

## Assessment of Knowledge about Hygiene during Covid-19 Pandemic in Catchment Area of Kaziba Health Centre

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### Abstract

*Introduction: Hygiene is an essential element of public health that could reduce transmission of several diseases and their consequences. In Sub-Saharan Africa, water and sanitation-related diseases are highly prevalent, causing illness, disease and even death. The main objective of this study is to assess knowledge about hygiene in context of Covid-19 in catchment area of Kaziba health centre from January to October 2021. Materials and Method: our study was descriptive and prospective cross-sectional. A random sampling was carried out to collect data through survey questionnaire with 384 participants. Data was captured in Excel spreadsheet and imported into SPSS for analysis. Results: 93.2% of households had heard about hygiene. 43.8% of households did not know correct definition of hygiene. 98.4% of households had a toilet within the courtyard which ¾ were traditional. 53.1% of toilets had cleaning material. 72.1% of households washed their hands using soap (50.5%). 68.5% of households did not know the WHO's handwashing technique. 57.3% of households had running water. 61.2% of water well or fountain were protected. 37% of households disposed their wastewater in the public places. More than ¾ of heads of households knew waterborne diseases. Negligence of environmental sanitation was 79.2%. 66.4% of households suffered from poor hygiene-related diseases such as Covid-19 (6.5%). Conclusion: poor of knowledge about hygiene in the population of this catchment area due to the existence of certain diseases related to poor hygiene observed in our results. There is need to increase awareness channels on hygienic practices and environmental sanitation.*

**Keywords:** Covid-19, Household, Hygiene, health, Kaziba.

### Introduction

Hygiene is an essential element of public health that could reduce the transmission of several diseases and their consequences in the population. In many countries, water, sanitation, and hygiene (WASH)-related infections have a high prevalence, thus causing illness, disease and even death for many people, especially children [1]. Therefore the improvement of hygienic practices is of paramount importance to limit the transmission of diseases related to water and sanitation [1]. Although hygiene can drive the intention to change behavior, it only

occurs when people have the appropriate water and sanitation facilities [1].

The sixth sustainable development goal (SDG) is to ensure the availability and sustainable management of water and sanitation for all by 2030, whereas the access to water, sanitation and hygiene remains one of the main challenges of the 21st century [2]. Though some progress made towards achieving universal access to basic water, sanitation, and hygiene services. Between 2016 and 2020, the global picture for water, sanitation and hygiene portrayed an increment from 70% to 74% of global population with safely managed drinking

water at home, from 47% to 54% of sanitation services and from 67% to 71% of handwashing facilities with soap and water [1]. In 2020, almost 25% world's population lacked safely managed drinking water in their homes and almost 50% world's population lacked safely managed sanitation. There are still billions of people that lack basic services especially in rural places. The statistics depict one in three people do not have access to safe drinking water, two out of five do not have a basic handwashing facility with soap and water, and more than 673 million people still practice open defecation [1]. In the inception of Covid-19 pandemic, 33% of world population could not wash their hands with soap and water within their homes, therefore, this Covid-19 pandemic has resurfaced the substantial importance of WASH for preventing and containing diseases [3].

There are factors that drive water and sanitation crisis in Africa [4]: a) access to water supply and sanitation: the use of sanitation facilities separate human waste from human contact, however, the inaccessibility to safe toilets leads people to opt to open defecation where the human waste is transferred back to people through food and water resources. It has been found that one in four people that openly defecate worldwide live in Sub-Saharan Africa (SSA). The human use of contaminated water and poor sanitary conditions lead to increased vulnerability to waterborne diseases such as diarrhea, cholera, dysentery, typhoid fever, etc. In addition, poor sanitation, and water supply lead to neglected tropical diseases (NTDs) such as trachoma, soil-transmitted helminths, and schistosomiasis, lymphatic filariasis and onchocerciasis. In SSA, more than 25% of the population spend more than half hour per trip to collect water. Almost 115 people die every hour from diseases related to poor sanitation, poor hygiene, and contaminated water. b) Sanitation gap: it is reported that even in SSA countries with high water coverage, 25% of people still lack adequate sanitation in urban settings, yet this situation is worse in rural settings. c)

Emergencies and disasters: flood and drought are the main devastating water-related disasters in SSA. Flooding process contaminates drinking water, also destroys hygiene and wastewater systems, meanwhile drought denies people water supplies that cause food insecurity leading to malnutrition which finally cause death. d) Water resources: Africa is the only continent with high population growth rate which drives demand for water yet decreases the availability of water resources. Perpetual armed conflicts in SSA lead to displacement of millions of people within country or across countries. This displacement of people brings challenges-related to WASH for host communities or countries. Surface water is the most reliable source used for more than  $\frac{2}{3}$  of SSA countries, however, this surface water is highly polluted and not considered safe for drinking. Therefore, the access to sanitation and clean potable water remain minimal for numerous African communities across SSA countries.

The clean water supply and security (water storage, water usage monitoring and water contamination) remain the challenges in many SSA countries [6].

In terms of sanitation, certain risky practices are common in rural areas, for example, 75% of households practice open defecation against only nine percent in urban areas. Elsewhere, only seven percent of rural households use improved latrines against 50% of urban households. However, in rural areas, the water source is not located within the courtyard or near the place of residence as in urban areas where 27% of households report having it in or near their usual home [1].

Current data indicates that the Covid-19 virus is transmitted by respiratory droplets or by contact [6, 7]. Contact transmission occurs when contaminated hands touch the mucous membranes of the mouth, nose or eyes; the virus can also be transferred from one surface to another by contaminated hands, which facilitates transmission by indirect contact [8].

The outbreak of a new respiratory virus, such as Covid-19, is followed by the development of vaccines and treatments, and these may have limited effect in containing or interrupting the complete spread of the Covid-19 virus. It is therefore important to identify and practice public health measures such as hand hygiene to reduce or stop the spread of Covid-19 [9]. Hand hygiene is extremely important to prevent the spread of the Covid-19 virus. It also interrupts the transmission of other viruses and bacteria that cause common cold, flu and pneumonia, thereby reducing the overall disease burden. Despite strong awareness on the importance of hand hygiene in preventing Covid-19 infection, the access to hand hygiene facilities, including alcohol-based hand rubs, as well as soap and water, is often suboptimal in the community and in health facilities, especially in low- and middle-income countries [1, 3].

Hand hygiene and the use of alcohol-based hand rubs are among the preventive measures considered to be very effective with a high level of evidence [10].

According to WHO, “the provision of safe water, for sanitation and hygienic conditions are essential to protect human health during all infectious disease outbreaks, including Covid-19, on the other hand, populations without efficient water, sanitation and hygiene facilities are therefore more vulnerable to contamination by the Covid-19 virus [8]. Hygienic practices and particularly hand washing with soap, constitute an effective barrier to the spread of the Covid-19 virus. However, it is estimated that 40% of the world’s population, or three billion people do not have handwashing facilities with soap and water at home [11].

Nowadays, in the Democratic Republic of Congo (DRC), access to water is becoming a persistent problem, insofar as many the local population has no access to drinking water in order to provide for their whole needs [12]. Water is essential for life; however, it can be a source of disease when hygienic measures are not well applied. The low rate of access to

drinking water, sanitation and hygiene makes the DRC vulnerable country to several diseases, particularly to Covid-19 and this is the reason why the World Bank is investing in drinking water supply, sanitation, and hygiene services to fight the pandemic [13].

Good hygiene practices are a vital first line of defense against Covid-19 and are at the heart of the World Health Organization public health recommendations [8].

A study noted that hand hygiene and the use of alcohol-based hand rubs are increasingly studied in healthcare settings, however, there are only a few studies on this subject in community settings [14].

Overall, the access to quality water and, adequate sanitary and hygienic conditions allow the prevention of many other waterborne diseases. DRC is an endemic country for cholera and has been facing Ebola epidemic since August 2018 [15]. The fight against the Covid-19 pandemic in the water, sanitation and hygiene sector in the DRC remains substantial.

A study conducted on the compliance with the alcohol-based hand rub solutions showed that the overall compliance rate was 39% for hand hygiene, however the friction with the alcohol-based hand rubs solution is much less frequent (5%) [16]. Washing hands with soap is one of the most crucial measures to prevent the spread of the coronavirus. Infected people can indeed spread the virus on surfaces or by touching other people after coughing or sneezing into their hands. Healthy people can become carriers if they touch contaminated surfaces and then touch their mouth, nose, or eyes [17].

Indeed, all this requires good education of the populations and financial support for the provision and/or construction of sanitary facilities. It is also necessary to strengthen WASH interventions to prevent households from facing the risks generated by the low level of access to WASH [18]. Therefore, communication strategy for behavior change related to hygiene and sanitation will focus on

advocacy, interpersonal communication and mass communication [19].

Towards this deplorable WASH situation, we were embarked to carry out this study to get in-depth knowledge on hygiene in the catchment area of Kaziba health centre, to raise the concerns of these communities in terms of hygiene and to make relevant recommendations that long term hygienic practices for these communities.

The main objective of this study is to assess knowledge about hygiene in the context of Covid-19 in the catchment area of Kaziba health centre from January to October 2021.

The specific objectives were to:

1. Assess the knowledge, attitudes and practices related to hygiene in the population and their socio-demographic characteristics.
2. Assess the status of water and sanitation facilities in the catchment area of Kaziba health centre.
3. Identify the consequences and highlight the main problems related to poor WASH practices.
4. Assess the importance of hygiene practice in the households.

## Materials and Methods

**Study Setting:** this study was carried out at Muchingwa cluster located in the chiefdom of Kaziba, Walungu territory of South Kivu Province, DRC and extended along the road linking Bukavu -Uvira passing through Nyangezi-Ngomo. Muchingwa cluster is made up of six localities (villages) and has a heterogeneous population of 7,163 inhabitants (Source: Kaziba Chiefdom Office, Statistics Report 2020).

**Study design and period:** a descriptive and prospective cross-sectional study was conducted in Muchingwa cluster from January to October 2021.

**Study participants:** the heads of household or their representatives were the participants aged from 20 years and above living in the

Muchingwa cluster during the data collection period. Exclusion criteria: children, teenagers, people who do not live in Muchingwa cluster.

**Sample size calculation and sampling procedures:** owing to the total population of Muchingwa cluster (7,163) that is less than 10,000 inhabitants, Schwartz formula  $n = Z^2 P(1-P) / i^2$  was used for a definite calculated sample size of 384. A simple random probability sampling was carried out giving each head of household or a representative an equal chance of being chosen.

**Study variables:** independent variables: socio-demographic characteristics, availability of water and sanitation. Dependent variable: hygiene.

**Data collection tools and procedures:** data regarding the variables were collected through anonymous in-person survey questionnaire filled out by the heads of households or their representatives. Data were collected by field data collectors who were followed by supervisors. A two-day orientation was given to the field data collectors and supervisors about the objective and the relevance of the study, data collection tools and interaction with the participants. During this process of the data collection, the supervisors and the field data collectors were provided with facemasks and alcohol-based hand rub solutions, and they were guided to comply with public health measures. The survey questionnaire was made of binary option and multiple option questions with either one or many options. The supervisors assessed the consistency and completeness of data daily.

**Statistical analysis:** Microsoft excel spreadsheets were initially used to capture data then to import into SPSS (version 21). Descriptive statistics was carried out and presented with narration and tabulation.

**Ethics approval and consent to participate** ethical clearance was obtained from the institutional review board (IRB) of the University of Kaziba. A written informed consent was obtained from each participant before data collection.

## Results

Socio-demographic characteristics of the study participants: in this study, a total of 384 participants was involved. There were 57.3%

(220) female participants versus 42.7% (164) male participants with 20 – 30 prevailing age group (32%) (See Table 1).

Table 1 shows that the age group between 30 and 30 is the most represented (32%).

**Table 1.** Age Group of Heads of Households

Age Group (years)	Frequency (n)	Percent (%)
20 - 30	123	32
31 - 40	95	24.7
41 - 50	86	22.4
≥ 51	80	20.8
Total	384	100

Almost  $\frac{2}{3}$  of participants were married [65.4% (251)], however, 21.9% (84) were single and 12.7% (49) were widowers. More than half (50.5%) of study participants had secondary level (See Table 2).

As can be seen in the Table 2, more than half (50.5%) of heads of households have secondary level of education.

**Table 2.** Distribution of Educational Level for Participants

Educational Level	Frequency (n)	Percent (%)
Primary Level	67	17.4
Secondary Level	194	50.5
College or University Level	72	18.8
No Formal Education	51	13.3
Total	384	100

Looking at the main activity of the heads of households, many participants were farmers (27.3%), followed by the businessperson (22.9%) as it can be seen in Table 3.

Table 3 portrays that farming (27.3%) is the most activity for the heads of households follow by business (22.9%).

**Table 3.** Distribution of Main Activity of Heads of Household for Participants

Activity of Household Head	Frequency (n)	Percent (%)
Civic Servant	81	21.1
Transporter	7	1.8
Businessperson	88	22.9
Technician	28	7.3
Farmer	105	27.3
Unemployed	69	18
Others	6	1.6
Total	384	100

When it comes to the awareness of hygiene, almost all household (93.2%) had already heard

about the hygiene [93.2% (358) vs. 6.8% (6.8%)]. There were 43.8% participants who

defined hygiene as a set of measures to make something clean as presented in Table 4.

Regarding the latrine/toilet, almost all household (98.4%) had a latrine/toilet within the courtyard [98.4% (378) vs. 6% (1.6%)]. There were three types of latrine/toilet at the study setting, among those three types, the traditional or dry latrine/toilet covered ¾ (291) while modern toilet without running water were 17.4% (67) and modern with running water were 6.8% (26). Regarding the toilet with sewage disposal system, there were 45.8% (176) that had septic tank whereas 54.2% (208) had no septic tank. There were 53.1% (204) toilets that had cleaning material yet 46.9% (180) had not. It was found

that 72.1% of heads of households had the habit of washing their hands after using the toilet or eating foods, or from a walk [72.1% (277) vs. 27.9% (107)]. More than half [50.5% (194)] of heads of households used soap as cleansing agent for washing their hands whereas some used ash [18% (69)] and others nothing [31.5% (121)]. There were 68.5% of heads of households who did not know the handwashing technique according to WHO [68.5% (263) vs. 31.5% (121)].

As presented in table 4, set of measures to make something clean is significantly reported than other definitions.

**Table 4.** Distribution of Definition of Hygiene according to Heads of Households

Definition of Hygiene	Frequency (n)	Percent (%)
It is the set of principles and practices tending to promote health	115	29.9
Set of measures to make a something clean	168	43.8
Keep waste where it belongs	54	14.1
Do not know	47	12.2
Total	384	100

In line with the household water supply system for domestic use, it was found that more than half [57.3% (220)] had running water, while some drew from water well or fountain [25.5% (98)] and others were drawing water from neighbors [17.2% (66)]. Concerning the distance from water supply system for domestic use, more than ¾ [82.3% (316)] drew the water from 500 meters, while for some the distance was less than 500 meters [12.5% (48)] and for others the distance was between 500 – 1000 meters [5.2% (20)]. A good rate of participants [61.2% (235)]

indicated that the water well or fountain was protected, unlike some [24.7% 995)] mentioned that the water well or fountain was not protected, and others did not know [14.1% (54)]. Regarding the practice of storing water in households, almost all household (98.2%) stored water [98.2% (377) vs. 1.8% (7)]. It was discovered that boiling of water was the most common method (56.5%) for water treatment for the households (See Table 5). Boiling water (56.5%) is the main method of treatment of drinking water as displayed in Table 5.

**Table 5.** Method of Treatment of Drinking Water

Method	Frequency (n)	Percent (%)
Chlorination	8	2.1
Filtration	41	10.7
Boiling	217	56.5
Other	118	30.7
Total	384	100

Concerning the wastewater disposal method of the households, a good number of households (37%) disposed their wastewater in the public places as displayed in Table 6. Table 6 shows

that the majority of heads of households evacuate their wastewater in public places (37%).

**Table 6.** System of Evacuation of Household Wastewater

Evacuation System	Frequency (n)	Percent (%)
Septic tank	56	14.6
Pit latrine	65	16.9
Public places	142	37
Vacant land	121	31.5
Total	384	100

On the other hand, the household waste disposal method, more than half (50.5%) of households used burying method as it can be

seen in Table 7. Table 7 displays that many heads of households practice burying in a hole (50.5%) as system of garbage disposal.

**Table 7.** System of Garbage Disposal

Disposal System	Frequency (n)	Percent (%)
Garbage collection	28	7.3
Charrette	21	5.5
Dumping in the bush	81	21.1
Burying in a hole	194	50.5
Incineration in a corner of property	60	15.6
Total	384	100

More than ¾ of heads of households had knowledge on the existence of waterborne diseases [76.3% (293) vs. 23.7% (91)]. Most heads of households (79.2%) reported that there were people that neglected the environmental sanitation [79.2% (304) vs. 20.8% (80)] which led to the environmental destruction and the outbreak of diseases. Concerning the experience of households about some diseases related to

deficient hygiene, it was found that Cholera (20.8%) was the top leading disease according to the heads of households (See Table 8).

From Table 8 we can see that 33.9% of heads of households highlight that cholera, typhoid fever, and diarrhea are the main waterborne diseases secondary to deficient hygiene, follow by cholera (20.8%).

**Table 8.** List of Waterborne Diseases in the Study Setting

Disease	Frequency (n)	Percent (%)
Covid-19	7	1.8
Typhoid Fever	73	19
Cholera	80	20.8
Diarrhea	41	10.7
Amebiasis	7	1.8
Dysentery	15	3.9
All diseases	31	8.1
Two to four diseases	130	33.9
Total	384	100

It was also discovered that 66.4% of households had already suffered from poor hygiene-related diseases [66.4% (255) vs. 33.6% (129)] of which the majority (55.1%) had one-episode diarrheal diseases since the year started

as presented in Table 9. Table 9 displays that more than half (51%) of households had one episode of diarrheal diseases from January to October 2021.

**Table 9.** Episodes of Diarrheal Diseases from January to October 2021

<b>Episode</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
One	196	51
Two	133	34.6
Three	21	5.5
None	34	8.9
Total	384	100

It was noticed that a small number (6.5%) of household members had already suffered of Covid-19 [6.5% (25) vs. 93.5% (359)]. The lack of civic virtues (44.8%) was found to be the main factor that led to poor environmental hygiene

according to the heads of households as portrayed in Table 10. Table shows that 44.8% of heads of households claimed that lack of civic virtues was the leading factor to poor hygiene.

**Table 10.** Factors Leading to Poor Hygiene

<b>Factors</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
Lack of sensitization about hygiene	165	43
Lack of civic virtues of the population	172	44.8
Lack of basic education	33	8.6
Do not know	14	3.6
Total	384	100

Several heads of households underscored that sensitization on waste management practices (45.1%) was the best method to improve the environmental hygiene (See Table 11). There was less than half (45.8%) of heads of households who claimed that there was no

channels of sensitization regarding the environmental hygiene [45.8(176) vs. 54.2% (208)]. As can be seen in Table 11, sensitization on waste management practices (45.1%) was the substantial method to improve the environmental hygiene.

**Table 11.** Methods of Improving Environmental Hygiene

<b>Methods</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
Sensitization on waste management practices	173	45.1
Education on preventive measures for diseases linked to poor waste management	153	39.8
Avoidance of defecation everywhere in the environment	52	13.5
Other	6	1.6
Total	384	100



## Discussion

This study was designed to contribute to the improvement of the living conditions of the population in terms of hygiene aimed at reducing several diseases due to poor hygiene and sanitation practices of the catchment area of Kaziba health centre.

1. The first specific objective of this study was to assess the knowledge, attitudes and practices related to hygiene in the population and their socio-demographic characteristics.

Age: the current study revealed that the most striking age range is between 20 and 30 representing 32% of the study population. This result aligns with [9] that reported the similar trend. However, this result contrasts with previous studies which found 30 years and above as the most represented group [20, 21]. A possible explanation could be that people above 30's are those who often leave for work during the day.

Gender of heads of households: the findings reveals that 57.3% households were headed by women. These findings contradict those of previous studies that found the predominance of male gender respectively 59.8% and 79.9% [22, 21]. A possible explanation may be related to different customs in certain regions.

Education level of heads of households: this study revealed that 50.5% heads of households has secondary level of education. These results are somewhat surprising given that other research shows that almost half (49.7%) have completed secondary education and 48.1% have entered tertiary education and sometimes graduated. These results are consistent with those of a previous study [20].

Main activity of the heads of households: this study revealed that farming is the most activity that the heads of households were involved (27.3%) followed by the business (22.9%). A possible explanation for this could be that most people who live in rural areas mainly do agriculture owing to lack of other jobs.

Knowledge about the hygiene: it was found that almost all heads of households (93.2%) declare having heard about the hygiene. The results of this study show that there may be a relationship between the level of education and knowledge about the hygiene.

Definition of hygiene according to the heads of households surveyed: the important finding is that 43.8% of heads of households believed that hygiene is a set of measures to make something clean. This finding was unexpected and suggests that most heads of households are unaware of the true definition of hygiene. A possible explanation for these results may be the lack of knowledge about hygiene as a whole.

2. The second specific objective was to assess the status of water and sanitation facilities in the catchment area of Kaziba health centre.

Existence of latrines/toilets by households surveyed: an interesting finding was that 98.4% of households had a latrine/toilet within the household or courtyard. These results are consistent with a report which showed that 4.2% of population practiced open defecation (Bottom to the fore). The possible explanation could be that some households might have the latrines/toilets placed in a certain distance within the courtyard since some properties were not fenced.

Type of latrines/toilets found at household level: the current study found that most households had a traditional or dry latrine (75.8%). The results of this survey were consistent and higher than those from another survey which found 24.7% of households with traditional latrines [23]. The reason is not clear, but it may have something to do with the socioeconomic status of the study participants, nonetheless these results may not be generalized to the entire population of this study.

Mode of sewage disposal at the household level: this study revealed that there were 54.2% of households that had no septic tank. So far there is no study consistent with this finding, therefore further studies are needed.

Cleaning materials for latrines/toilets at the household level: an important finding is that 53.1% of households declared having the cleaning materials for the latrines/toilets. Findings from this survey do not corroborate with those of a previous study which indicate that the cleanliness of the latrines/ toilets was a challenge [24].

Water supply system at the household level: the most important finding was that 57.3% of households had running water within household. This finding was unexpected and suggests that the water supply is more plentiful in more than half of households. These results are in line with those of previous studies which show that only 60% of people in sub-Saharan Africa have access to improved water sources [12] and 65.1% had improved water source [21].

Protection of source of water supply: the findings of this survey revealed that 24.7% of households indicated the water well or fountain were not protected. Comparing these findings with those of other studies which found that 33% of the rural population are still using water from unprotected source of supply [1].

Water storage practice at the household level: what is surprising is that almost all households (98.2%) practice water storage. The findings of this survey align with a previous study that found almost similar trend shortage [25, 21]. A possible explanation could be the prevention of water shortage in case of unnoticed interruption of water supply.

Treatment methods for drinking water: the important result was that boiling water was the most method used (56.5%) by households for water treatment was boiling. What is curious in this result is that only 30.7% do not apply methods for the treatment of drinking water. This result is higher and consistent with a previous study which found boiling water method (43.3%) was the main method for drinking water treatment [21].

3. The third specific objective was to identify the consequences and highlight the main problems related to poor WASH practices.

Disposal system of household wastewater: this study revealed that a good number of households (37%) evacuate their wastewater on public places against 31% on vacant lands. This findings are not consistent with those of study conducted in Burkina Faso [26]. There is no possible explanation to this practice.

Knowledge of the Existence of Waterborne Diseases: an interesting finding is that 76.3% of households were aware of waterborne diseases compared to 23%, which can be explained by the effect of having heard of or suffered from it. These results align with the previous study which found that waterborne diseases were prevalent in rural areas [27].

Washing hands after using latrine/toilet, before eating or after a walk: the current study revealed that only 72.1% of householders would report that they routinely wash their hands after using the toilet, before eating or after a walk. Regarding this practice of washing hands, only ½ of households use soap for handwashing and more than ⅔ of households do not know handwashing technique according to WHO.

These results support the conclusions of a report that present the availability of handwashing facilities in low- and middle-income countries is very low, only 19% of people wash their hands with soap after defecating [1]. This result can be explained by the ignorance of the population of this group in terms of hand washing.

Negligence of the environmental sanitation: this study revealed that 79.2% of households claimed that some people were neglectful at some extent of environmental sanitation that may contribute to the spread of diseases. A possible explanation attached to the negligence of environmental sanitation seemed the lack of civic virtues of certain community members.

4. The fourth specific objective was to assess the importance of hygiene practice in households.

Households who have ever suffered from poor hygiene-related disease(s): the current study revealed that 66.4% of households

suffered from poor hygiene-related disease(s). What is surprising is that 33.9% of heads of households indicated that typhoid fever, cholera and diarrhea were the main diseases associated to poor hygiene, in addition the results show that 20.8% of households suffered from cholera alone owing to poor hygiene which align with previous study [28]. A couple of studies found that diarrheal diseases were prevalent in rural areas [29, 30]. Many households did not know that there is a strong relationship between hygiene and Covid-19. These results support the conclusions of [1] which shows that each year 1.8 million people, 90% of whom are children under five, have diarrheal diseases (including cholera). There are several possible explanations for this result, however the ignorance could be the main factor that led to poor hygiene.

Households who have already had episodes of diarrheal diseases: this study revealed that 51% of households would report having had one diarrheal episode, followed by 34.6% who had it twice from January to October 2021. This results are not consistent with any previous study. However, there are other possible explanations due to either by non-effective water treatment or by food.

Lack of civic virtues as root cause of poor environmental hygiene: the current study revealed that 44.8% heads of households claimed that poor environmental hygiene was associated to lack of civic virtues of some community members.

Heads of householders involved in the improvement of environmental hygiene: the current study found that some heads of households (45.1%) were involved in sensitization of the community on waste management practices. This findings corroborate with those of [28] which indicate that there is still gap in knowledge in environmental hygiene

## Conclusions

Compliance with hygiene measures poses a huge problem in the catchment area of Kaziba health center and highlights shortcomings in the knowledge and practices of heads of households. A good number of heads of households, female gender, aged between 20 and 30 years had low knowledge of hygiene definition, principles, and practices in the context of Covid-19 pandemic. A remarkable level of ignorance towards the relationship between poor hygiene and Covid-19 is critical for the prevention and/or control of Covid-19. The human centered design approach is substantial to address the problems of hygiene via buying-in the individual and collective commitment. Improving hygienic practices is of paramount importance to limit the transmission of water- and sanitation-related diseases. Although hygiene can lead to the intention to change behavior, the transition from intention to action only occurs when people have the appropriate water and sanitation facilities. Continued sensitization on hygiene principles and standardized practices in the catchment area of Kaziba health centre may be the best channel to curb down the hygiene-related diseases such as diarrhea and Covid-19. Further study should be undertaken at community level to assess the compliance with hand hygiene practice and the use of alcohol-based hand rubs as well as their relevance and technical skills.

## Conflict of Interest

The authors declare no conflict of interest.

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