Evaluation of Utilization Practices towards Cholera Response Water Tanks among Residents: A Case Study of Lusaka District.

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DOI: https://dx.doi.org/10.47772/IJRISS.2024.803111

Received: 05 March 2024; Accepted: 19 March 2024; Published: 12 April 2024

ABSTRACT

Cholera outbreaks generally occur when water, sanitation and hygiene (WASH) services are inadequate or compromised. Annual estimates stand at 2.9 million cases and 95,000 deaths across 69 cholera-endemic countries with Sub-Saharan Africa and South Asia leading on the global cholera morbidity and mortality rates. Zambia continues to report higher morbidity and mortality with each recurrent outbreak. This raises concern on the impact of available interventions.

This study was cross-sectional and employed qualitative evaluative techniques. Thirty (30) Focus Group Discussions (FGDs) supplemented with field notes by researchers) were conducted with 14 participants in each group drawn from 2 epi-centers i.e. Matero and Kanyama Sub-districts which accounted for over 70% of mortalities and morbidities. These epi-centers received 107 water tanks from authorities.

The study found that residents were aware of the outbreak and attributed it to hygiene standards in the community while citing poor waste management and unsafe drinking water sources. The study also found poor WASH practices which included inability to perform correct hand hygiene during water collection, use of uncovered buckets and allowing children at the water points. Residents accessed the cholera response tanks and appreciated the intervention the government had put in place. Among the uses of the water from the tanks, residents preferred the water from cholera response tanks as they noted it tasted like mineral water. However, the water was prominently used for bathing highlighting that it made their skin smooth. The study also noted erratic supply as tanks ran out of water within 24hrs and it took an average of 4 days to refill the tanks.

The study concluded that this intervention was appreciated, however, due to poor hygiene standards and erratic supply of water, the intended result could not be realized. The study recommends long term solutions such as drilling of boreholes alongside the tanks as well as repairing existing supply networks to water kiosks with consistency in water supply by utility companies.

Keywords: Epi-centers, Cholera Response, WASH, Water Tanks, Residents.

BACKGROUND

Diarrheal diseases such as cholera are transmitted through the fecal-oral route. Infection with *Vibrio*

cholerae (V. cholerae) can originate from a susceptible person ingesting the bacteria from environmental point sources (e.g. contaminated water in lakes and rivers, or a fecal-contaminated environment) (Islam et al., 2019): this is known as the environment-to-human transmission pathway (Tien, et al., 2010: Fung, 2014). For example, in a rural North-Central Nigerian community, an unmatched case-control study was conducted during a cholera outbreak by Dan-Nwafor et al., (2019). In this study, the researchers noted that *V. cholerae* was the cause of the outbreak in Gomani. Infection can also occur between infected and susceptible individuals (Richterman, et al 2018; Deen, et al., 2019), from consuming contaminated food (Ujjiga, et al., 2015; Burrowes, et al., 2019) or water at the point of use (Burrowes, et al.,2019; Rashid, et al., 2017) that has been contaminated by a cholera case or through caring for existing cholera cases, particularly among household contacts of a case (Richterman, et al., 2018): this is known as the human-to-human transmission pathway.

Cholera remains a major public health threat in many parts of the world (Legros, 2018), particularly in areas facing complex emergencies (Shannon, et al., 2019). Cholera outbreaks generally occur when water, sanitation and hygiene (WASH) services are inadequate or compromised (Spiegel, et al 2010; Smith et al., 2014), and cholera remains a leading cause of disease outbreaks globally (Smith et al., 2014; Ganesan, et al., 2019), with an increasing rate and intensity (WHO, 2017). During outbreaks, recurrent environment-to-human reinfection of the population may also occur through ingestion of *V. cholerae* through contaminated environmental point sources, due to sustained contamination of the environment by symptomatic and asymptomatic cholera cases (Islam, et al., 2019; Rebaudet, et al., 2019; Mukandavireet, al.,2014). Both transmission pathways occur through the fecal-oral routes of diarrheal disease transmission commonly known as the F-diagram (Wagner and Lanoix, 1958).

Prevalence of Cholera

Considering incomplete reporting, 2.9 million cholera cases (1.3–4.0 million uncertainty range) and 95,000 deaths (21,000–143,000 uncertainty range) are estimated to occur across 69 cholera-endemic countries annually (Ali, et al., 2015). Sub-Saharan Africa and South Asia account for the largest proportion of global cholera morbidity and mortality (WHO, 2017; Lessler, et al., 2018), with many cities acting as transmission hotspots (Lessler, et al., 2018; Blake, et al., 2018; Moore, et al 2018).

Zambia has been grappling with recurring cholera challenges for quite long. The outbreaks have disproportionately affected urban areas, particularly Lusaka, due to factors such as rapid urbanization, inadequate sanitation, and limited access to clean water as noted by (WHO, 2019; Ali, et al., 2015). The statistics paint a concerning picture: in 2018, Lusaka reported 4,833 cases with 96 deaths and the Case Fatality Rate of 1.85% (ZNPHI, 2018). The situation persisted in 2019, with Mpulungu Township facing cumulative confirmed 40 cases, suspected 141 and 1 death with case fatality rate of 0.5%. In April 2023, a cumulative of 334 cases and eight deaths with CFR of 2.4% were recorded and the cumulative incidences increased to 688 cases and 13 deaths with CFR of 1.9% in May 2023. Lastly, As of 28 January 2024, Zambia has recorded 15,303 confirmed cases and 574 deaths, with a Case Fatality Rate of 3.8%. Of particular concern is the evolution of the outbreak in Lusaka, where in just a week, the Ministry of Health reported an increase of 71.2% in cases and of 175% in deaths by 2nd January 2024.

There is currently global momentum to tackle cholera and an internationally agreed road map to eliminate the disease by 2030 (Global Task Force on Ending Cholera, 2017). While it is accepted that large scale investment in water and sanitation infrastructure in Europe and the Americas led to the elimination of cholera and a reduction in other diarrheal diseases (Najnin, et al 2018; Lantagne, et al., 2018), there is a paucity of evidence to support which WASH interventions are most relevant for cholera prevention and control in currently cholera-affected populations (Taylor, et al., 2015; D'Mello-Guyett, et al., 2018).

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue III March 2024

Cholera Response Interventions

In response to the 2023/2024 cholera outbreak, authorities installed water tanks in cholera hotspots in an effort to provide safe water and reduce the cholera cases. Whilst appropriate cholera responses will always be specific to the geographical and social context, it is important that these responses are informed by the best possible evidence and updated models of cholera transmission or, in the absence of rigorous evidence, a combination of theoretical reasoning, best operational judgment and documented practice, even if unpublished (Djulbegovic et al., 2017; WHO, 2014).

While a number of interventions were implemented, it remained unclear regarding the source of the cholera epidemic as no water or food samples were found contaminated with vibrio cholerae on biological analysis at the national food laboratory (NFL Sample Results, 2024). Our study therefore sought to ascertain if provision of water tanks had a significant impact on the cholera fight.

METHODS AND MATERIALS

The study used qualitative methods employing a cross-sectional design while taking non-experimental evaluative data collection techniques. Data were collected using focus group discussions and were supplemented by non-participant observation field notes. Qualitative methods were used so as to explore perceptions and then draw deeper conclusions on how the provision of water tanks was perceived and how the community used the water in the tanks. The objectives set allowed probing quantitatively by asking the discussants to quantify the frequency with which tanks were refilled with treated water. Some specific objectives such as "establish perceptions on the cholera epidemic among residents in Lusaka district" involved estimating knowledge levels, causes and transmission patterns for cholera.

Participants

Residents were conveniently and purposely recruited as participants for the FDGs. Convenient sampling was employed as it was difficult to schedule a specific day for the discussion as this would require funds for refreshments and compensating the members. However, besides including the residents that were available, we purposely excluded participants that were less than 2 weeks of residence in the study sites as well as children under the age of 18 due to issues of consent. A total of four hundred and ninety (490) community members (possible beneficiaries from the Cholera response tanks) from Matero and Kanyama Sub-districts of Lusaka District participated in the FGDs. Evidence has shown that people who reside and work near water sources are more likely to be concerned about the quality and safety of drinking water (Gachango, et al., 2015). Males and Females across the different age groups (but above 18 years of age) that met the inclusion criteria were included. Those less than a month of residence in the selected sites were excluded from this study only because they could not yet understand enough about the communities' dynamics regarding the epidemic and the cholera response tanks. From the total of 490 residents that consented to participate in this study, most of them were female (n=167, p=95%) and between the age of 30 and 39 years (n=178, p=37%). Discussants were from different occupations including: housewives (n=398), businessmen/women (n=37), while other occupations were represented by (n=55). On economic status, most discussants were in the K1000 to K2500 monthly income (n=369), while only (n=32) were above a K5000 monthly income bracket. However, the cost of living for a family of five in Lusaka as measured by the Jesuit Center for Theological Reflection (JCTR) stood at K9,294.76 in October 2023 (the month when the first case of cholera was reported in Lusaka Zambia). This amount is K5, 079.76 above Zambia's national average income of K4,215.00 (JCTR, 2023).

Data Collection

Community gatekeepers were engaged in the recruitment of FGD participants and selection of appropriate sites for discussions. Written, informed consent was obtained from all study participants. The consent forms,

and focus group discussion were translated into Nyanja and Bemba, the languages widely spoken and well understood by the majority of residents in the study area. Data were collected between January and February 2024; a period Lusaka District reported the highest morbidity and mortality. The key study questions included: 1. What is your perception of the quality and safety of drinking water from sources in your community? 2. In your own view, who/what do you think is responsible for the quality and safety of drinking water you have described? 3. Do you get water from the recently installed tanks by Authorities? 4. At family and community level, what has been done to ensure that drinking water in your community is of quality and is safe? 5. At family level, what do you do to ensure quality and safety of drinking water from drinking water sources in the community? These questions were elaborated by probing and have been summarized and presented in three themes.

Each FDG comprised a minimum of 8 and a maximum of 14 participants. Extra effort was made to ensure an equal number of males and females constitute the focus group discussions. However, socio-economic activities could not permit equal representation as most males were not found in the residential sites visited while some found shunned the discussions. The FGDs were conducted at private locations at the convenience of the different participants and as advised by community gatekeepers. The Discussions were recorded with an audio recorder and field notes (non-participatory observation) were taken as the research team moved around and interacted with study participants. Participants were not paid for participating in the study. The interviews lasted between 40 and 50 minutes. The discussions were transcribed and those in Nyanja or Bemba were translated into English and back translated to Nyanja or Bemba to ensure that what was recorded in local languages was what was captured in the English version of the transcript.

Procedure

The participants were informed about the study procedure, such as significance of the study, data collection, and their right to withdraw. The participants were asked to read and sign an informed consent form before proceeding with the questionnaires. After receiving informed consent forms, the researchers collected sociodemographic data which included gender, age, occupation and financial status. The nature of the discussion was explained prior to the discussion, a time at which it was made clear that the participants' identity was not required. In instances where a discussant called out a name of a fellow discussant, that name was not noted down and the same was coded when transcribing the audio recording. It was explained that the discussions would be recorded, but the researchers would only retain a write-up transcript that would be used for the originality of their submissions.

Data Analysis

Data analysis started with listening to the audio recordings alongside the field notes at the end of each day's discussion sessions. These recordings were transcribed sequentially on a daily basis by Lweendo Shimunzhila (LS), Linda Mumba (LM) and Macmillan Kapungwe (MK) which helped in giving a deeper insight into the evaluation during the data collection process in line with the study objectives. The data transcribed by LS, LM and MK was checked by Chola Shimangwala (CS), Choongo Mulungu (CM) and Emmanuel Siwela (ES). Data analysis was done through different stages of familiarization with data and dual coding was employed. CS, ES and CM independently read through the transcripts to identify emerging themes and manually identify corresponding quotes by highlighting them with different colors per theme. Using three predetermined themes, indicative thematic analysis was done by analyzing statements from participants, identifying commonalities and developing sub themes. The findings were reported through verbatim narrations per theme.

RESULTS

The findings for qualitative reviews conducted on the utilization practices of cholera response water tanks

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue III March 2024

among residents in Lusaka are presented under themes that were derived from the research objectives and contained in the FGD guide.

Perception on the Cholera Epidemic

In this research, we conceptualized perception as one's ability to identify, organize, interpret and understand the information about a phenomenon in their environment. The researchers sought to understand perceptions held by the residents regarding the ongoing cholera outbreak. The following were the verbatim responses after the following questions;

Firstly, we sought to understand which diseases residents knew were being fought in the country. Findings show a good awareness of what conditions the country was responding to. Others were even able to highlight the fact that the country was still faced with COVID-19.

Right now, the disease we are fighting is cholera (Female Discussant number 3 in the second Focus Group Discussion = FD3 FGD2).

What I know of is cholera and Covid-19 (FD1 FGD1).

Now we have cholera but I also know that Covid-19 is still there (MD6 FGD16).

The disease we have is Cholera (FD1 FGD27).

For me I just have cholera but now it has reduced (FD11 FGD16).

I don't know of any disease (FD2 FGD1).

Cholera which is vomiting and diarrheal which is watery more than three times (FD8 FG25).

With this clear understanding of what condition was at hand, we sought to get their thoughts about what causes recurring cholera cases almost every year. Majority of the respondents attributed it to lack of amenities such as waste disposal facilities, water and poor hygiene practices among themselves.

Us we know that if you don't clean the surroundings you will have cholera, if you drink dirty water or eat leftover foods you will suffer from cholera (FD5 FGD23).

Once the outbreak is over we usually relax in implementing hygienic standards or measures which reduce outbreaks (FD5 FG25).

For me, let me tell you, the main problem in this place that makes cholera keep coming is because of garbage from people's homes. We have no proper ways of disposing waste so most people just pay individuals to dispose of their waste. But the same people have nowhere to take the waste so they mostly just dump it in drainages and when rain comes, the garbage floats back to people's homes and comes in contact with water in wells and people start getting sick. For me the solution is if the government can collect the garbage at a small fee for example K5, I know most people can manage because it's lower than the K10 they give to people that just end up throwing the sacs in the drainage (MD1 FGD2).

What causes cholera in our community is number one, dirty, we throw garbage especially diapers on the streets. The other thing is our pit latrines are full and no one is attending to them, hence flowing into the streets and mixing with water pipes because the pipes are also broken (FD14 FGD8).

For purposes of gaining a deeper understanding of their experience with cholera, we sought to learn if they

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue III March 2024

actually had seen cholera patients and their experiences.

In response to this question, respondents were able to name the individuals that they knew suffered from cholera in the current outbreak. Majority of the discussants knew people and not just one. This spoke to the extent of the outbreak and community transmission which could possibly explain why the community deaths or Brought in Dead (BID) due to cholera were higher than facility deaths.

Yes, we know many people that suffered from cholera, actually I myself was sick, they took me to the clinic and then later to the bigger hospital where I recovered from (FD1 FGD1).

Yes, we know them but most people hide because they fear being taken to Heroes (a Cholera Treatment Center – CTC) so they just buy medicine and some die in the house. This is because people will discriminate against you when you have cholera (FD5 FGD18).

Yes, from my household, my grandchild. I was on the bed side for a week. The disease has humbled me to see a person vomit and pugging at the same time. You literally see them depreciating within the shortest time (FD11 FGD11).

Well a number of them are from our community. Our neighbor had two of her children in CTC (FD 14 FGD15).

*Yes, we know of two that were taken to the Cholera Treatment Center and they came ou*t (MD2 FGD26).

Yes, we have heard of many from the community (FD3 FGD 27).

Water and Sanitation Hygiene Practices

As we collected data in the field, it was noted that most locations where the tanks were installed had some households with tapped water from service providers and some from boreholes. However, an interaction with environmental health staff revealed that water from these water points had no residue chlorine whenever they tested it with rapid test kits such as the Lovibond comparator. This was also confirmed by discussants as they indicated that the taste of the water from their taps and other sources of water was different compared to the water from tanks installed by authorities. Shallow wells were common in the community but they were mainly hidden from authorities. However, the community gatekeepers were able to direct the investigators where the shallow wells were due to their familiarity with their community.

Our icebreaking question on this theme during the focus group discussion was asking them to describe their initial existing water sources in the community.

We have some taps where we pay and sometimes we get water from Kajimas (water Kiosks). Others just get from wells that they have in their homes. But if you move around you won't see the wells but they are there (FD4 FGD21).

We get water from the tanks, Kajimas, Boreholes and dug wells (FD6 FG25).

From the kiosk provided by care, but it's to pay and it has a fixed time for drawing water. If we find it closed as we are returning from work we fetch from those with tapes at their homes which we also pay (FD 1 FGD3).

We fetch from those with a hand pumped borehole but if no one is home we have to wait for them to return as they lock them for safety (FD2 FGD3).

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As a follow up, we probed the kind of receptacles they normally used.

Mostly we use buckets and sometimes containers but what is common are buckets (FD9 FGD22).

Mostly we use the five liters containers for the young ones to carry and the buckets for me to carry, this is because I have no wheelbarrow to assist carry the big buckets (FD3 FGD2).

We use buckets, containers and small containers for our children (FD2 FGD 27).

Once they have the water from the identified sources in the buckets as indicated above, our interest shifted to treatment procedures for the said water.

We normally just use the water. At some point when they gave us some chlorine, we used to chlorinate but after it finished we just used to drink until they brought the big tanks (FD2 FGD3).

You know most people here can't manage to buy chlorine to make the water safe so we just drink. Sometimes we boil but that requires charcoal which is also expensive. But again, the problem with boiling water is that you have to wait for it to cool down before you can drink and if you are thirsty you are forced to just drink the untreated water (FD6 FGD3).

We use it for all our domestic chores which includes washing, bathing, watering our gardens and drinking (FD1 FGD1).

We just use it as we collect it from the tanks since it is already chlorinated for cooking, drinking, bathing and washing (FD8 FGD 27).

Cholera Response Water Tank Utilizations Practices

This was the main area of interest and the discussions took more time to probe and get responses to provide insight into the practices in the community. All the group discussants indicated having accessed water from the cholera response water tanks. This was a good thing as this was the intention of installing the cholera response water tanks. Among other questions, we asked discussants to highlight any good things about the tanks.

Well, for me let me just say thank you to the president, he is working by thinking of us to bring these tanks, we are thankful and they are working. Please help me think the president, he is really caring (FD4 FGD18).

For me the good thing I have seen about this water is that it is very good for my skin. It is becoming smooth. Even people are telling me my face looks smooth. Even just the smell is very nice. When you bathe you feel very fresh (FD3 FGD1).

The tanks are the best thing ever, currently we are not paying for water nor are we buying chlorine or boiling water as you know the economy is biting. Also, water is available at all times with no need for beating time (FD4 FGD2).

We shifted to the negative things they noted about the tanks which could have affected their access or utilization. Majority of respondents expressed concern over the safety of the tanks and the water due to lack of lids on the tanks, pausing as a safety hazard to children and others accessing the water as well as the security of the tanks from vandalism. Distance was another major concern for some residents that lived far from the roads in which the tanks were installed.

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For me the biggest problem I have seen is that these things have no lids, and in this area, it is a Komboni (shanty compound) in which we have more junkies (street kids that abuse alcohol and other substances). They can throw in bad things; thousands of people can return to the dust. Go around the compound you will not find a tank with a lid on top. We have thousands of junkies, they move around and they might put poison in the tanks and people can return to the dust (MD6 FGD7).

We asked for clarity what the discussant meant by "people can return to the dust". The discussant clarified to say;

What I mean is thousands of people will die if these junkies poison this water. The water is not the same, the tanks need lids (MD6 FGD7).

Other discussants submitted as follows;

Yes, I agree with him, for the first time he has spoken sense, actually I have been telling your friends, those people that come to refill the tanks to give us the lids for the tanks. You see the way it's open on top, when it rains the chlorinated water and rainwater mixes and that makes the chlorine stop working. I also told them that this tank is not well balanced; it can fall on someone (MD1 FGD7).

For me the tanks are okay. The only problem is the attitude of people who fetch from the tanks, most people are coming to wash from the actual site even nappies and leaving the place dirty (MD1 FGD3).

*Also, those people with running water from their taps even those with boreholes have closed their taps and come to fetch from the tanks making water to finish fast. Maybe if they can put rules to stop them from fetching water, it would last unlike it finishing within 24 hour*s (FD1 FGD6).

On my side, instead of preserving, others come to clean their buckets right at the site, finishing water that can be used for cooking and drinking, not only that they send small children to fetch water with big containers who spill water and play with water hence wasting (FD 2 FGD6).

Our area only has one tank catering for a large population, this is because the other areas have no road access. So, it would be better to have two tanks in the area (FD2 FGD4).

For residents that managed to access the water, we probed on the uses of the water from the cholera response water tanks. Findings show a mix of uses in the home. A perception was strongly held that the water was only to be used for drinking and no other uses.

I have a tap at home so i only use it for drinking as the water is chlorinated (FD7 FGD2).

I won't lie that we only fetch water for drinking. We use this water for everything including washing, drinking and bathing (FD8 FGD8).

Looking at the use we probed further by asking what time they normally fetch water from these tanks. It was found that the tanks and specific times that residents would come for water after which it would be closed.

Water is open from 06 hours to 11 hours in the morning and 15 hours to 17 hours in the evening every day (MD8 FDG1).

We sought to understand how long water lasted in the tanks and what happened when tanks ran out of water. Respondents lamented the availability of water adding that lack of water in the tanks triggered

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vandalism of the tanks. This spoke to the fears the community had about possible poisoning of the water tanks.

Water is not 24/7. I even wonder why they brought the tanks and not brought water. In cases when it runs out we go back to fetch from the kiosks but water is brought sometimes within 24 hours but in other tanks even 3 weeks no water (FD2 FGD2).

For us at this tank, water is not here, it's been five days now. When you call the people that bring them they say there is a cue where they get the water to bring, sometimes they say there is no fuel (MD12 FGD9).

A common issue that normally arises in the community is people saying they do not trust the water from the cholera response water tanks, so they would rather get the drinking water from kiosks than the cholera response water tanks. We sought to confirm if they were people that used water from the cholera response water tanks for other uses except drinking or food preparation.

I have heard of people saying that, but mostly those saying that are just deceiving others so that they benefit alone and the reason is because when they first started providing the water it was smelling of chlorine too much (FGD1 FGD11).

With positive feedback regarding community myths we probed further by asking, from the time you started using the cholera response water, do you know anyone that uses the water that suffered from cholera?

No, no, no, this water is good and I have not heard of anyone getting sick or suffering from cholera (MD6 FGD16).

No, this water is just okay, no one is complaining. They said the water is treated so no one can complain (FD8 FGD8).

DISCUSSION AND IMPLICATIONS

The purpose of this study was to evaluate Cholera response water tank utilization practices among residents. This study focused on perception informed by knowledge they possess, their general water and sanitation hygiene practices taking a retrospective approach and the practices related to the installed water tanks by the authorities. The following is the discussion and implications of the findings presented in themes above. The discussions followed the same pattern of themes and each was tailed with implications.

Community Perception on the Cholera Epidemic

The study found that residents were aware of the outbreak of cholera and attributed its recurrence to hygiene standards in their community while citing poor waste management and unsafe drinking water sources. This study finding was consistent with previous studies from a number of locations on the African and continents beyond. For example, in a rural North-Central Nigerian community, an unmatched case-control study was conducted during a cholera outbreak by Dan-Nwafor et al., (2019). In this study, the researchers noted that *V. cholerae* was the cause of the outbreak in Gomani. While drinking water from the Zamani river which was polluted due to indiscriminate defecation, living in overcrowded households and poor hand hygiene were significantly associated with the outbreak.

Another study by Vincent et al., (2022) investigated the 2021 Cholera Outbreak in West Africa: Epidemiology and Public Health Implications. They found that low access to safe water and proper sanitation, cross border movements and inadequate behaviors were the main predisposing factors. Further, in their study titled How does handwashing behavior change in response to a cholera outbreak? A qualitative case study in the Democratic Republic of the Congo, White et al., (2022) found that Cholera was

well understood by the population and viewed as a persistent and common health challenge.

Water and Sanitation Hygiene Practices

We also found poor WASH practices including non-performance of hand washing/hygiene at water points, use of buckets without lids and allowing children at the water points. We also found that other sources of water were available in the community including shallow wells, taps and boreholes. These findings are consistent with previous studies on the subject. For example, hand hygiene during water collection is critical in preventing the spread of cholera. For example, handwashing with soap was generally observed to be rare during the outbreak despite self-reported increases in behavior (White et al., 2022). They further found that, across case and comparison groups, individuals were unable to prioritize handwashing due to competing food-scarcity and livelihood challenges and there was little in the physical or social environments to cue handwashing or make it a convenient, rewarding or desirable to practice. In an assessment of Physico-Chemical and Bacteriological Quality of Drinking Water at the Source, Storage, Point-of-Use, Dry and Wet Season in Damot Sore Woreda, Southern Regional State, Ethiopia by Tome et al., (2018) found that Bacteriological parameters showed variation from source to household storage and from storage to point of use. The concentration of total coliform increases significantly from supplied source to point of use ($p=0.024$). The dry and wet season measurement showed variations in physico-chemical and bacteriological parameters. However, statistically no significant difference was observed between dry and wet season in all parameters studied. Regarding the safety of water from other sources, our findings are similar to Bwire, et al., (2020) in their study on the quality of drinking and domestic water from the surface water sources (lakes, rivers, irrigation canals and ponds) and springs in cholera prone communities of Uganda: an analysis of vital physicochemical parameters. This study showed that surface water and springs in the study area were unsafe for drinking and had favorable physicochemical parameters for propagation of waterborne diseases including cholera. These findings were of concern to the researchers as the practices found pose a danger of contamination of water that could initially be safe for drinking or domestic use as shown by previous studies as discussed above. Further studies could be conducted in these locations to identify contamination points for water from taps and other treated sources.

Utilizations Practices for Cholera Response Water Tanks

Residents accessed the cholera response tanks and appreciated the intervention. Among the uses, bathing came out prominent adding that the water made the skin smooth. The cholera response water was also preferred as they noted that it tasted like mineral water. The study also noted erratic supply as tanks ran out of water within 24hrs and it took an average of 4 days to refill the tanks. Erratic water supply can have serious implications for public health, particularly in cholera endemic areas. A study by Mujere and Saidi, (2016) observed that erratic water supply has socio-economic effects and these include high incidences of diseases, disruption of service delivery at institutions such as the hospital, clinic and schools and retarded infrastructural development.

Contrary to provision of water during outbreaks, previous studies advocate for governments and organizations moving away from disease-specific efforts and towards systems strengthening, these interventions may be viewed in terms of their broader effects on WASH-related diseases and other health outcomes (Wolf, et al., 2018; Esteves, et al., 2016).

Our study found distance as a challenge for the majority of residents as the tanks were installed in linear locations near main roads. This affected those from the interior of the residential areas visited which were not accessible by trucks refilling the tanks. Given evidence that limited hours of water availability during the day (Jeandron, et al., 2015), distance and time needed to fetch water (Wolf, et al., 2016; White, et al., 1972) all affect health and water-use practices negatively, standards for water availability, and other WASH interventions, should be further specified across their included recommendations.

CONCLUSION

The Global Roadmap for Cholera Elimination by 2030 has focused attention on current efforts to prevent and control cholera, and highlighted the need for clear, consistent and evidence-based guidelines. This study sought to throw light onto some unclear aspects of the 2023/2024 cholera response in Lusaka Zambia.

The study concluded that intervention of providing water by authorities was appreciated by the community whose knowledge was found limited to cholera preventive measures. However, it can't be concluded that the tanks had reduced the number of cholera cases due to the poor hygiene practices observed at the cholera response tanks as well as possible contamination and point of collection, transportation (in buckets without lids) and storage at the household. Further, the erratic supply of water to the tanks could have compelled residents to alternate between safe and the usual unsafe water sources, thus the intended result could not be realized.

The study recommends that the installed tanks should be well supervised to ensure security (to avoid vandalism as well as safety of water), ensure compliance to WASH standards by residents including having a hand hygiene point at each tank. We further recommend the drilling of boreholes alongside existing installed tanks as well as installation of new tanks in hard-to-reach areas accompanied by repair of the existing water kiosks to ensure consistency in supply of safe water by utility companies. The same should be monitored to ensure adequate chlorine residue is maintained at all times.

Consent for Publication

The authors consent to the Editorial Board of the journal to publish the paper.

Further, all the respondents consented both verbally and through a written consent form in which we documented the respondent's agreement to participate in the study by ticking the signing consent section of the questionnaire.

Competing Interests

The authors declare that they have no competing interests.

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