Summary

The Table 1 above indicate that majority of the respondent are aged 30-39years 49(34.3%) with lowest number of people aged 60 years and above 14(9.8%); Sex of the respondent also indicate a high number of male 80(55.9%) with least of Female 63(44.1%); The level of education which has high number of people who attained secondary school 57(39.9%) with least who attended other school 22(15.4%); Occupation of the respondent indicated that majority of the respondent are involve in business 61 (42.7%) with few employed in government establishment; and also marital status of the despondence revealed that there are more married people 57(39.9%) with Few Separated 10 (7.0%).

Conclusion

In Nigeria, existing prevention and control strategies are multi-sectoral. Epidemic Preparedness and Response (EPR) approaches including registration of cases, case management and public health measures targeting personal hygiene and water treatment as well as emergency responses from both governmental and non-government agencies have contributed to the reduction in case fatality rates over the years and should be sustained. Nevertheless, the need to explore more viable approaches cannot be overplayed if the infection has to be wholly curtailed (Badmos *et al.*, 2018).

Various studies elsewhere have utilised geographic and mathematical information systems to assess spatial distribution of cholera at local levels, demonstrating case clustering and disease risk areas (Edessa, Geritu, & Mulugeta, 2017). Due to its endemicity in Nigeria, surveillance systems can provide early alerts to outbreaks, therefore leading to coordinated response (Ebimgbo *et al.,* 2019).

More importantly, it is necessary to introduce intervention measures that address the root problems of poor sanitation and unsafe water supplies in order to prevent future cholera epidemics. In this regard, perhaps, prevention of the disease is the best way to counter subsequent outbreaks (Dahiru, 2017).

Studies have also indicated that use of soap and hand washing promotion can achieve a 26 to 62% decrease in the incidence of diarrhoea in developing countries and also, simple measures as boiling the water for drinking, washing and

cooking purposes, treatment of infected facilities, sewages and drainage systems, proper disposal of infected materials such as waste products, clothing, and beddings, treatment of infected faecal waste water produced by cholera victims and sterilisation of utensils either by boiling or by using chlorine bleach (Omari, Frempong, & Arthur, 2018).

Recommendations

Based on the findings of this study, the following are recommended:
1. Creating awareness and enlightenment of the populace about the implication and effects of Cholera as an Epidemic in our dear communities.
2. There should be creation of appropriate measures to reduce the incidence of cholera.
3. Health workers should encourage appropriate means of health education
4. Good personal, food and environmental hygiene should be practice by all individuals to reduce the incidence of cholera

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