

Original Research Article

Knowledge, attitude and utilization of oral cholera vaccine in Bauchi Metropolis, Bauchi State, North-Eastern Nigeria

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ABSTRACT

Background: Since early 1800s, pandemics of cholera have affected millions of people around the world. It is estimated that 1.3 to 4.0 million cases of cholera and 21 000 to 143 000 deaths occurs each year due to cholera worldwide. Nigeria had suffered large cholera epidemics in recent years. The study determined the knowledge, attitude and utilization of oral cholera vaccines (OCV) in Bauchi metropolis, Bauchi state, Nigeria.

Methods: The design was a descriptive cross sectional study and a multistage sampling technique was used in collecting data from 372 respondents using semi-structured, interviewer administered questionnaires. Data were analyzed using SPSS version 26 at 5% significance level and 95% confidence interval.

Results: The study revealed that majority of the respondents 328 (88.2%) knew about OCV and their commonest source of information was radio 120 (34.7%). More than half of the respondents 239 (64.2%) have heard of the house to house OCV campaign. Attitudes were partially negative, because more than half 198 (53.2%) believed that oral cholera vaccine is unsafe for ill persons. Practices were relatively poor because out of the 372 respondents, 201 (54.0%) received OCV, 225 (60.4%) didn't know when to receive the second dose and 225 (60.5%) didn't receive the second dose.

Conclusions: The respondents had fairly good knowledge about OCV use, but with negative attitude which could have led to the poor practice. We recommend that the government should reinforce education to the public on the importance of OCV use in prevention of cholera.

Keywords: Attitude, Bauchi, Knowledge, Nigeria, OCV, Utilization

INTRODUCTION

Background information

Cholera is a waterborne, life threatening form of dehydrating diarrhea disease caused by the toxigenic serogroup strains of *Vibrio cholera*.¹ The main clinical

feature for cholera is the watery diarrhea. Although the causative bacterium has above 200 serotypes, only two serotypes are prevalent in poor sanitary and hygienic conditions which are the O1 and O 139. The particular two strains have been linked to the cholera outbreaks globally. Cholera infections are commonly severe, and highly virulent. Additionally, cholera outbreaks usually

occur in areas which have contaminated water or food because of poor sanitary measures.²

The bacteria are transmitted along the gastrointestinal tract through contaminated food or water.³ *Vibrio cholera* produces cholera toxin which causes the clinical symptoms of the infection. In addition to the watery diarrhea, other symptoms included vomiting and abdominal colic. Furthermore, the infection affects all age groups. It remains a public health threat, as evidenced by its substantial contribution to morbidity and mortality in low-income countries. Globally, about 317,534 cholera cases were reported⁴ during 2008-2010, with a 52% increase in deaths, half of which occurred in children aged less than five years. However, in real terms, the numbers are likely much higher due to underreporting, differing definitions of acute watery diarrhea from country to country, inconsistencies in case definitions, and poor surveillance systems.⁴

Diagnosis of cholera depends mainly on culturing the causative bacteria from a stool sample of the patient. Rapid testing can also provide a preliminary result to start a targeted treatment plan. The management of cholera consists of antibiotics for the infection, and rehydrating measures for the vomiting and diarrhea through electrolytes and fluids administration. However, the key to prevent cholera outbreaks is through improving public hygiene, water sanitation, and sewage systems. Additionally, cholera vaccination can play an important role in infection control and prevention.²

Recent reports have demonstrated that the annual estimates for cholera infections globally are up to 4 million patients with up to 143,000 patients' annual mortality.² Accordingly, cholera represents a global public health hazard and a sign of under development for a country. Cholera outbreaks affected multiple countries over the past years mainly in Asia and Africa, such as India, Sudan, Pakistan, and Bangladesh. Another contributing factor for the spread of cholera is the poor knowledge and awareness of the public about its modes of transmission and early measures of diagnosis and treatment of cholera symptoms. Hence, it is important to understand the knowledge and awareness of the public toward the disease to reduce its transmission.²

In the interim, Oral Cholera Vaccines (OCVs) can save lives in epidemics and in endemic areas. The World Health Organization (WHO) recommends OCVs as a short-term control strategy for high-risk populations.⁴ Two safe OCVs --Shanchol™, with a protective efficacy of 66%, and Dukoral®, with 79% direct protection are currently available for international use. Efficacy is not enough, however, for vaccines to be effective. People must also be willing to accept them. Local social and cultural ideas about illness, vaccines and community preferences are critical considerations. Past programs experience provides valuable lessons that underscore the priority of social and cultural aspects of vaccine

acceptance and effective vaccine action. A recent review of vaccine hesitancy suggests community effectiveness may depend on particular features of setting, health problem and vaccine.⁴ The incidence of cholera is accelerated by poor sanitation, contaminated food, and contaminated water due to poor knowledge, negative attitude and poor practices of unhygienic life style of living. All these situations are common in overcrowded environments.^{3,5}

Problem statement

In Nigeria, the first series of cholera outbreak were reported between 1970 and 1990.⁶ Nigeria had suffered large cholera epidemics in recent years. In the last quarter of 2009, it was reported that more than 2,600 people died of cholera in four Northern States with over 96 people in Maiduguri, Biu, Gwoza, Dikwa and Jere council areas of Bauchi State. Most of the Northern States of Nigeria rely on hand dug wells and contaminated ponds as sources of drinking water. Usually, the source of the contamination in other cholera patients where their untreated diarrhea discharges is allowed to get into water supplies.

Historically, Nigeria has experienced several cholera outbreaks characterized by high Case Fatality Rates (CFR), notable ones being the epidemic of 1991 which resulted in 59,478 cases and 7654 deaths, and the CFR of 12.9% reported for that outbreak remains the highest for the country to date. Furthermore, another major cholera outbreak occurred in Kano state in March, 1999, with cases spreading to Adamawa and Edo states by May of that year; and the outbreak resulted in 26,358 cases and 2085 deaths. From January to December 2010, Nigeria reported 41,787 cases and 1716 deaths (CFR 4.1%) across 18 states.⁷ The last major cholera outbreak prior to 2018 was in 2014, during which the number of cases recorded cases surpassed over half of the number of cases recorded between 2012 and 2013 as well as between 2015 and 2017. In line with global evidence, however, it is likely that cholera burden in Nigeria is underestimated due to factors ranging from differences in case definitions and completeness to social, political, and economic disincentives for reporting cholera.⁷

Twenty-seven states and Federal Capital Territory (FCT) have reported suspected cholera cases in 2021. These are Abia, Adamawa, Bauchi, Bayelsa, Benue, Borno, Cross River, Delta, Ekiti, Enugu, FCT, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Kogi, Kwara, Nasarawa, Niger, Ogun, Osun, Plateau, Sokoto, Taraba, Yobe, and Zamfara in the reporting week (week 36), 13 states reported 1,182 suspected cases - Bauchi (472), Katsina (194), Borno (106), Jigawa (95), Yobe (80), Kaduna (68), Adamawa (63), Sokoto (38), Gombe (34), Abia (13), Taraba (10), Ogun (8) and Niger (1).⁸

The control and prevention of the disease outbreak has been linked to the access of safe water and improved sanitation. Stakeholders tried to prevent and control an

outbreak by providing health education and training with regards to cholera causes, signs and symptoms, its transmission and modes of control and preventions of the disease as well as purchasing supplies and equipment. To date, there has been no concrete global improvement despite efforts made at the country level; the incidence of disease has even increased in recent years. Predicting potential outbreaks remains difficult and is often complicated by the lack of data on trends and patterns of the disease over time.⁹ However, the outbreaks have been recurring every year despite the efforts above hence necessitates further studies on the critical factors behind the recurrence of the outbreak.¹⁰

Making the benefits of immunization, including new and underutilized vaccines, available to all regardless of where they are born, who they are, or where they live is a vision of the decade of vaccines (2011-2020). In 2012, the World Health Assembly approved the Global Vaccine Action Plan as a framework to achieve this vision and a strategic objective of the plan emphasized the importance of understanding community demand and trust in vaccines. The decision made by the Vaccine Alliance (Gavi) to contribute to a global stockpile for OCVs during 2014-2018 reflects increasing priority for use of cholera vaccines in endemic settings. However, not enough is known about community acceptance of OCVs, especially across populations, and this information is critical for effective vaccine implementation. Furthermore, although some socio-cultural features may have consistent effects on across settings, others are specific to particular local settings. Systematic comparison of local studies clarifies consistent and distinctive effects of socio-cultural factors on vaccine acceptance that may not be apparent from findings of the local studies.⁴

Justification

Two meetings WHO in 1999 and 2002 had examined the potential use of OCV as an additional public-health tool for the control of cholera.⁹ In the light of the work accomplished since 2002, WHO convened a third meeting to reexamine with a group of experts the role that OCVs might play in preventing potential outbreaks of cholera in crisis situations and to discuss the use of OCVs in endemic settings. The aim of the meeting was to agree a framework for the recommendations of WHO on these subjects and to consider the pertinence of further demonstration projects in endemic settings. The meeting addressed key issues, including currently-available vaccines, surveillance, and cholera-control measures in complex emergencies, and past experiences of using OCVs.⁹ More than 40 participants took part in the discussions, representing cholera-prone countries, humanitarian organizations, scientific institutions, United Nations agencies, and WHO. The experts agreed that when considering the use of OCVs in emergencies, a multidisciplinary approach is essential and that the prevention and control of cholera should be envisaged within the larger context of public-health priorities in

times of crisis. As for the use of OCVs in endemic settings, all participants acknowledged that further data need to be collected before a clear definition of endemicity and potential vaccination strategies can be established. Results of further studies on the vaccines per se are also awaited. Recommendations relating to the use of OCVs; (a) in complex emergencies and (b) in endemic settings were elaborated, and a decision making tool for assessing the pertinence of use of OCVs in emergency settings was drafted.⁹

It is clear that additional public-health tools, such as vaccines, can play a critical role in the control of cholera. The pre-emptive use of oral cholera vaccines (OCVs) in emergency situations was recommended by the World Health Organization (WHO) in 1999, and this general recommendation remains valid. However, vaccines must be used in appropriate circumstances, where they can provide a definite benefit and will not jeopardize the response to other health priorities. Identifying the population at risk of epidemic cholera is, therefore, a key element in considering the use of OCVs, as is the cost-effectiveness of such an intervention.⁹ Several mass vaccination campaigns have already been carried out in crisis situations, and a group of experts, convened in a WHO meeting, used the evidence provided by these interventions as the basis for developing assessment tools and recommendations for the use of OCVs in mass-vaccination campaigns and to identify the possible constraints and limitations.⁹

A number of other live oral vaccines are under development in the USA and in Cuba. In addition, research is currently being conducted on parenteral conjugate vaccines and on ways to improve vaccine formulation to ease the numerous logistics constraints, particularly acute in emergencies, linked to the mode of administration of the vaccine presently available. Indeed, the limitations of the WC/rBS vaccine in emergency settings, where logistic and practical constraints abound, are numerous, but its use in a routine context is much more easily managed. Since efficacy requirements may be lower in an emergency context, vaccines specifically designed for emergency public-health applications might be considered.⁹

The study examined the knowledge, attitude and utilization of oral cholera vaccine in Dawaki ward of Bauchi LGA, Bauchi state, North-Eastern Nigeria.

METHODS

Study area

The study was carried out in Dawaki ward, Bauchi L.G.A of Bauchi State, Nigeria. Dawaki ward was purposively selected because it was the only ward that benefitted from the last house to house oral cholera vaccination campaign (in 2021) in Bauchi metropolis. Dawaki ward is located in Bauchi town at longitude of 9°25'60"N. The ward is

divided into zones namely; Fadaman Mada, Bakin Kura, kofar Ran, and Unguwar Dawaki. There is an estimated 171,672 people in Dawaki ward according to 2006 census. The projected population as at December 2021 was 282,554 using the respective yearly national population growth rate as reference value.¹¹ The predominant tribe of Dawaki ward is Hausa/Fulani, with Islam as the predominant religion and some few Christians. The main occupation of the residents in the ward is trading. There are 3 comprehensive secondary schools in the ward and comprehensive health center (Urban Maternity).

The study period was from October, 2021 to January, 2023, three months after the last house to house oral cholera vaccination campaign (in 2021) in Bauchi metropolis.

Study design and population

The study design adopted was a descriptive cross-sectional study design. A total sample size of 401 was calculated using Fisher's formula for estimating the minimum sample size for descriptive studies, assuming a prevalence of 48% obtained from a previous study.¹² The minimum sample size was inflated by 4% being a non-responses rate obtained from a previous similar study.¹³ The study population included residents (above 18 years) of Dawaki wards of Bauchi LGA who were present during the data collection processes and consented to participating in the study.

Sampling techniques

A multistage sampling technique was employed in selection of 372 participants for the study. In the first stage, Dawaki ward was purposively selected because it was the only ward that benefitted from the last house to house oral cholera vaccination campaign (in 2021) in Bauchi metropolis. In the second stage, settlements were selected in which 100% of the settlements were selected. In the final stage, the respondents were selected. A proportionate number based on the population of each settlement were determined for the administering of the questionnaire. A systematic sampling technique was used to select respondents in each sampled settlement. In each sampled settlement, mapping and house numbering was done. A sampling fraction and interval was determined separately for each of the settlements. The first house that the questionnaire was administered was selected by using random number table. In house with more than one household, one was selected using simple random sampling by balloting. For a house without eligible participant, the next house in series was selected and the interval continued from this last house.

Study instrument description/data collection

In this study, an interviewer administered, semi-structured questionnaire adopted from the previous

studies was used to collect the data for the study and it has 5 parts; Section A: sought information on socio-demographic information and has six (6) variables, Section B: on knowledge towards oral cholera vaccine which contained seven (7) variables, Section C: on attitude towards oral cholera vaccine which contained also seven (7) variables, Section D: on utilization of oral cholera vaccine which contained five (5) variables and Section E: on factors affecting the utilization of oral cholera vaccine and contained nine (9) variables.¹² The questionnaire was translated into the main local language (i.e. Hausa) and was administered by four Hausa speaking trained research assistants. Ethical clearance was obtained from the Department of Public Health, Bauchi State University Gadau, and an approval was granted by the Bauchi Local Government Secretariat, through the Department of Primary Health Care. Confidentiality was assured to all respondent before the interview. Informed consent was obtained from all prospective respondents. The consent form was translated into the main local language, and literate respondents indicated acceptance by signing the consent form, while illiterate participants affixed their thumbprint. Data collected are kept confidential and only for the purpose of this study.

Data analysis

The data was collected, the pre-recorded data were entered manually into excel questionnaire by questionnaire and analyzed using SPSS version 26 at 5% significance level and 95% confidence interval.¹⁴ Data was run in the program; tables of frequencies and percentages were developed and transferred to Microsoft words where the data was interpreted in a written form. The dependent variable was utilization toward OCV use, independent variables were knowledge and attitude toward the use of OCV. Seven questions on knowledge of OCV were asked, a correct response was scored one point, while a wrong response was allocated a zero point. Respondents with knowledge score of (0-2), (3-5) and (6-7) were considered to have poor, fair and good knowledge of OCV respectively. Similarly, seven questions on utilization of OCV were asked, a correct response was scored one point while a wrong response was allocated a zero point. Respondents with attitude score of (0-2), (3-5) and (6-7) were considered to have poor, fair and good utilization of OCV respectively.

RESULTS

Out of the 401 distributed questionnaires to the respondents (being the total sample size), 372 were duly filled and returned completed given a response rate of 72.3%. The mean age of the respondents is 36 years with majority 120 (32.3%) were between the age of 26-35 years. 208 (56.2%) were of female gender, 260 (69.8%) were married and 237 (63.7%) of the respondents were of Hausa ethnicity (Table 1).

Table 2 showed the distribution of knowledge of respondents on oral cholera vaccine. Majority of the respondents 328 (88.2%) knew about OCV and their commonest sources of information were Radio 120 (34.7%), followed by health worker 76 (20.4%) and social media 71 (18%). More than three quarter 307 (82.5%) knew where to get OCV, 303 (81.5%) knew the importance of OCV and more than half of the respondents 239 (64.2%) have heard of the house to house OCV campaign. After scoring the knowledge, it showed that 259 (69.6%) have good knowledge, 61 (16.5%) have fair knowledge, and 52 (13.9%) have poor knowledge on OCV.

Table 1: The socio-demographic characteristics of the respondents (n=372).

Variables	Frequency	Percentage
Age (years)		
18-25	75	20.2
26-35	120	32.3
36-45	81	21.8
46-55	74	19.9
>55	22	5.9
Total	372	100
Mean±SD	35.9±2.1	
Sex		
Male	163	43.8
Female	208	56.2
Total	372	100
Religion		
Islam	310	83.3
Christianity	62	16.7
Others	0	0
Total	372	100
Marital status		
Single	95	25.6
Married	260	69.8
Separated	3	0.8
Divorced	6	1.6
Widowed	8	2.2
Total	372	100
Ethnicity		
Hausa	237	63.7
Fulani	76	20.4
Others	59	15.9
Total	372	100
Occupation		
Civil servant	125	35.1
Business	145	37.6
Others (students, housewife)	102	27.3
Total	372	100.0

Table 3 showed the distribution of attitude of the respondents toward oral cholera vaccine. Majority of the respondents 283 (76.1%) believed OCV is used for

cholera prevention. More than half of the respondents 198 (53.2%) believed oral cholera vaccine is unsafe for ill persons. However, 298 (80.1%) believed that OCV is not harmful to health, more so, 269 (72.6%) were willing to receive OCV. 200 (53.8%) were irritated by its taste and 252 (67.7%) denied the mindset that OCV should be injected rather than given orally.

Table 2: Knowledge of respondents on oral cholera vaccine (n=372).

Variables	Frequency	Percentage
Know about OCV		
Yes	328	88.2
No	44	11.8
Total	372	100
Source of information		
Radio	120	34.7
Social media	71	18.0
Television	57	14.0
Friends	48	12.9
Others (health facility, house to house campaign)	76	20.4
Total	372	100
Know about cholera		
Yes	352	94.6
No	16	4.3
No response	4	1.1
Total	372	100
If yes, mode of transmission		
Mosquito	16	4.3
Contaminated water and food	315	84.7
Domestic animals	4	1.1
I don't know	24	6.5
No response	13	3.4
Total	372	100
Know where to get OCV		
Yes	307	82.5
No	64	17.3
No response	1	0.2
Total	372	100
Know the importance of OCV		
Yes	303	81.5
No	69	18.5
Total	372	100
Heard of OCV campaign		
Yes	239	64.2
No	133	35.8
Total	372	100.0

Table 4 showed the distribution of utilization of oral cholera vaccine among the respondents. More than half of the respondents 201 (54.0%) received OCV. However, 225 (60.4%) didn't know when to receive the second dose and 225 (60.5%) actually did not receive the second dose.

Out of the 91 (24.4%) who showed their vaccination card, only 53 (14.2%) were fully vaccinated.

Table 3: Attitude of respondents toward oral cholera vaccine (n=372).

Variables	Frequency	Percentage
Believed OCV is unsafe for ill persons		
Yes	198	53.2
No	166	44.6
No response	8	2.2
Total	372	100
Believed OCV is used for cholera prevention		
Yes	283	76.1
No	74	19.9
No response	15	4.0
Total	372	100
Believed OCV may be harmful		
Yes	69	18.5
No	298	80.1
No response	5	1.3
Total	372	100
Believed OCV ingredients are safe		
Yes	273	73.4
No	92	24.7
No response	7	1.9
Total	372	100
Willing to receive OCV		
Yes	269	72.6
No	94	25.0
No response	9	2.4
Total	372	100
Think OCV taste awful		
Yes	200	53.8
No	151	40.6
No response	21	5.6
Total	372	100
Think OCV be injected rather than orally		
Yes	85	22.8
No	252	67.7
No response	35	9.4
Total	372	100.0

Table 5 showed the distribution of factors affecting the utilization of oral cholera vaccine among respondents. Majority of the respondents 318 (88.5%) do not have superstition on the use of OCV and more than half of those that received the vaccine 285 (63.2%) did not experience side effect.

Table 5: Factors affecting the utilization of oral cholera vaccine among respondents.

Variables	Frequency	Percentage (%)
Have superstition on OCV		
Yes	42	11.2
No	318	85.5
No response	12	3.3

More than three quarter of the respondents 300 (80.6%) think that health talk on the importance of OCV is important and 312 (83.9%) did not prefer treating cholera than getting vaccinated against it.

Table 6 is a bivariate analysis which showed the relationship between knowledge of the respondents and utilization of OCV in cholera prevention. It revealed that the respondents' knowledge was highly associated with their utilization. Findings showed that the following factors were significant (with p-value less than 0.05 at 95% confidence level); knew OCV ($p<0.000$), knew where to get OCV ($p=0.000$), knew the importance of OCV ($p=0.000$) and heard of OCV campaign ($p=0.000$).

Table 4: Utilization of oral cholera vaccine among the respondents.

Variables	Frequency	Percentage
Received OCV		
Yes	201	54.1
No	166	44.6
No response	5	1.3
Total	372	100
Didn't receive (reasons)		
Don't know where to receive OCV	37	9.9
Believed its side effects are severe	20	5.4
Taste awful	19	5.1
No reason	96	25.8
Know when to receive second dose		
Yes	139	37.4
No	225	60.4
No response	8	2.1
Total	372	100
Received second dose		
Yes	82	22.0
No	225	60.5
No response	65	17.5
Total	372	100
Showed vaccination card		
Fully vaccinated	53	14.2
Partially vaccinated	38	10.2
No response	281	75.5
Total	372	100

Continued.

Variables	Frequency	Percentage (%)
Total	372	100
Superstitions		
Won't live long	15	4.0
Causes bleeding	15	4.0
Others	9	2.5
No response	333	89.5
Total	372	100
Experienced side effects		
Yes	28	7.5
No	285	76.6
No response	59	15.9
Total	372	100
Side effects experienced		
Nausea	21	5.6
Headache	8	2.2
No response	343	92.2
Total	372	100
Think health talk on OCV is important		
Yes	300	80.6
No	70	18.8
No response	2	0.6
Total	372	100
Preferred treating cholera than getting vaccinated		
Yes	42	11.3
No	312	83.9
No response	18	4.8
Total	372	100
Paid for OCV		
Yes	17	4.6
No	220	59.1
No response	135	36.3
Total	372	100
Method of procurement of OCV		
Free	199	53.5
Paid	16	4.3
No response	157	42.2
Total	372	100
Think gov't should do more on OCV		
Yes	348	93.5
No	24	6.4
Total	372	100.0

Table 6: The relationship between knowledge of the respondents and utilization of OCV in cholera prevention.

Characteristics	Indicator	Received OCV	Didn't receive OCV	Total	Percentage	P value
Know OCV	Yes	195	129	324	87.6	0.000*
	No	6	37	43	11.1	
	No response	0	0	5	1.3	
	Total	201	166	372	100	
Source of information	Radio	70	50	120	30.9	0.074
	Social media	38	31	69	14.0	
	TV	28	26	54	12.6	
	Friends	25	23	48	12.9	
	Others	40	36	76	20.4	

Continued.

Characteristics	Indicator	Received OCV	Didn't receive OCV	Total	Percentage	P value
	No response	0	0	5	1.3	
	Total	201	166	372	100	
	Yes	191	156	347	93.6	
	No	8	8	16	4.3	
	No response	2	2	9	2.1	
Know about cholera	Total	201	166	372	100	0.535
If yes, mode of transmission	Mosquito	11	5	16	4.3	0.063
	Contaminated water	174	137	311	83.6	
	Domestic animals	1	3	4	1.1	
	don't know	8	16	24	6.5	
	No response	7	5	17	4.5	
	Total	201	166	372	100	
Know where to get OCV	Yes	193	111	304	81.7	0.000*
	No	7	55	62	16.7	
	No response	1	0	6	1.6	
	Total	201	166	372	100	
Know the importance of OCV	Yes	187	112	299	81.3	0.000*
	No	14	54	68	17.4	
	No response	0	0	5	1.3	
	Total	201	166	372	100	
Heard of OCV campaign	Yes	112	123	235	63.2	0.000*
	No	89	43	132	35.5	
	No response	0	0	5	1.3	
	Total	201	166	372	100	

*Statistically significant, p-value less than 0.05 at 95% confidence level

Table 7: The relationship between attitude of the respondents and utilization of OCV in cholera prevention.

Characteristics	Indicator	Received OCV	Didn't receive OCV	Total	Percentage	P value
OCV is unsafe for ill persons	Yes	92	104	196	52.7	0.002*
	No	104	61	165	44.4	
	No response	5	1	11	2.9	
	Total	201	166	372	100	
Believed OCV is for cholera prevention	Yes	169	113	282	76.8	0.000*
	No	26	46	72	19.2	
	No response	6	7	16	4.2	
	Total	201	166	372	100	
Believe OCV may be harmful	Yes	23	46	69	18.5	0.000*
	No	178	120	298	80.2	
	No response	0	0	5	1.3	
	Total	201	166	372	100	
Believed OCV ingredients are safe	Yes	164	109	273	73.4	0.001*
	No	36	56	92	24.7	
	No response	1	1	7	1.9	
	Total	201	166	372	100	
Willing to receive vaccine	Yes	177	92	269	72.3	0.000*
	No	22	71	93	25.0	
	No response	2	3	10	2.7	
	Total	201	166	372	100	
Think OCV taste awful	Yes	118	82	200	53.8	0.206
	No	79	72	150	40.3	
	No response	4	12	22	5.9	

Continued.

Characteristics	Indicator	Received OCV	Didn't receive OCV	Total	Percentage	P value
	Total	201	166	372	100	
Prefer OCV injected rather than orally	Yes	48	35	83	22.4	0.606
	No	138	114	251	67.4	
	No response	15	17	38	10.2	
Total		201	166	372	100	

*Statistically significant, p-value less than 0.05 at 95% confidence level

Table 7 showed the relationship between attitude of the respondents and utilization of OCV in cholera prevention. More than half of the respondents believed that OCV is unsafe for ill persons 196 (53.6%) with a significance level of ($P=0.002$), they also believed that OCV is used for cholera prevention 283 (76.1%) ($P=0.000$). They 298 (80.1%) also wrongly believed that OCV is harmful to health ($P=0.000$), 271 (73.4%) of the respondents believed OCV ingredients are safe, with a significance value of ($P=0.001$) and 276 (72.6%) of the respondents were willing to receive the vaccine ($P=0.000$).

DISCUSSION

This study aimed at assessing the knowledge, attitude and utilization of oral cholera vaccine. Results showed that majority of the respondents 120 (32.3%) were between the age of 26-35 years. Knowledge on OCV was one of the significant factors; almost all the respondents 328 (88.2%) knew about OCV and more than three-quarter 283 (76.1%) knew that it was used for cholera prevention. This implies good knowledge on OCV because ideally OCV was produced for cholera prevention. Respondents who had that knowledge had higher chances of avoiding cholera infection compared to others who never had. These findings are similar to a study by Scobie et al; in a study in Thailand also found out that respondents had high knowledge on OCV as a tool for effective cholera prevention.¹⁵ However, the results are not in line with findings from the study of knowledge attitude and preventative practices relating to cholera and oral cholera vaccine among urban high risk in Dhaka Bangladesh in which the results revealed that only 16% of the participants had heard of cholera vaccines.

Knowledge about where to get OCV is a significant factor in the utilization of OCV ($P=0.000$). Majority of the respondents 307 (82.5%) knew where to procure OCV. Most of the respondents who received OCV knew that OCV is gotten from health facilities or during house-to-house campaigns. Having knowledge on the importance of OCV was highly associated with the utilization of OCV in prevention of cholera ($P=0.000$). This was due to the fact that many of the respondents believe in the fact that prevention is better than cure, and that they had the fear of cholera in them.

Knowledge about OCV campaign was highly associated with its utilization; this was because of the fact that a house-to-house OCV campaign was recently conducted in

the ward. Similarly, Heyerdahl et al in his focus group discussion reported that most of those who were vaccinated heard about the campaign from community sources such as “people from health authorities going around campaigning” and announcing it over a megaphone, community sensitization in school, church, home visits, including from a “little boy,” clinic, friends, and family (including those working in health).¹⁶ Access to information during the campaign, cultural understanding of medicinal potency and perceived side-effects influenced OCV uptake.¹⁶

Moreover, majority of the respondents believed that OCV is unsafe for ill persons 198 (53.2%). The study found out that OCV was the most effective tool for cholera prevention 283 (76.1%) with a significance level of ($P=0.000$). However, results were not in line with the study carried out by Demolish et al where majority of the respondents said that oral vaccine may be perceived as less efficacious than injectable vaccines, as the former do not directly enter the bloodstream; the concentration of vaccine may be lower with oral than with injectable vaccines; and that young children might spit out the oral vaccine. Some respondents pointed out their reluctance to be treated like “guinea pigs” by receiving an unknown vaccine.¹⁷

Another significant factor in the utilization of OCV is that majority of respondents 298 (80.1%) believed that OCV is not harmful to health, however results were not in line with in a focus group discussion by Heryerdahl et al; in which one non-vaccinated man emphasized that “We don’t know the statistics, so we can’t say how safe they [OCVs] are because people are just taking vaccine and we have not seen the result.”¹⁶

However, majority of the respondents 269 (72.6%) were willing to receive the vaccine. Similarly, in a study carried out in Thailand on use of oral cholera vaccine and knowledge attitude and practices regarding safe water sanitation and hygiene in a long standing refugee camp; at baseline, 262 (97%) of 271 respondents reported willingness to receive OCV, and 221 (97%) of 228 of respondents with children reported willingness to let their child receive OCV. At first follow-up, 184 (99%) out of 187 respondents reported awareness of the OCV campaign.¹⁵

200 (53.8%) respondents think the vaccine taste awful, similarly, Heryerdahl et al reported that; the taste of the vaccine also influenced uptake. Those vaccinated

described the taste of OCV as “bad,” “bitter,” “funny,” “like rotten eggs,” “salty,” “chlorine,” “raw grasshoppers,” and “raw eggs.” While non-vaccinated said that these reports dissuaded them, several of fully vaccinated coped by downplaying the taste. One man stated the bad taste was “only 15 minutes”; some that they had become accustomed to the taste by the second dose; and, others that they were given water or bought mint sand sweets to get rid of a taste that would otherwise last in one’s mouth.¹⁶

Majority of the respondents in our study preferred OCV be given orally rather than by injection 252 (67.7%). However, results were not in line with a study where majority of the respondents preferred injection rather than oral administration. A study carried out in Nampula Mozambique on rapid qualitative assessment of oral cholera vaccine anticipated acceptability in a context of resistance toward cholera intervention findings showed that participants also expressed hesitancy regarding the immunization method: 55% of participants stated that they would prefer injections and 40% stated a preference for oral delivery.¹⁷

Majority of our respondents 201 (54.1%) received OCV. Similarly, according to Scobie et al, in his study on the Use of oral cholera vaccine and knowledge attitude and practices regarding safe water sanitation and hygiene in a long standing refugee camp Thailand Overall, 186 (99%) of respondents reported at least one household member receiving OCV during the campaign; 70 (38%) reported non-vaccination of at least one household member; and 35 (19%) reported at least one household member receiving only 1 dose. Absence from the camp was the most commonly reported reason both for non-vaccination (14%) and receipt of only 1 OCV dose (6%), besides non-eligibility. Few (1%) respondents reported a household member spitting out part of the vaccine.¹⁵ While 166 (44.6%) reported that they didn’t receive the vaccine. Some of the respondents don’t know where receive the vaccine, some believed it has severe side effects, some refused getting vaccinated because of its taste, others do not have reason while others were ineligible at time of vaccination (sick, pregnant etc). Similarly, Ivers et al in 2013 reported that among the 37 respondents reporting that they were not vaccinated, 18 (3.7) reported not being present at the time of vaccination, 3 (<1%) did not want the vaccine, 2 (<0.5%) reported other reasons; 1% declined to respond.¹⁸

Despite the high uptake of OCV among the respondents, majority 225 (60.4%) did not know when to receive the second dose and majority 225 (60.4%) did not receive the second dose. This was due to the reason that there was no follow up campaign after the first campaign which the first dose was given. Out of the 91 respondents who showed vaccination card only 53 (14.2%) were fully vaccinated. Similarly, Scobie et al in his study reported that Vaccination cards were available for 443 (40%) individuals. OCV coverage by card, among individuals

with available documentation, was 93% (95% CI: 89%±96%) for the first dose and 84% (95% CI: 78%±89%) for the second dose. Assuming that all 203 individuals in the 46 non-responding households were unvaccinated, OCV coverage in the camp overall could have been as low as 77% (95% CI: 72%±82%) and 72% (95% CI: 67%±77%) for the first and second dose, respectively.¹⁵

Almost all the respondents 318 (85.5%) do not have superstition on OCV, also majority did not experience side effects after they received the vaccine, those who experienced side effects describe the side effects as mild they include, nausea, vomiting and mild headache. Similarly, Heryerdahl et al reported in his focus group discussion reported that, those vaccinated reported developing a rash (vipeele), experiencing a drunkenness sensation, insomnia, loss of appetite, stomach ache, dizziness, nausea, diarrhea and vomiting. Other mild side-effects reported included feelings of severe weakness, nausea, vomiting, “small diarrhea,” temporary stomach pains and a rash.

Majority of the respondents 300 (80.6%) think health talk on the importance of OCV is important; this was due to the fact that knowing some vital information on the use of OCV will increase the uptake of OCV. Almost all the respondents 312 (83.9%) did not prefer treating cholera than getting vaccinated against it, similarly it was narrated by a member of a focus group discussion conducted by Heryerdahl et al; “*Why we have liked the vaccines is because it prevents us from the disease. This year, there is no [treatment] tent for cholera.*” The respondents 220 (59.1%) that received the OCV reported that they did not pay for receiving the vaccine; this was due to the fact that the vaccine was a government provided free vaccine and not for sale. Almost all the respondents 348 (93.5%) think government should do more in providing OCV.

The limitations for the study were that some respondents withheld information regarding OCV because they feared being ashamed of improper utilization. This is information bias; as respondents may have given information that is perceived as ideal rather than real information. Another limitation was financial constraints as very large sample size could have been used. But, because the study is self-sponsored, there were some financial constraints.

CONCLUSION

The study assessed knowledge, attitude and utilization of residents of Dawaki ward of Bauchi State in the prevention of cholera. The study found out relatively good knowledge about OCV because respondents have ever heard about it and they knew it was a tool used in preventing cholera. However, lack of awareness on; how safe OCV is and when to receive the second dose created doubts about their awareness on the efficacy and

effectiveness of OCVs. Generally, respondents have fairly negative attitude toward the utilization of OCV. Majority believed that OCV may be harmful to health; OCV is not safe for ill persons and that OCV taste awful. These comments discouraged the unvaccinated from getting vaccinated. Majority of the respondents received OCV. Despite the high intake of the first dose, majority of the respondents did not receive the second dose. Also, majority of the respondents could not show their vaccine confirmation card.

Recommendations

Based on the findings of this study, we recommend that the government/ministry of health should emphasize on educational sensitization to the communities on the benefits of receiving double dose of OCV over fears of severe side effects and perceptions that it is harmful. This should be done over media channels such as radio, television and newspapers. In addition, OCV should be made more available to public especially through health care facilities so that people can access them free. The Health care teams in different communities should be empowered to give door to door education on utilization of OCV in the prevention of cholera. They should physically visit the households and check the status of OCV and advise them accordingly. They should also provide the governments with periodical reports on cholera, so that proper arrangements are done to provide more free of charge OCV to the public through mass vaccination campaigns. Finally, the communities should ensure good personal and environmental hygiene to prevent cholera, as prevention is better than cure.

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