

# Knowledge, Compliance and Effects of the Oral Cholera Vaccine at the Hill Top of the Ndobbo Community, Littoral Region, Douala, Cameroon

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## Abstract

**Introduction:** Developing an effective and safe cholera vaccine is a global public health necessity in the cholera epidemic. Vaccination compliance maybe a major concern with cholera vaccine due to some factors. Therefore, this study aims to evaluate the compliance, knowledge and effects of cholera vaccine in the Hill top Ndobbo community in the littoral region Douala, Cameroon.

**Methods:** A cross sectional community-based survey was carried out at the Hill top Ndobbo community in Douala. A semi-structured questionnaire was used to collect data after authorization was granted. The data collected was coded, analyzed using statistical package for the social sciences (SPSS) version 23 then presented on tables and figures. The statistical significance was set  $p < 0.05$ .

**Results:** A total of 300 participants were recruited into the study, and it was revealed that, majority had a good knowledge about cholera (67.0%), the vaccine (57.7%) and the mode of transmission (55.5%). 14.0% of the total population had received the vaccine at the time of sampling, and among those who didn't received the vaccine, students (60.1%) significantly ( $p = 0.023$ ) made up the population, and 95.0% of the study population attested that they were not comfortable taking the vaccine.

**Conclusion:** The population had a good knowledge about the cholera vaccine, but majority had not received the vaccine. A vaccination campaign at the Hill top Ndobbo community in the littoral region Douala, Cameroon is recommended.

**Keywords:-** Cholera, Cholera vaccine, Compliance, Knowledge, Hill top Ndobbo-Douala.

## I. INTRODUCTION

Cholera is an acute diarrheal infection caused by ingestion of food or water contaminated with bacterium *Vibrio cholera* (1). Cholera remains a global threat to public health and an indicator of inequity and lack of social development (2). During the 19<sup>th</sup> century, cholera spread across the world from its original reservoir in the Ganges delta in India in which six subsequent pandemics killed millions of people across all continents (1). The current (seventh) pandemic started in south Asian 1961, reached Africa in 1971 and America in 1991 (3). Cholera is now endemic in many countries and Cameroon is among several countries in West and Central Africa experiencing recurrent cholera Outbreaks. Cameroon reported its worst outbreak in 2011 (4) with the first case of cholera registered on the 4<sup>th</sup> of February 1971 (5, 6). Cholera outbreak in Cameroon, is as a result of wide Circulation of *Vibrio cholera* in the country, limited access to safe drinking water in some areas, seasonal pattern of cholera occurrence, inadequate WASH conditions, lack of training for community health workers (CHWs), a lack of quality healthcare workers needed in treatment centers, inconsistent application of norms and standards' an insufficient number of cholera treatment kits and medical supplies such as rapid diagnostic tests insufficient capacity in treatment centers due to overcrowding, lack of cholera beds and other equipment, poor control of patient flow and inadequate communication tools and lack of vaccine uptake (7).

The cholera vaccine provides health benefits to susceptible populations, affects family earning capabilities and financial stability of the family. Currently the WHO has pre-qualified three oral cholera vaccines (OCV): Dukoral®, Shanchol™, and Euvichol-Plus® and all three vaccines require two doses for full protection (1). The use of oral cholera vaccine for the prevention of cholera was first recommended by the world health organization (8) and in 2015, Cameroon had chosen oral cholera vaccination campaigns in addition to other interventions to respond to cholera outbreaks (9) but compliance to these vaccines in many Cameroonian communities is still lagging. So, community base research and evaluations are necessary to understand perceptions and compliance of the community

relating to cholera and oral cholera vaccines. A study carried out in Haiti confirmed that there was a great knowledge on oral cholera vaccine and not ignoring the other aspects or measures for cholera prevention (10) and research has revealed that vaccination campaigns have a great influence on vaccine uptake (9, 11).

In 2020, the Littoral region registered 979 suspected cases with 49 deaths and by 2021, 10 suspected cases were detected, with one death. Moreso, in the Littoral region, a cholera case was confirmed by culture on 21 November 2021 in an eight-year-old boy at the Laquintinie Hospital laboratory in Douala. His family and those in his neighborhood also reported no history of travel (2). As of 30<sup>th</sup> April 2022, 6652 suspected cases have been recorded in Cameroon including 51 deaths in the Littoral region (1). Controlling cholera in the region remains a significant challenge as many people still live in unclean places and access to clean portable water remains low and vaccination compliance is not encouraging. Current reports show that more deaths have been reported in Cameroon recently, so there is need for prompt actions through vaccination and maintaining good hygienic conditions. Thus, assessing compliance and knowledge about the uptake of the vaccine is imperative. The aim of this study was to evaluate the compliance, knowledge and effects of cholera vaccine in the Hill top Ndobbo community.

## II. MATERIALS AND METHODS

### A. Study area

The study was carried out at Hill top Ndobbo Bonaberi-Douala Community of the Littoral region of Cameroon. Ndobbo is located in the western side of the harbor across the Wouri-River some 211km west of Yaounde the country's capital. It is located at Latitude: 4.10182° N and Longitude 9.63602° E of the equator. It is made up of a heterogenous population of business people, farmers, and students.

### B. Study design

This study was a community base cross-sectional study in the Hill top Ndobbo Bonaberi community Douala of the Littoral Region of Cameroon. Participants were included consistently as they gave their consent to take part in the study.

### C. Study population

The study population was made up of inhabitants of the Hill top Ndobbo community in Bonaberi Douala which included; farmers, civil servants, business men and women and students who were available at the time of data collection. Individuals who were inhabitants of the Hill top Ndobbo community, gave their consent and were mentally upright were included into the study. Those who did not take part in the study were those who did not give their consent and were not present during data collection.

### D. Sampling techniques and Sample size

The convenient sampling technique was used which gave everyone equal chance to be selected for the study. This sampling technique was used because it recruited participants who were willing to take part in the study. A total of 300 participants were recruited into the study population.

### E. Data collection

Data was collected through a semi-structured questionnaire to seek participant's socio-demographics, compliance, knowledge and effect of the cholera vaccine. The questionnaire was adopted and drafted after a thorough review of literature by the researchers, and the questionnaire was then pretested.

### F. Data management and analysis

After completing every individual questionnaire, it was marked as 'entered' so that duplicates should not be generated. When all entries of questionnaires were completed, they were bagged in an envelope and labeled completed and locked away in a cabinet at the end of each day. Data were entered, verified, cleaned and analyzed using SPSS version 23. A descriptive statistic was done to evaluate percentages while the chi-square test was used to evaluate significant differences between groups. Results were presented on tables and figures. Statistical significance was set at  $p < 0.05$ .

### G. Ethical consideration

Authorization number 0259/AAR/MINSATE/DRSPL/BCASS to conduct this study was obtained from the Regional Delegation of Public Health, Littoral region, Douala, and also from the chief of the NDOBO community. Consent was obtained from all the participants, and they were made to understand that their participation was voluntary. All information collected was kept confidential through physical and electronic barriers.

## III. RESULTS

### A. Socio-demographic characteristics of the study population

Out of the 300 participants that were recruited into this study, 58.0% of them were females and 56.7% were married. Majority of them were traders (65.7%), and most of them were Christian (79.3%) with a majority having secondary education (56.7%).

FACTOR	VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Sex	Male	126	42
	Female	174	58
Marital status	Married	170	56.7
	Single	130	43.3
Occupation	Trader	197	65.7
	Civil Servant	17	15.7
	Student	59	19.7
	Farmer	27	9.0
	None	65	21.7
	At Least Primary	56	18.7
Educational level	Secondary	170	56.7
	Tertiary	73	24.3
	None	1	0.3
Religion	Christian	238	79.3
	Muslim	29	9.7
	None	33	11

Table 1: Socio demographic characteristic of the study population

*B. Knowledge and uptake on the oral cholera vaccine in the Hill top Ndobu community*

Statistical analysis revealed that, most of the participants knew that maintaining good hygienic conditions (75%) was the main preventive measure against cholera spread in a community.

While a few understood that accepting the vaccine (2.3%) was key to reduction of the spread of cholera in the community (Figure 1).

Furthermore, most of the participants know about the outbreak of cholera in Cameroon (67%), they knew about the cholera vaccine (57.7%), but majority of them had not received the vaccine (86%). Furthermore, using Pearson’s chi-square test to test for differences in groups, statistical analysis revealed that students significantly ( $p = 0.023$ ) did not receive cholera vaccine (60.1%) compared to the other educational levels as seen in figure 2. Most of the participants revealed that the spread of the bacteria can be prevented (55.3%) (Table 2).

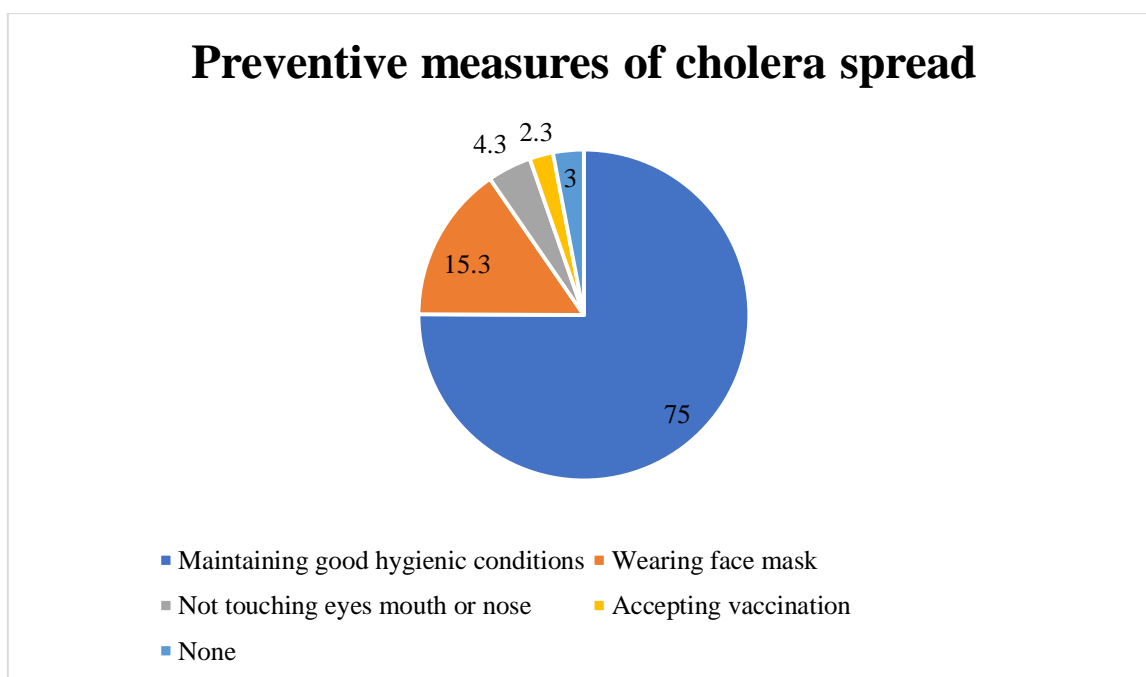


Fig. 1: Knowledge on the preventive measures against Cholera spread

FACTOR	VARIABLE	FREQUENCY	PERCENTAGE
Do you know about the outbreak of cholera in Cameroon?	Yes	201	67
	NO	99	33
Do you know about the cholera vaccine?	Yes	173	57.7
	NO	127	42.3
Have you received the Cholera Vaccine?	Yes	42	14
	NO	258	86
Can the spread of the bacteria be prevented?	Yes	166	55.3
	NO	134	44.7

Table 2: Participants knowledge on cholera and the effects of the cholera vaccine in the Hill Top Ndobbo community

C. Compliance to cholera vaccine uptake in the Hill top Ndobbo community

Table 3 explored the compliance to cholera vaccine uptake and statistical analysis revealed that most of the participants knew it was important to take cholera vaccine

(88.3%), most respondents accepted that they will take the vaccine if it is made available (78.3%) and accepted that they will advise friends and neighbors to take the cholera vaccine (80.7%).

FACTOR	VARIABLE	FREQUENCY (N)	PERCENTAGE (%)
Do you think it is important for you to take the vaccine?	Yes	265	88.3
	No	21	7.0
	None	14	4.7
Will you take the vaccine if made available?	Yes	235	78.3
	No	64	21.3
	None	1	0.4
Will you advice friends or family members to take the vaccine?	Yes	242	80.7
	No	42	14.0
	None	16	5.3

Table 4: Compliance to cholera vaccine uptake in the Hill to Ndobbo community

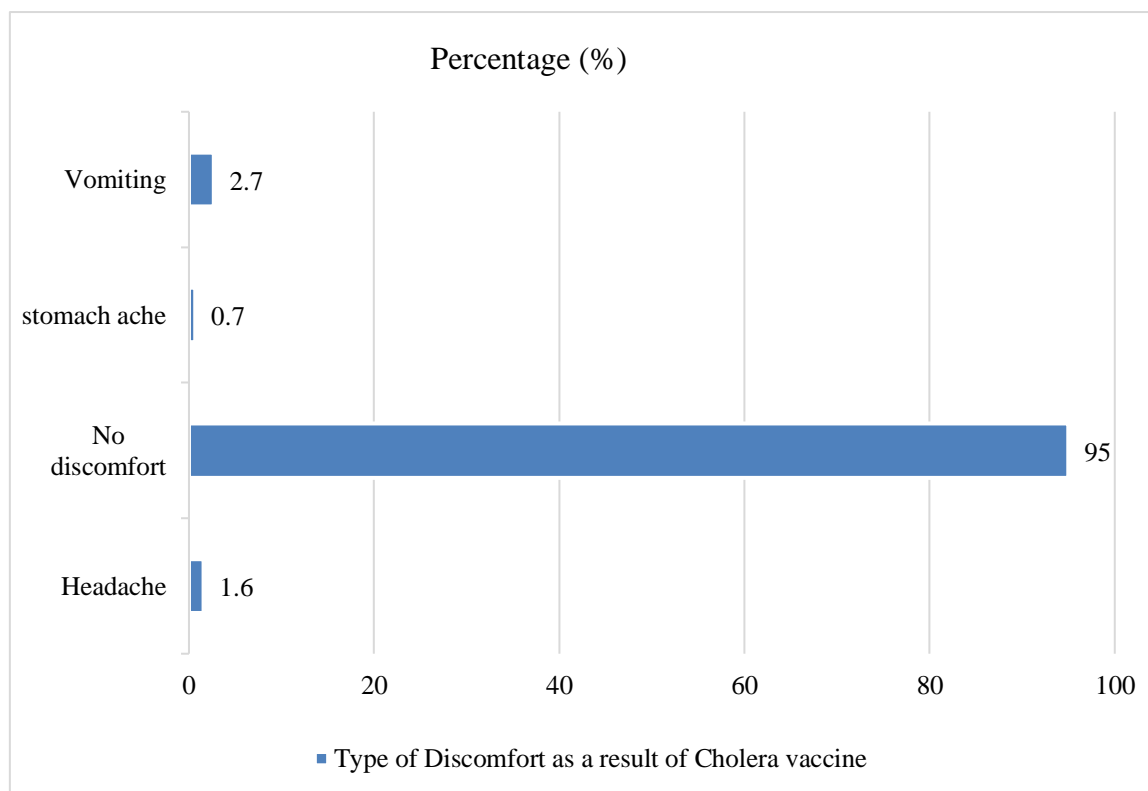


Fig. 3: Type of discomfort suffered as a result of cholera vaccine

Out of the participants who had received the vaccine, a majority of them revealed that they felt no discomfort after taking the vaccine (95%) (Figure 3).

#### IV. DISCUSSION

Cholera remains a public health concern in Cameroon with reports of suspected and diagnosed cases in several regions of the country. This study was aimed at evaluating the knowledge and compliance of cholera vaccine in the Hill top Ndobonaberi Douala, a community in the littoral region of Cameroon.

Statistical analysis revealed that, most of the participants knew that maintaining good hygienic conditions was the main preventive measure against cholera spread in the community. This finding is in line with one of the measure recommendations of the WHO with regards to prevention of the spread of cholera. It was also revealed that, majority had a good knowledge about cholera (67.0%), the vaccine (57.7%) and knew that the spread of bacteria can be prevented (55.5%). These findings reveal that there was a general high knowledge about the cholera, the oral vaccine and that the spread of the bacteria can be prevented. This finding in line with studies carried out in Haiti which confirmed that there was a great knowledge on oral cholera vaccine and not ignoring the other aspects or measures for cholera prevention (10). Through high level of vaccination campaigns, majority of individuals turn to know more about the oral cholera vaccine (9) which is key to vaccine uptake. In Cameroon, there have been limited number of vaccination campaigns since the implementation of the oral cholera vaccine as the vaccine of choice for the country (8). As a result of the few campaigns, the uptake of the oral cholera vaccine (OCV) becomes limited and this study clearly reveals a low coverage of cholera vaccine uptake (14.0%). This coverage is contrary to the coverage of a reactive vaccination campaign with a single OCV during a cholera outbreak in Cameroon by Amani *et al.*, (9) and Ateudjieu *et al.* (13). This could be due to the fact that this study was carried out in a small community in Bonaberi, Douala with a limited number of participants, short study period and was not during a vaccination campaign period.

A study carried out in Malawi on the feasibility and acceptability of OCV mass vaccination campaign in response to an outbreak and floods in Malawi also revealed a high cholera vaccine uptake (11). These counter values could be that, vaccination campaigns give a chance for oral vaccine uptake while our coverage value was not within a vaccination campaign. Mello-Guyett *et al.* (12) and Ateudjieu *et al.* (15) revealed that outbreaks of cholera have been as a result of low cholera vaccine uptake and other factors such as; limited access to safe drinking water in some areas, seasonal pattern of cholera occurrence, inadequate Water, Sanitation and Hygiene (WASH) conditions, lack of training for community health workers (CHWs) and a lack of quality healthcare workers needed in treatment centers. This study revealed that the population know that maintaining good hygienic conditions is key to prevention of cholera spread but most Cameroonian communities lack good sanitary conditions (16). Students

significantly made up the population of participants who did not receive the oral cholera vaccine.

This could be as a result of lack of vaccination campaigns within schools as most campaigns are concentrated in communities and not schools. Out of those who had received the cholera vaccine, majority of them did not feel any discomfort. This is in line with the study of Wiedermann *et al.* (17) were occasional gastrointestinal side effects (15% diarrhea, 8.1% nausea, 1.1% vomiting) were seen among individuals who took the OCV and were very mild, and probably a consequence of associated factors.

#### V. CONCLUSIONS

- The community of Hill-top Ndobonaberi, Douala, had a good knowledge about the cholera vaccine but just a few of them had received it.
- The participants attested that they will take the vaccine if made available to them as well as maintain good hygienic conditions around their communities.
- Majority of the participants who took the OCV did not feel any discomfort.

#### RECOMMENDATIONS

- There should be an increase in vaccination campaigns against cholera in the Hill-top Ndobonaberi community.
- There should be constant communication between the inhabitants in local communities and health sectors for easy flow of information in situations of any outbreak.

#### DECLARATION

- **Ethical consideration:** Authorization number 0259/AAR/MINSATE/DRSPL/BCASS to conduct this study was obtained from the Regional Delegation of Public Health, Littoral region, Douala, and also from the chief of the NDOBO community. Consent was obtained from all the participants, and they were made to understand that their participation was voluntary. All information collected was kept confidential through physical and electronic barriers.
- **Consent for publication:** All authors consented and accepted for this article to be submitted for publication.
- **Availability of data and materials:** Most data generated or analysed during this study are included in this article. Also, all findings that support the result of this study are included.
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and editing. R.A.M: results interpretation, writing, and editing. M.S.F: data collection, writing and editing. S.N: study design, data collection and writing. All Authors fully reviewed the manuscript.

#### • Abbreviations

- ✓ OCV: Oral Cholera Vaccine
- ✓ WHO: World Health Organization
- ✓ CHW: Community Health Worker
- ✓ WASH: Water, Sanitation and Hygiene
- ✓ FCFA: Franc de la Communauté Financière de l' Afrique.

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