

Cholera Knowledge, Preventive Practices And WaSH Characteristics In Tiko Health District.

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Keyword

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Abstract

The south-west region of Cameroon has been reported to be the most affected, with 4617 cases and 77 cholera deaths. This report urges an assessment of cholera knowledge, preventive practices, and WaSH characteristics to determine what actions must be taken to eradicate cholera and improve WaSH in Tiko Health District. This was a questionnaire-based descriptive and observational cross-sectional study designed from June 3 to July 20th, 2023. A stratified random sampling technique was used to select three health areas, where 50 households were randomly selected to administer the questionnaire. The data was represented in terms of frequencies and valid percentages for categorical variables. SPSS was used to perform all statistical calculations. The study revealed that more females (51%) with housewives (38.8%) as occupations took part in the study. Most participants were within the age group of 18–24 years (38.8%), and the majority (39.8%) had a family size of 5–10 persons. Most (35.7%) had attained a secondary level of education. Further findings revealed that the majority (56.1%) had heard about the prevention and treatment of cholera on the radio. Most (80.7%) of the study participants were knowledgeable about cholera but had poor preventive practices, and the WaSH characteristic was not fully respected as there was evidence of open defecation and improper household waste disposal. To conclude, it was discovered that residents of Tiko district were knowledgeable of cholera, but the state of preventive measures practiced was below standard, and WaSH characteristics observed revealed that WaSH was practiced but not up to expectations. Therefore, cholera preventive plans should contain a comprehensive education campaign to improve knowledge and preventive practices. Stakeholders should support communities with sustainable water and sanitation systems as well as conduct more qualitative research to identify communities' needs and perspectives and thus design prevention programs accordingly.

Introduction

Cholera is an acute and life-threatening diarrheal disease caused by a bacterium called *Vibrio cholera* (Momba and Azab El-Liethy, 2017). Despite the fact that the causative bacteria has over 200 serotypes, only two are prevalent in poor sanitary and hygienic conditions: O1 and O 139. (Al-Ghabban et al.) These two strains have been linked to global cholera outbreaks. Watery diarrhea is the primary clinical symptom of cholera and can range from mild to moderate cases that can be treated with oral rehydration solutions to severe cases with profuse watery diarrhea and dehydration that can be fatal if untreated. In addition to watery diarrhea, other clinical manifestations seen in infected patients include vomiting and abdominal colic (WHO, 2022).

Cholera is transmitted through the ingestion of an infective dose of *Vibrio cholerae* in contaminated water or food, which is associated with poor sanitation. Rapid cholera testing is critical because it provides a preliminary result that can be used to initiate a targeted treatment plan (Nelson et al., 2009; Ontweka et al., 2016).

Cholera outbreak management requires a multi-sectorial preventive approach, including surveillance, sewage systems management, water sanitation, public hygiene, social mobilization, treatment, and oral cholera vaccines (Ahmed et al., 2018). These measures are essential for controlling the outbreak and reducing mortalities. Cholera vaccination is an effective prophylactic measure for travelers to outbreak regions (Gabutti et al., 2020).

Insufficient sanitation practices contribute to infectious diseases. Clean, easily accessible water is crucial for global health as it is essential for drinking, domestic use, food security, and recreation.

Clean water, sanitation, and hygiene (WaSH) facilities are essential for human livelihood and well-being. Deprived WaSH negatively impacts wellbeing, production, financial growth, and progress. Enhancing WaSH procedures can control contagious illnesses. Adopting safe fecal disposal and hand washing with soap can reduce waterborne disease frequency by 30% and 40%, respectively.

Healthy drinking water management and storage can decrease infectious disease incidence by 30–50% (Berhe et al., 2016). A 2006 study by WHO and UNICEF found 2.5 billion communities lacking enhanced hygiene facilities, and 1 in 4 experienced open defecation in developed countries (Shrestha A et al., 2017).

Polluted water supplies are linked to 502,000 gastrointestinal disease deaths. Hygiene and sanitation facilities are crucial for public health. In 2019, 39% of the global population used a properly managed sanitation system, such as toilets or improved latrines, to manage bodily excretions appropriately. Healthcare, reproductive, and nutritional health are multifaceted tasks. WaSH industry professionals prioritize hand washing with soap and water, but many people lack access to these essential tools. Insufficient hygiene causes 280,000 diarrheal disease deaths annually and preventable diseases like intestinal parasites, tuberculosis, and typhoid fever (Sibiya et al., 2015). Developing WaSH techniques can effectively manage highly contagious diseases. Three primary WaSH activities, including proper disposal of faeces and urine, hand washing with soap, and safe water supply management, reduce infectious disease incidence by 30% and 40%, respectively. Three primary WaSH activities, including proper disposal of faeces and urine, hand washing with soap, and safe water supply management, reduce infectious disease incidence by 30% and 40%, respectively.

Studies revealed gaps in cholera knowledge and suboptimal awareness of preventive practices in Kenya, Saudi Arabia, and Yemen (Orimbo, E.O. et al., 2020; Ali, E.M. et al., 2021; Dureab, F. et al., 2021). Community knowledge and practice studies during outbreaks help identify areas to reduce exposure and cholera morbidity, shaping public health responses (Ngwa, M.C. et al., 2017).

The global burden of cholera is estimated to be 1.3 to 4.0 million cases annually, with 21,000–143,000 deaths (WHO, Cholera: Key Facts, 2022). The disease is unequal globally, with the highest toll occurring in Africa, Asia, and the Middle East. (al., 2004) Lebanon recently declared its first cholera outbreak since 1993, and the disease continues to spread (WHO, 2022). In central Africa, particularly in Cameroon, there is a lack of KAP studies on cholera and WaSH among some communities. In research conducted by Chi NN et al. on the knowledge, attitude, and practices of community health workers on managing and preventing childhood malaria and diarrhoea in Fako Division, South West Region, Cameroon, and particularly in Tiko, 57.5% of these community health workers had inadequate knowledge on childhood diarrhea management; only 60% always administered ORS as a treatment for childhood diarrhea, and 28.75% did not know that zinc supplements are used in treating childhood diarrhea (Chi NN et al., 2023) (Oyungu E., 2019).

Similar results were observed in Kenya, where all the community health workers knew that diarrhea should be treated with ORS, but none of them knew that children with diarrhea also needed to receive zinc supplements. In the same study, 70.0% of the community health workers agreed that childhood diarrhea could be managed at home with the use of traditional herbs like fresh guava (*Psidium guajava*) leaves, 'masepo' (*Ocimum gratissimum*), and charcoal mixed with palm oil, hence the negative attitude towards the management of cholera (Tambe A et al., 2015).

According to the WHO, Cameroon is among several countries in West and Central Africa that experience recurrent cholera outbreaks. Statistics revealed that between October 2021 and April 2022, a total of 6652 suspected cases, including 134 deaths, had been reported (WHO, 2022). Similar information was published by Aljazeera on a current cholera outbreak overburdening hospitals in the south-west region of Cameroon, with towns like Limbe, Buea, and Tiko most affected (Aljazeera, 2022). Several risk factors can be attributed to recurrent cholera outbreaks in Cameroon, including limited access to safe drinking water in some areas, the wide circulation of *Vibrio cholerae* in the country, inadequate WaSH conditions, and the seasonal pattern of cholera occurrence.

To design community-tailored educational messages and methods for prevention and control activities it is important to understand the community's awareness and needs. The present study therefore aims at assessing cholera knowledge, prevention practices, and WaSH characteristics in a bid to identify interventions needed to prevent cholera and improve WaSH in this locality. Furthermore, the findings of this study may contribute to efforts to monitor Cameroon's progress towards the achievement of the UN Sustainable Development Goals, particularly SDGs #6 and #3: clean water, sanitation, good health, and well-being.

. Materials and method

2.1 Research Design

The study was a descriptive cross-sectional study designed between June 3 and July 20.

2.2 Research Population

The study was conducted in three health areas of Tiko health District (Tiko town, Likomba, and Holforth). Tiko has eight health areas: Likomba, Holforth, Mutengene, Mondoni, Mudeka, Misselelle, Kange, and Tiko town.

Tiko, originally called 'Keka' by the Bakweris, is a town found in the southwest region of Cameroon and a popular destination for tourists visiting Cameroon. The estimated population as of 2012 was 78,885 per habitat. The town is an industrial area bounded to the east by the Atlantic Ocean. . It is mostly occupied by the CDC (Cameroon Development Co-operation), responsible for the production of banana, rubber, and palm oil.

Tiko also has a golf club (Likomba Golf Club, n.d.). The town also once had an active international airport, which is now closed. The airport hotel, derived from Tiko Airport, and 3813 were the two major hotels in Tiko. To date, only the Airport Hotel is operational. Tiko is also known for its diversified population, in particular the Nigerian population, and its organised marketplace, with people travelling from surrounding villages, cities, and countries to conduct business in Tiko. In terms of security, the town hosts special military forces while being home to many colleges. The main active quarters in Tiko include streets 1–7, Down Beach, Motombolombo, New Quarter, New Layout, P&T Quarters, Longstreet, Golf Club, Likomba, Ombe, and Mutegene (ATRUSA, n.d.).

In terms of sanitation, the only bodies in charge of maintaining hygiene and sanitation are the council (Tiko Council) and district health service. Tiko Council launched the "Clean City 2023" programme, which deploys enrolled members of the community to clear and clean certain areas of the town (roadside and council). Despite such initiatives, WaSH is still not the best. Based on primary data obtained from the Tiko district hospital laboratory, water and soil transmittable diseases are still on the rise, with malaria being the most commonly diagnosed disease, followed by gastroenteritis like salmonellosis, STH, amoebiasis, and *Helicobacter pylori*-induced gastritis.

There is no proper waste disposal system in the Tiko community. Most domestic waste is dumped into the river (Ombe, Ndongo, and Benyo streams). Others prefer dumping their domestic waste along the road or in incomplete buildings, while others may bury it (compost). The most common household wastes are soiled diapers, sanitary pads, bananas and other peelings, perishable foods, and plastic containers. Along the Ndongo River at the roundabout, there are many plastic containers floating. The same river serves as a site for defecation, washing dresses, carrying drinking water, and water for domestic purposes, as observed in Likomba. The same water is also used for industrial purposes such as car washing, palm oil extraction, cassava processing, etc. Water sources are generally CamWater, but other sources exist, like unprotected springs at airports, untreated borehole

water (Bocom), CDC public taps, and other untreated boreholes. Some homes also tap water directly from the Ndongo River for domestic use.

In terms of hygiene and sanitation, most residents live in camps. These camp houses share a common toilet that can be ventilated, compared to an ordinary pit toilet with a slab. Evidence of environmental defecation is very common in camp environments. Other renting homes also use pit latrine in a ratio of 1 latrine for sometimes 10 tenants, which may be

covered or uncovered with some usually full (septic tanks) to the extent

of obliging tenants to defecate outdoor (bushes, streams, rivers, etc.), as seen in Motombolobo, Likomba, and Buma Street. There are also cistern flush toilets in modern homes and others with manual flushing. This all contributes to the spread of waterborne diseases such as cholera, salmonellosis, and other gastroenteritis, making the population and community suitable for the study.

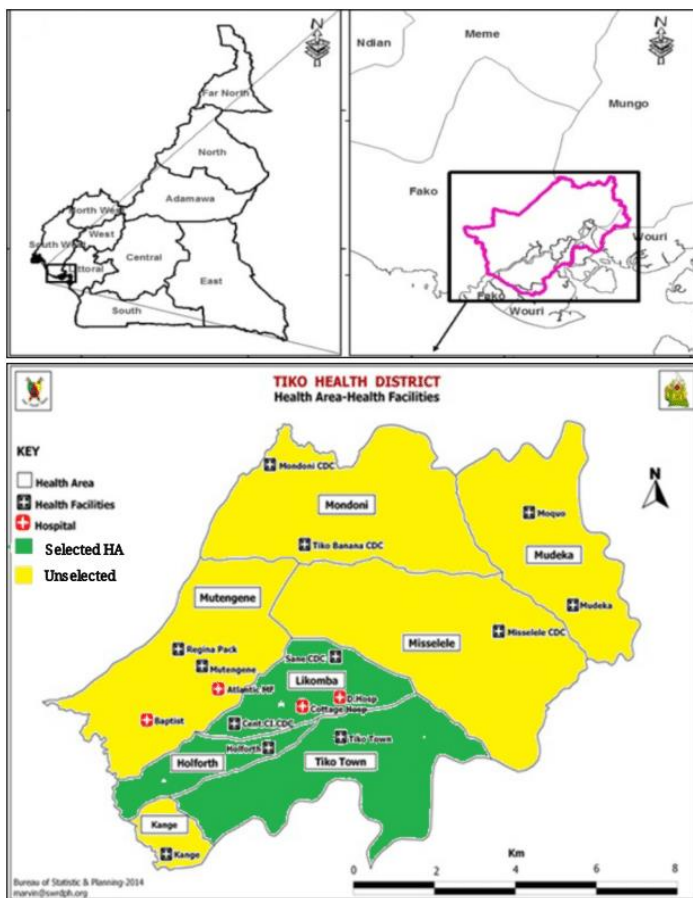


Figure 1 Map of the Tiko Health District

2.3 Sample Size

If the total population is 240 and $N = \text{Population}$

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- $n = \text{sample size,}$
- $E = \text{margin of error}$
- $n = N/1+ (N) (E)^2$
- $n = 240/1+ (240) (0.05)^2$
- $n = 240/1+ (240) (0.0025)$
- $n = 240/1+0.6$
- $n = 240/1.6$
- $n = 150$

2.4 Sampling Procedure

A stratified random sampling technique was used to select the three study health areas, and in each health area, 50 households were randomly selected. The questionnaire was administered either to the head of the household or, in his absence, to a responsible adult over 18 years of age after obtaining their informed consent.

Environmental observation was also made, and pictures were taken (with the respondents' permission) so as to identify day-to-day, common practices within the community that could have constrained or enhanced measures intended to

prevent or prepare for a cholera outbreak. Observation also comprised WaSH characteristics such as assessing the availability, use, and cleanliness of toilet facilities, handling children's stools, washing hands with soap after using toilets, preparing food, eating, and handling children's stools. Water sources and the treatment of water for home use, water preservation, washing kitchen utensils and cutlery, food handling, and waste disposal

2.5 Research Instrument

A semi-structured questionnaire adapted from a previous study about cholera in Haiti (Valery E.M. et al., 2010) was administered to the eligible household members through face-to-face interviews.

1. Socio-demographic characteristics
2. Knowledge of cholera
3. Respondent preventive practices in regard to cholera
4. Respondent households WaSH characteristics
5. Each question from sections B to D was marked with one point, which was used for evaluating the respondent's response.

2.6 Data Analysis

The data were represented in terms of frequencies and valid percentages for categorical variables. One-way ANOVA analysis was used to compare means among different groups. All P values <0.05 were considered statistically significant. IBM SPSS (Statistical Package for the Social Sciences; IBM Corp., Armonk, NY, USA) was used to perform all statistical calculations, version 24 for Microsoft Windows.

2.7 Ethical Considerations

In order to protect the anonymity of study participants and the confidentiality of the private information that was shared in the study, no names, personal identifiers, phone numbers, or emails were collected. Additionally, informed consent was obtained from all participants prior to data collection. A letter of introduction was obtained from Kesmonds International University, and ethical clearance was obtained from the University of buea, letter of authorization to collect data was also obtained from the delegation of public health and Tiko District Medical service to carry out this study.

3. Results

3.1.1 Socio-demographic description of study

In this study, majorities (51%) of the participants were females and most of them were within the age group 18-24 years (38.8%). Also majority of the participants (39.8%) had a family size of 5-10 persons and most (35.7%) had attained a secondary level of education. As regards occupation, 38.8% of the participants were housewives and 2% were self-employed. Further findings revealed that majority (56.1%) of the study participants have heard about prevention and treatment of cholera prior to the survey and the largest (27.6%) participants had the radio as their source of information. 53.1% of the participants said they were receiving materials for education and prevention with purification and vertical information the commonest (21.4%) materials received. The results are summarized in **Table 1**.

Table 1: Socio-demographic description of study population

Characteristics	Frequency n=98	Percentage (%)
Gender		
Male	48	49.0
Female	50	51.0
Age group/years		
18-24	38	38.8
25-34	30	30.6
35-44	25	25.5
45-54	05	5.1
>55	00	00
Family size		
<05	31	31.6
5-10	39	39.8
>10	28	28.6
Education		

Informal	28	28.6
Primary	24	24.5
Secondary	35	35.7
Vocational	05	5.1
Tertiary/university	06	6.1
Occupation		
House wife	38	38.8
Public work	21	21.4
Private work	12	12.2
Unemployed	11	11.2
Self employed	02	2.0
Student	07	7.1
Others	07	7.1
Information		
Yes	55	56.1
No	35	35.7
Do not know	08	8.2
Source of information		
Family member	09	9.2
Neighbor/friend	13	13.3
Healthcare worker	22	22.4
Radio	27	27.6
TV	10	10.2
CHW	04	4.1
Community meeting	08	8.2
Religious leaders	02	2.0
others	03	3.1
Receiving materials		
Yes	52	53.1
No	46	46.9
Materials received		
Soap	16	16.3
ORS	15	15.3
Purification	21	21.4
Vertical information	21	21.4
Print material	9	9.2
Others	11	11.2
Do not know	05	5.1

3.1.2 Knowledge on cholera among residents of Tiko District

Most (80.7%) of the participants understood that cholera was a bacterial infection. 14.3%, 8.2%, and 14.3% of the study population, respectively, stated that fever, bloody diarrhoea, and loss of appetite were symptoms of a cholera infection. As concerns the general knowledge of cholera transmission and risk factors, the mean score was 6.18 ± 1.10 and the median score was 7 (IQR: 2–7), and a larger (58.2%)

proportion of the participants had adequate knowledge on cholera transmission and risk factors. More so, as concerns general knowledge on cholera prevention, the mean score was 10.79 ± 2.17 and the median score was 12 (IQR: 10–12). A larger (67.3%) proportion of the study participants had adequate knowledge of the prevention of cholera. **Table 2**

Table 2: Participant’s knowledge on Cholera

Theme	Frequency n=98	Percentage (%)
Cholera is caused by		
Bacteria	79	80.6
Virus	08	8.2
Parasite	03	3.1
Fungi	01	1.0
I do not know	07	7.1
Cholera symptoms		
Fever	14	14.3
Bloody diarrhea	08	8.2
Loss of appetite	14	14.3
Vomiting	25	25.5
Watery diarrhea	15	15.3
Leg cramps	10	10.2
Dehydration	08	8.2
Stomach/abdominal pains	02	2.0
Do not know	02	2.0
Transmissions/risk factors		
Adequate knowledge	57	58.2
Inadequate knowledge	41	41.8
Cholera prevention		
Adequate knowledge	66	67.3
Inadequate knowledge	32	32.7

3.1.3 Overall knowledge of study participants on Cholera

Out of the 23 components used to assess knowledge of participants on cholera, the knowledge score ranged 9 to 23. The mean knowledge score was

18.30±3.11 and the median knowledge score was 19 (IQR: 16.75-20.25). 57.1% of the study population had adequate knowledge on cholera. **Figure 2**

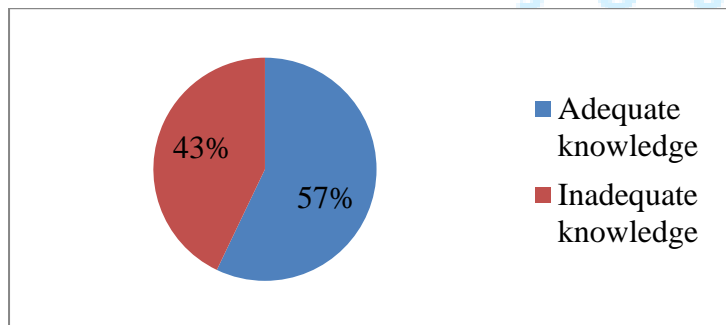


Figure 2 Knowledge on cholera

3.2 Cholera prevention practices among participants

Out of the 98 participants, 77 (78.6%) said they would go to the hospital for treatment if suspected of having a cholera infection, and most (46.9%) said they would take between 30 and 59 minutes to reach a health facility. Further findings revealed that 33.7% of the

participants will resolve to pray as a means of treatment if suspected of a cholera infection, and 50% said they won’t consider a traditional means of treatment. More so, 72.4% of the study population said they would buy drugs to treat themselves, and more findings reveal that 68.4% properly use toilets. Results are summarized in **Table 3**.

Table 3: Prevention practice of cholera

Theme	Frequency n=98	Percentage (%)
Seek medical treatment		
Yes	77	78.6
No	17	17.3
I do not know	04	4.1
Time to reach health facility/minutes		
30	34	34.7
30-59	46	46.9
60-120	15	15.3
≥120	03	3.1
Prayers as treatment		
Yes	33	33.7
No	26	26.5
I do not know	39	39.8
Traditional treatment		
Yes	39	39.8
No	49	50.0
I do not know	10	10.2
Buy drugs to treat self		
Yes	71	72.4
No	22	22.4
I do not know	05	5.1
Proper toilet usage		
Yes	67	68.4
No	09	9.2
I do not know	22	22.4
Hand washing		
Yes	74	75.5
No	23	23.5
I do not know	01	1.0
Drinking chlorinated water		
Yes	76	77.6
No	18	18.4
Do not know	04	4.1
Rubbish disposal		
Yes	81	82.7
No	13	13.3
I do not know	04	4.1
Water storage in clean bottles		
Yes	89	90.8
No	08	8.2
I do not know	01	1.0
Wash fruits before eating		
Yes	81	82.7
No	15	15.3
I do not know	02	2.0
ORS preparation at home		
Yes	49	50.0
No	40	40.8
I do not know	09	9.2
How to prepare ORS		
6 level teaspoon of sugar + ½ teaspoon of salt +1L water	45	45.9

10 level teaspoon of sugar + ½ teaspoon of salt + 1L water	27	27.6
10 level teaspoon of sugar + 1 teaspoon of salt + 1L water	16	16.3
6 level teaspoon of sugar +1 teaspoon of salt +1L water	09	9.2
I do not know	01	1.0

3.2.1 Overall practice of participants towards cholera prevention

Out of the 13 components used to assess practice of participants towards the prevention of cholera, the score ranged 03 to 11. The mean score was 7.16±2.07

and the median score was 07(IQR: 5.75-9.0). Also, majority (55.1%) of the participants had poor prevention practices of cholera. **Figure 5**

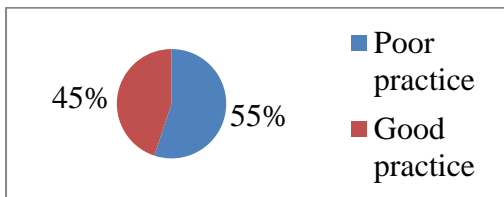


Figure 3 Cholera prevention practices

3.3 Wash characteristics predisposing community to cholera

Pipe water in the home yard was the most (26.5%) common source of drinking water and 1% of the study

participants drink water from the river **Figure 7(a)**. 27.6% of the study population used a toilet in which water is poured for self-cleaning into a toilet bowl **Figure iii (b)**.

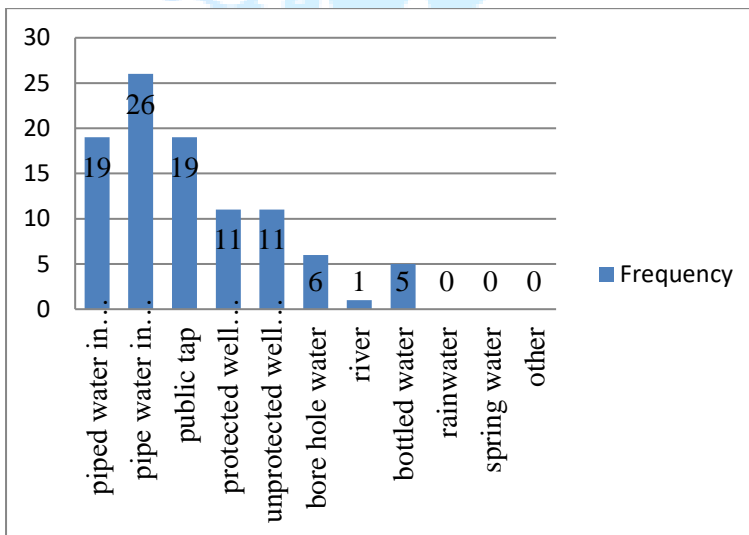


Figure 4 (a): Participant's source of drinking water

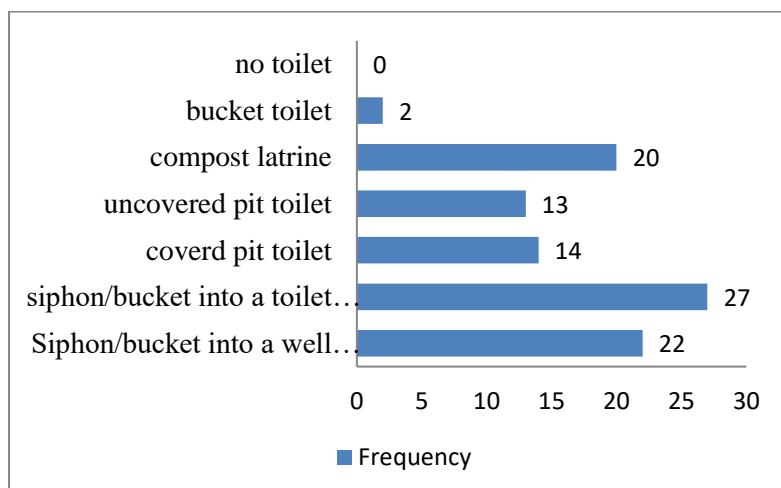


Figure 4 (b): toilet types of participants

With respect to observational variables, 56.1% of the study participants had soap in the house for washing wands, and in 58.2% of the cases, soap and water were in the same location. Further observations reveal that there was evidence of open defecation near homes in 57.1% of the participants. Majority

(39.8%) of the study participants had a metal/iron sheets roofing and cement (35.7%) was the main flooring material. More so, 31.6% of our participants dumped their domestic waste in the bush and 9.2% dumped it somewhere around the house. **Table 4**

Table 4: WaSH characteristics among households

Theme	Frequency n=98	Percentage (%)
Soap in place of washing hands		
Yes	55	56.1
No	20	20.4
Unable to observe	23	23.5
Water and soap in same location		
Yes	57	58.2
No	21	21.4
Unable to observe	20	20.4
Evidence of open defecation around home		
Yes	56	57.1
No	31	31.6
Unable to observe	11	11.2

Main roofing material for household

Metal/Iron sheets	39	39.8
Tile/Asbestos sheets	32	32.7
Wood	16	16.3
Cement	08	8.2
Others	03	3.1

Main flooring material

Metal/Iron sheets	04	4.1
Tile/Asbestos sheets	19	19.4
Wood	29	29.6
Cement	35	35.7
Other	08	8.2
Earth/sand	03	3.1

Site of dumping domestic waste		
River/Stream	18	18.4
Buried	30	30.6
In the bush	31	31.6
Somewhere the home	09	9.2
Other	10	10.2

4. Discussion

4.1.1 Socio-demographic description of study population

This descriptive study highlights the knowledge, preventive practices, and WaSH characteristics of cholera in Tiko District. The demographic data shows that more females (51%) with housewives (38.8%) as occupations took part in the study. This is noteworthy because, in Cameroonian culture, keeping a clean home environment and preparing hygienic and healthy food is almost the sole responsibility of the woman. Similar results were reported in a study in Nigeria (Anetor and Abraham, 2020). Another study conducted by Odia J. and Odia AA (2019) in the western part of Nigeria showed that women and girls display more pro-environmental and eco-friendly behavior. (Anjana Kuberan et al., 2015)

It was concluded that females between the ages of 15 and 60 were the primary responsible people for fetching water. Therefore, women being more involved in this study further supports these previous studies. With these roles performed by women naturally, having them in a good number to ascertain their knowledge and preventive measures against cholera is important in a study like this so that a targeted health education intervention may be given if they lack knowledge that may put them at risk of cholera.

In terms of age group, the majority was within the age group of 18–24 years (38.8%), similar to that obtained by Nauja et al. (2019) on *“the knowledge, perceptions, and practices on cholera transmission and prevention measures among heads of household members in Kigamboni municipality, Dar es salaam”* in Tanzania and that obtained by Anetor and Abraham (2020) on *“Knowledge of cholera and its prevention amongst urban residents of a district in Abuja: The pivotal role of health education”*. This implies that the majority of the participants in the Tiko community were in their youthful years. It is good to know that there are many relatively young people in the Tiko community, which may also imply that the people may be able to work hard to keep their environment clean and also put up a community effort to provide clean water for their use. Usually, young people have more of the required

knowledge of disease than old people because of their active involvement in social media (Leist AK, 2013).

The good number of young people may be an advantage if they are directed to get involved in environmental sanitation to give a face lift to the community.

The majority of the participants (39.8%) had a family size of 5–10 people, and most (35.7%) had attained a secondary level of education. This is contrary to that obtained by Auja et al. (2019), in which most of the participants were first-time school leavers. Looking at the family size of 5–10 people in a house is indicative of an overpopulated household. By the time of sample collection, most of these house occupants were supposed to be in school. The cause of overpopulation and stagnant levels of education could be linked to the current Anglophone crisis occurring in the south-west region of Cameroon, taking into consideration that war leads to poverty, diseases, and low social and economic development. Factors like this can be held responsible for preventing pupils, students, and the whole community from evolving in all aspects of life.

Further findings revealed that the majority (56.1%) of the study participants had heard about the prevention and treatment of cholera prior to the survey, and the largest participants had the radio as their source of information.

These findings are in accordance with the results obtained by Sae-Rom Chae et al. (2016) on *“An Assessment of Household Knowledge and Practices during a Cholera Epidemic—Dar es Salaam,*

Tanzania,” where approximately half (45%) of the 641 respondents were aware of the cholera outbreak in the area. The only difference was in the source of information, with family members, neighbours, and friends being the most common. In this study, a neighbour or friend was the third source of information. This can be explained by the significant differences in sample size and the period of study. In this study, a sample was collected during a low-alert epidemic of cholera in Tiko district, while in the other study, there was an active epidemic, hence the widespread dissemination of preventive information from door to door influenced awareness.

4.1.2 Knowledge of cholera among residents of Tiko District

As earlier mentioned, the majority of the study participants were knowledgeable about cholera, especially the bacterial causative agent (80.7%) and the signs and symptoms such as vomiting (25.5%) and watery diarrhoea (15.3%). These results are similar to those obtained by Sae-Rom Chae et al. (2016) and Auja et al. (2019), where severe diarrhoea was identified by respondents as a principal symptom of cholera. This could be because the first signs of cholera transmitted by media and shared by health workers and organisations are watery diarrhoea and vomiting. Such signs are easily identifiable, prompting a quick medical impression. Most participants also had adequate knowledge on cholera transmissions and risk factors (58.2%) and prevention (67.3%). Similarly, results were reported by Nauja et al. (2019) and Anetor and Abraham (2020). Reason being, a larger proportion of the study participants confirmed receiving information (health campaigns) on cholera during sample collection.

4.1.3 Cholera prevention practices among participants

Treatment of cholera is better managed in the hospital to prevent further transmission to the public. In this study, the majority of the participants (78.6%) said they would go to the hospital for treatment if suspected of having a cholera infection, and it would take them between 30 and 59 minutes to reach a health facility. As far as preventive practices are concerned, the study revealed that practices such as hand washing, washing fruits before eating, drinking chlorinated water, properly using toilets, and proper waste disposal were well respected among participants. They all agreed that water storage should be in clean bottles. As far as preventive treatment was concerned, the majority agreed with using ORS preparation at home and were knowledgeable on how to locally prepare ORS. That is, six teaspoons of sugar mixed with half a teaspoon of salt in one litre of water. As far as the local formulation of ORS was concerned, some of the respondents could not verbally provide the correct answer to the quantity of sugar, salt, and volume of water, though on the paper, they had the right choice of answer. The wrong formulation of ORS can be dangerous to the patient.

Too much salt can cause salt toxicity (hypernatremia), leading to convulsions, while too little salt does not harm, but the preparation turns out to be less effective. A rough guide to the amount of salt is that the solution should taste no saltier than tears. However, all these parameters are similar to those

reported by Sae-Rom Chae et al. (2016). Except for the use of chlorinated tablets to treat water. In the Sae-Rom Chae et al. (2016) study, chlorine tablets cost 0.25 USD on average, with each tablet treating a 20-litre bucket, which seems expensive, hence limiting their use among the community. In this study, 77.6% of the participants drank chlorinated water. This doesn't seem right, as based on the current Anglophone crisis favoring poverty, it will be difficult for a community like Tiko to afford chlorine tablets. Either the researcher failed to describe chlorinated water as tap chlorinated water or chlorine tablets in water as chlorinated water, or the participants thought chlorinated water was chlorine tablets in water. If it was chlorine tablets, the possible source could be from NGO's and government health facility distribution, as most participants had confirmed receiving information on cholera. This finding contradicts the results obtained by Anjana Kuberan et al. (2015) on "*Water and sanitation hygiene knowledge, attitude, and practices among household members living in rural settings of India*", and Sridhar et al. (2020) where none of the participants, despite their knowledge of WaSH, were following any methods of water treatment.

Among the 97 participants, 33.7% preferred prayers for healing, 72.4% will auto-medicate, and 39.8% agreed to use traditional medicine. This could be due to the increased costs of living in the Anglophone region of Cameroon, coupled with the coronavirus. In a study conducted by Roger Tsafack Nanfosso (2022) titled "*Does the fear of COVID-19 transmission affect hospital attendance in Cameroon?*", he concluded that people were now reluctant to visit government hospitals due to the fear of COVID-19 transmission and other related nosocomial infections (Roger Tsafack Nanfosso, 2022). However, reluctance to visit the hospital can be fatal to the health status of the community and country as a whole since most of these diseases are notifiable, requiring public health interventions as soon as possible. According to David Nalin (2022), cholera has 10%–20% case fatality rates in Cameroons when untreated. This is extremely high compared to the CFR of <1% achieved with standard intravenous and oral water and electrolyte replacement therapy. Therefore, prayers, traditional medicine, and auto-medication are likely to worsen the case and are **highly** not recommended as preventive practices.

4.1.4 WaSH characteristics predisposing community to cholera

According to the WHO, safe drinking water, sanitation, and hygiene are crucial to human health and well-

being. Safe WaSH is not only a prerequisite to health but also contributes to

livelihoods, school attendance, and dignity and helps to create resilient communities living in healthy environments (WHO, 2019). A set of three hygiene practices has been demonstrated to be effective and programmatically cost-effective in terms of public health impact. These practices, which can reduce diarrhoea prevalence by at least 30 percent, include treatment and safe storage of water at the point of use, optimal hand washing (method and timing), and sanitary disposal of human faeces at the household level.

In this research, WaSH characteristics predisposing the community to cholera were accessed. In terms of water as a characteristic of WaSH, the majority (26.5%) had pipe water in their home yard as the most common source of drinking water, and 1% of the study participants drank water from the river. This is similar to the result obtained by Anjana Kuberan et al. (2015) where most of the participants had water supplies inside their household premises. Having water in the house or household premises reduces the chances of the transmission of some infectious diseases, such as cholera, soil-transmitted helminths, and other water- and soil-related pathogens. The community of Tiko is known for its camps, houses, boreholes, and public taps kept in place by the CDC, NGO's, etc. With most neighbouring houses sharing a single public tap, with the upcoming development, modern houses will be built with taps inside. Such results therefore indicate that the majority of the participants were probably living in newly built modern houses.

Another criteria for WaSH is sanitation. In terms of toilets, 27.6% of the study population used a toilet in which water was poured for self-cleaning into a toilet bowl. This result is consistent with this study's previous remark that most of the participants were living in newly built modern houses, as most camp houses use public, shared toilets, and even open defecation. In this study, further observations revealed that there was evidence of open defecation near homes in 57.1% of the participants, similar to the results obtained by Anjana Kuberan et al. (2015) where one-fourth of the total participants were devoid of toilet facilities inside their households. (Anjana Kuberan et al., 2015) It was also reported that the same one-fourth of the total participants devoid of toilet facilities inside their household had the only options of using community toilets, open defecation, or sharing the toilets with other households. Such practices promote an increase in the incidence of water-borne and soil-transmitted diseases. More so, 31.6% of our participants dumped their domestic

waste in the bush, and 9.2% dumped it somewhere around the house. This contradicts the results obtained by Auja et al. (2019), where the majority of the participants disposed of their domestic waste in trash cans. Such practices are not strange, as far as the Tiko community is concerned. Tiko district is made up of 3 urban areas (Tiko Town, Mutengene, and Likomba) and 28 rural villages. In terms of sanitation, most households prefer burning, as similarly reported by Auja et al. (2019), or dumping their household waste in the bush as manure, while others are dumped almost anywhere, especially around incomplete buildings, water bodies, or even at roadsides, as seen in Appendix I. Practices like this prompt the community to contract soil, water-borne, and other vector-borne diseases. Among the most common wastes are plastic containers and papers, disposable diapers, and sanitary pads. Air pollution from factories and aerosols from fertilizers are common in Tiko. The majority of the study participants had metal or iron sheet roofing, and cement was the main flooring material, as similarly observed by Fekri Dureaba et al. (2021) in their study titled "*Knowledge on and preventive practices of cholera in Al-Mahweet, Yemen, 2018: a cross-sectional study*".

Hygiene is characteristic of WaSH; the majority of the participants had soap in the house for hand washing, and soap and water were in the same location. This result is similar to that obtained by Auja et al. (2019), who found that the majority of the respondents regularly washed their hands with soap and clean water, washed their hands after visiting the toilet, and used soap and detergent at their homes for washing hands and fruits before and after eating. Practices like this reduce exposure to fecal oral transmissible diseases in the community and also reduce the financial burden in terms of hospitals, especially in this period of crisis. In research carried out by Anjana Kuberan et al. (2015), although the majority of the participants knew and reported hand washing before

and after meals, only one in three participants felt that hands should be washed after defecation. It was also observed that few of the participants used plain water for hand washing after defecation, which contradicts this study. Washing hands should be done before and after using the toilet with clean water and soap to ensure hygiene

4.2 Conclusions

In respect to the first specific objective (to assess the general knowledge of cholera among residents of Tiko district) and research question (are residents of the Tiko community knowledgeable of cholera?), Out of

the 23 components used to assess the knowledge of participants on cholera, the knowledge score ranged from 9 to 23. The mean knowledge score was 18.30 ± 3.11 and the median knowledge score was 19.57. 1% of the study population had adequate knowledge on the cause, signs and symptoms, transmission, and risk factors of cholera. Therefore, the residents of the Tiko community were knowledgeable about cholera.

The second specific objective was to assess the cholera prevention practices among residents of Tiko Community, and the research question was, what is the state of preventive measures practiced by residents of Tiko Community against cholera? Out of the 13 components used to assess the practice of participants towards the prevention of cholera, the score ranged from 3 to 11. The mean score was 7.16 ± 2.07 , and the median score was 07. Also, the majority of the participants had poor prevention practices for cholera. Therefore, the state of preventive measures practiced by residents of the community of Tiko was below standard.

The WaSH characteristic assessed in this study was related to water, sanitation, and hygiene. Houses had metal or iron sheet roofing, and cement was the main flooring material. Pipe water was available in homes and was the commonest source of drinking water. The majority used modern toilets with soap and water for washing hands. However, the majority displayed evidence of open defecation near homes and dumped their domestic waste in the bush and somewhere around the house, which are factors predisposing the community to vector, soil, and water-borne diseases such as cholera. Observations revealed that WaSH was practiced but not up to expectations.

4.3 Recommendation

Knowledge, prevention practices for cholera, and WaSH characteristics in Tiko can only be effective if people change their behaviour and no longer practice risky behaviours regarding cholera. In conclusion, this study revealed high knowledge about the symptoms and risk factors of cholera and poor knowledge of disease transmission and prevention measures. Various gaps were obvious in different aspects of practices, such as water treatment and defecation practices. The study also demonstrated discrepancies between preventive practices and education. Therefore, Cholera preventive plans should contain a comprehensive education campaign to improve knowledge and preventive practices. Stakeholders should support communities with sustainable water and sanitation systems as well as conduct more qualitative research to identify communities' needs

and perspectives and thus design prevention programmes accordingly.

4.4 Suggestions for Further Research

Future studies should be planned to investigate why preventive measures practiced by residents of the community of Tiko were below standard in the presence of sociocultural and socio-economic problems. Studies should be done to investigate whether government health policies and health-related policies (like water, engineering, and land) reflect the needs of people and correct the situation.

Abbreviation and Acronyms

WaSH: Water, Sanitation and Hygiene

WHO: World Health and Organization

UNICEF: United Nation Infant and Child Education Fund

KAP: Knowledge, Attitudes and Practice

ORS: Oral Rehydration Solution

UN: United Nation

SDG: Sustainable Development Goal

CFR: Case Fatality Rate

CDC: Cameroon Development Cooperation

CTXphi (CTX ϕ): Carried by a Temperate Bacteriophage

CT: Cholera toxin

TCP: Toxin Coregulated Pilus

OMVs: Outer Membrane Vesicles

Qrr RNA: Quorum regulatory small RNAs

OCVs: Oral cholera vaccines

FDA: Food and Drug Administration

ORT: Oral rehydration therapy

STH: Soil Transmitted Helminthes

ANOVA: Analysis of variance

IBM: International Business Machines

SPSS: Statistical Package for the Social Science

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