

UNIVERSITY OF NAIROBI
DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK

**ACCESS TO SAFE DRINKING WATER AND EFFECTS IN CURBING
CHILD MORBIDITY IN CENTRAL SOUTH SOMALIA: A CASE STUDY ON
PREVALENCE OF DIARRHOEA IN SOUTH CENTRAL SOMALIA**

BY

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**A research project submitted in partial fulfilment of the requirements for the
award of the Degree of Master of Arts in Sociology (Rural Sociology and
Community Development), University of Nairobi**

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DECLARATION

This research project is my original work and has not been presented for award of a degree award in any other University.

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This research project has been submitted for examination with my approval as the university supervisor.

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Supervisor's Signature..... Date.....

DEDICATION

Dedication to my Dear late mother Elinah Kaveza for her discipline and encouragement for higher education and my Son Aaron for giving me hope.

ACKNOWLEDGEMENTS

Gratitude to almighty God for keeping me healthy and providing finances for completion of this course.

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LIST OF ACRONYMS

AWD:	Acute Water Diarrhoea
CBOs:	Community Based Organizations
CSR:	Carrier Sensitive Routing
CSZ:	South Central Somalia
FAO:	Food and Agricultural Organization of the United Nations.
FDGs:	Focus Group Discussions
FSNAU:	Food Security Nutrition Unit
HMIS:	Health Management Information System
HTWTSS:	Household Water Treatment and Safe Storage
IDP:	Internally Displaced Persons
JMP:	Joint Monitoring programme
KIIs:	Key Informant Interviews
MCH:	Maternal Child Health
MDG:	Millennium Development Goals
MICS:	Multiple Indicator Cluster Survey
NGOs:	Non-Governmental Organizations.
OCHA:	Office for the Coordination of Humanitarian Affairs
ORS:	Oral Rehydration Solution
ORT:	Oral Rehydration Therapy
SDG:	Sustainable Development Goals
SWALIM:	Somali Water and Land Information Management
UNDP:	United Nations Development Programme
UNFPA:	United Nations Population Fund
UNICEF:	United Nations Children Fund
USA:	United States of America
WASH:	Water Sanitation and Hygiene
WHO:	World Health Organization

ABSTRACT

The aims of the research were to find out how access to safe drinking water in Central South Somalia has helped curb child morbidity by reducing diarrhoea episodes; to determine the prevalence/incidence rate of reported diarrhoea among under five year age children in Central South Somalia; to relate hand washing with soap to reduction of diarrhoea cases; to determine the effect of household water storage on reported diarrhoea cases; to assess the aims for use of various treatment options for water in the households and to establish the effect of water treatment on diarrhoea episodes. A survey research design was used to sample 200 respondents to whom questionnaires were administered. The study found out that access to safe drinking water plays a critical role in curbing under 5 diarrhoea episodes. With improved water sources along with handwashing after defecation helped in reducing diarrhoea, especially in urban areas. Hand washing facilities need to be near or inside the toilet not distance away and hand washing occasion's education increased to caregivers. Installation of water containers in the households enhanced hygienic practices and further reduced cases of diarrhoea with urban areas showing greater improvement than rural areas. These water storage containers need not to be available but clean and covered with a lid to prevent contamination. Various reasons were given for choices of different use of different water treatment options, from cultural of reducing productivity to strong chlorine taste. The practice of drinking treated water also reduced diarrhoea cases especially in urban areas, where walking distance to water points is minimal or piped water is available compared to rural where people have to walk more than 30 minutes. The study recommends that a water management framework be put in place to protect water sources, and also to ensure treatment of water and safe storage is readily available in both rural and urban populations.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Clean water and sanitation is one of the 17 global Sustainable Development Goals (SDGs) (Mara & Evans, 2017). The purpose of the goal is to facilitate availability and sustainable running of water and sanitation for all (UNDP 2015). Due to inadequacy of water, 40% of people around the world are affected and the number is expected to go up because of changed in climate. Even though 2.1 billion individuals in the world can access improved water sanitation since year 1990, slow supply of safe drinking water is the main limitation affecting every continent (Mara et al., 2017). In year 2011, forty-one nations experienced water shortage and 10 of the 41 were close to exhausting their renewable freshwater which is forcing them to depend on non-conventional sources. Accumulating desertification is already portraying these trends. By 2050, it is expected that on the lower side, one in every four people will be affected by recurring water shortages.

Through improving infrastructure, providing sanitation facilities and advocating for hygiene at all levels, worldwide access to harmless and affordable water by 2030 will be achieved. Also, inadequacy of water can be mitigated through protecting and re-establishing water-related ecologies such as forests and rivers (Connor, 2015). Involving of international partners will be essential to encourage efficiency of water and adoption of modern technologies for treating water in developing countries. For African countries and other developing countries from other regions to achieve universal access to clean water and sanitation, a cohesive tactic is crucial for progress across the 17 Global Goals (Bernhardt & Adamo, 2017).

According to Connor (2015), regardless of the substantial progress during the Millennial Development Goals period, seven hundred and forty eight million people still face inadequate access to safe water for drinking purposes, 2.5 billion people around the globe access to better sanitation of the same group of people, 1 billion still practise open defecation. It has been proved that preventable diseases and morbidity among children under five years around the globe have been caused by inaccessibility to clean drinking water, sanitation and hygiene. Pro-longed contact to repeated Water Sanitation and Hygiene (WASH)-related infections leads to stunting and prevents children from reaching their full potential (Cumming & Cairncross, 2016). In adequate access to clean water is mostly experienced by the financially disadvantaged people in the society, especially those residing in rural areas. Working on a

development framework that eliminates disparities in the society will enhance achieving of a dignified world. Safe water and hygienic toilet are some of the basic amenities that no one should lack in the society as noted in report on “progress on drinking water and sanitation” (Satterthwaite, 2016).

However, Somali, as one of the countries in the Sub-Saharan region, is one of the nations that can be regarded as off-track in achieving the SDGs for sanitation and water supply by 2030. Zeid and Cochran (2014) posit that only twenty nine percent of Somalia’s population has access to endorsed source of water. Further, the report shows that only 23% of the Somali nationals access sanitation facilities. The report also indicated that sixty seven percent of the people living in urban access improved drinking water while only nine percent in the rural areas. Access to sanitation of urban and rural population were 52% and 6% respectively. In CSZ, poor sanitation combined with poor hygiene practices is the major cause of diseases such as diarrhoea, polio and malnutrition. This in turn leads to high morbidity, especially among children aged 5 years and below.

Drinking safe water is essential for good health. Drinking unsafe water has been widely associated with diseases like cholera and typhoid (Pullan, Freeman, Gething & Brooker, 2014). Unsafe water has high chances of being tainted with chemicals, visible and microbiological contaminants that are harmful to human health. Apart from the association with diseases, availability of drinking water in close proximity to population residences is important particularly to women and children who are majorly involved in fetching water for domestic use. Organizations around the world advocating for children rights are fighting for access to clean sanitation amenities and reasonably priced safe drinking water by one-third (Ngoran, Dogah & Xue, 2015). To speed up the attainment of the SDG 6 and also play part in clean water and sanitation that is part of 2030 Agenda for Sustainable Development. Having a detailed strategy is important for achievement of various goals. I intend to get data related to clean water for better planning, implementation and monitoring at host communities, IDP/returnee camps and institutions in CSZ. This data would also assist to tell whether there has been progress in reducing diarrhoea in children u-5 as a result of WASH interventions and what can be done with intervening variables to achieve greater success.

Defining access to sanitation and drinking water varies from region and another because sources vary widely. Satterthwaite (2016) posit that an upgraded sanitation facility should separate human waste from human contact in a hygienic way. Further, they two organizations

define an improved water source as one by how it is build and one that adequately protects the source from contaminations specifically faecal matter from the outside.

The Table 1 outlines the JMP classification improved drinking water sources.

Table 1: JMP method of defining access to sanitation and drinking water

UNIMPROVED DRINKING WATER	Surface drinking water sources They include river, dam, lake, pond, stream, canal, Irrigation channels.
	Unimproved drinking water sources They include wells that are unprotected, springs that are unprotected; water carried with small tank/drum tankers truck and bottled water
IMPROVED DRINKING WATER	Other improved drinking water sources Include; Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, Rainwater collection
	Piped water on buildings These are the water connections done in households in various dwelling
	Drinking Water Ladder

NB: Bottled water is considered safe for consuming when households use safe water when cooking and personal hygiene.

1.2 Background to the population

Somali is mostly dominated by the Cushitic group. Cushitic people are one of African native groups. The term Somali was derived from two Somali words, that is, SOO and MAAL which simply means, “Go and Milk it”. This is an indication that the Somali people were initially nomadic pastoral society, who reared camels, cattle, goats and sheep. The animal farming they practised was both meant for both subsistence and commercial purpose (Shiil, 2014).

Somali have the longest coastline in Africa. This made it a convenient center for conducting trade with the rest of the ancient world. Also, the opening of Suez Canal 1869 facilitated European development in the area. This led the Somali nationals to leave under the rule of three foreign powers by the end of the 18th century, that is, the British (in north central Somali and in the northeast Kenya), the Italians (in southern Somali) and the French (in the northwest, in what is currently Djibouti).

Regardless of the civil war that had been on the toll and a failed state administration, Somali had performing informal economy. Estimates show that in the recent years, there has been growth annually of 2% to 3% and in 2014 it was estimated at 3.7% (IMF 2015; CIA 2016). Agriculture, specifically the livestock have been the greatest contributor to economic growth. Somalis main sources of revenue are the export of livestock, leather, fish, charcoal and bananas. However, major elements in the Somali economy in the recent are the established telecommunications and money transfer companies.

The main internal transport in Somali is by truck and bus as there no railways in the country. The country’s road network comprises of over 22000km of highways but only 2,600 of it is paved. Also, the country have no main waterways but there are major ports which includes; Berbera, Mogadishu, Kismayu and lighter age port at Merca; minor port at Maydh. However, in 1980s, a port modernization was launched with the help of United States which in turn improved expressively cargo handling at Kismayu. The programme also increased number of berths and deepened harbour at Berbear (Global security, 2018).

1.1.1 Sources of Water in Somalia: Surface Water and ground water

1.1.1.1 Surface Water

In Somali, river Juba and Shabelle are considered to be major water sources, both which flow from Ethiopia to the Indian Ocean through the Southern area of the country (Michalscheck, Petersen & Gadain, 2016). However, the two resources encounter extreme seasonal variation flows but never runs dry absolutely. During April to June and September-November seasons, the rivers experience high flows. Also, during this wet season, the rivers in most cases break the weak embankments and flood the land nearing the rivers. During the dry season, the volume of river flows are at their lowest. The approximated flow during the dry season along Juba River is at 186m³/s and that along Shabelle river is at 75m³/s.

Apart from the two major rivers in Somali, there are a number of seasonal rivers known as togga locally. The seasonal rivers are known to flow during the rainy season and also experienced after heavy storms accompanied by flash floods. During the dry seasons, seasonal rivers tend to remain dry, however, there are sub-surface wells that are majorly located in areas with river beds that have shallow water table. Water for domestic and livestock use is mostly collected from natural depressions, artificial dams that are locally known as Waro and man-made cisterns. However, majority of the sources mentioned above retain water for a very short time, therefore making it hard for the locals to rely on them for water supply around the year (Houghton-Carr, Gadain & Muchiri, 2011). Juba and Shabelle are shown in figure 1.1 Drainage Systems of Somalia.

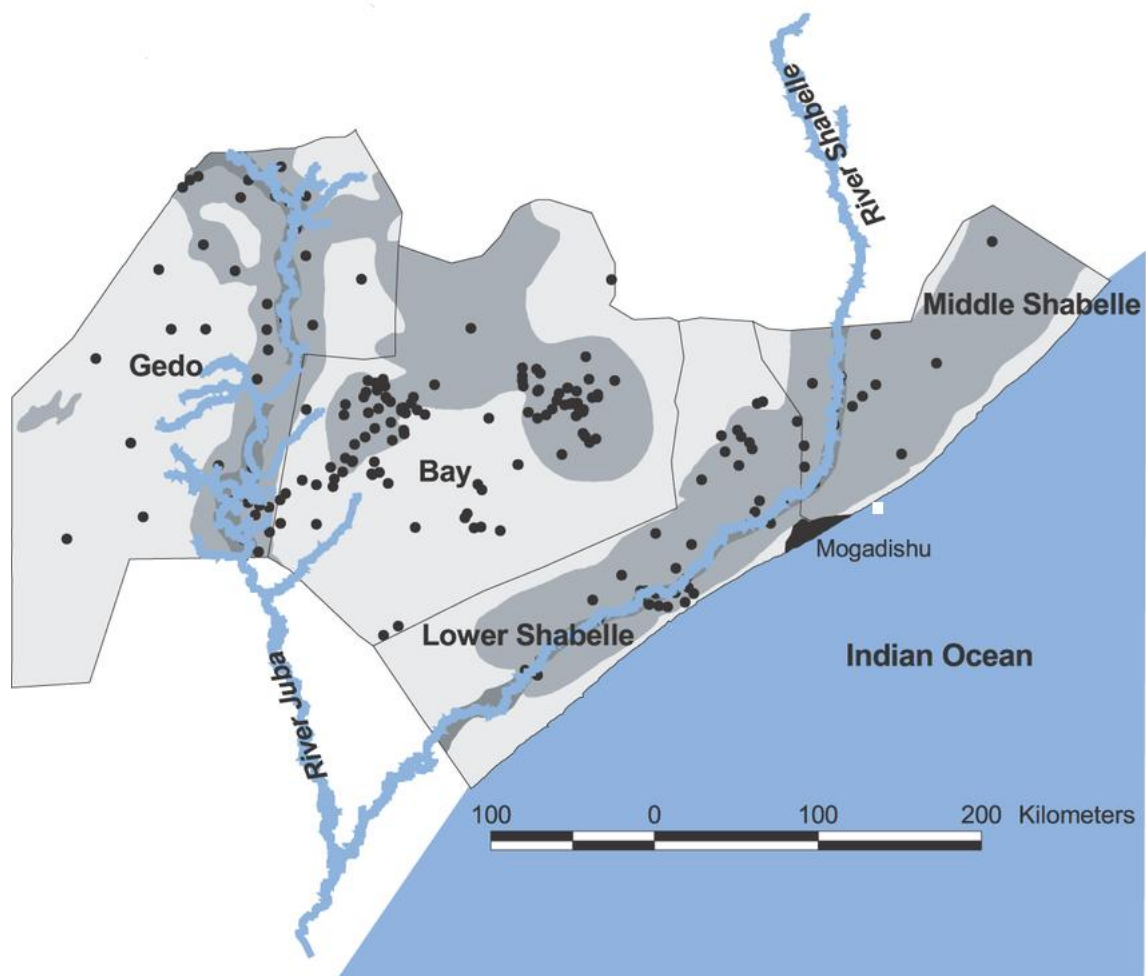


Figure 1.1: Drainage Systems of Central South Somalia

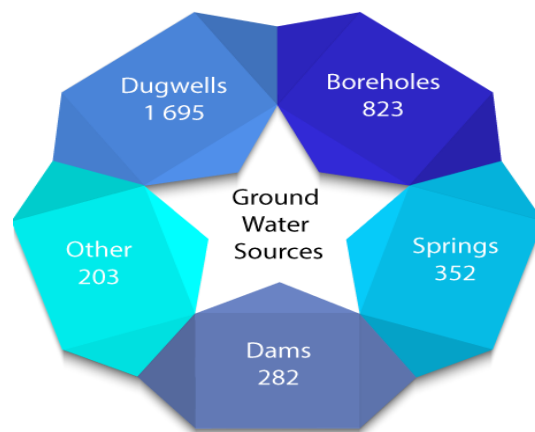
1.1.1.2 Ground Water

Ground water is a major source of water to majority of the Somali locals, specifically those who don't live along the Juba and Shabelle Rivers (Michalscheck et al., 2016). The ground water is majorly used for domestic use, livestock and irrigation which is practised on small scale. Some of the major sources of ground water include; boreholes, shallow wells and springs as shown in figure 1.2. However, among the three sources mentioned above, boreholes are the most strategic water source as most of them have water throughout the year. These boreholes have a depth ranging 90m to 250m. However, in some areas, the depths can be more than 400 metres. On the other hand, the shallow wells are less than 20m deep. The amount of water yielded from these sources varies from one area to another depending the aquifer. Majority of the shallow wells produce between 2.5 and 10m³/hr compared to the yield for deep wells which produce between 5 to 20m³/hr.

Apart from the inadequacy of water sources in Somali, coming up with new groundwater resources faces a major challenge, that is, poor water quality. Most of these sources have salinity levels above 2,000 μ S/cm. This kind of salinity level is extremely high comparing it the required standard of drinking water which should be less that 600 μ S/cm. The open wells are also unprotected from microbiological elements and other contaminations.

In addition, majority of the Somali women and girls walk for more than six miles in precarious conditions. Many children are left an attended by their mothers who go to fetch water in long distances. This makes the children left on their own to be unprotected from strangers or wild animals who may attack them. Young girls who participate in fetching water are exhausted due to the long journey which takes approximately half a day in the hot Sun. This makes it even impossible for them to attend school. To make the matter worse, in some instances, the girls and women from fetching water are at risk of being attacked and their water stolen. Also, in some cases, they are forced to fetch contaminated water by the grazing animals that water at the same source. This at times leads to extreme dehydration, diarrhoea and cholera which lead to death (Mercy USA, 2015).

Figure 1.2: Ground Water Sources as at September 2014, SWALIM



1.1.1.3 Household Point of Use Water Treatment Technologies

Treatment of household water and safe storage intercessions can lead really improve the quality of drinking water. This is also associated with reduction of diarrhoeal disease and this makes tremendous improvement in the lives of the people who depend on water from polluted rivers, lakes and in some instances unsafe wells or piped water supplies (Mara et al., 2017).

Treatment of water at the site or at the point of use and safe storage have been associated with reduced waterborne diseases in the communities in both first world countries and third world countries (Waldman, Mintz & Papowitz, 2013). However, improving the water at the domestic level is greatly determined by the available technology and the site specific environmental and background factors which require further assessment and analysis. Commendable reduction of diarrhoea diseases of six to ninety percent have been achieved depending on the technology adopted and exposed population and local conditions (Cairncross et al., 2016). Technologies that have been employed include; filtration with ceramic filters, solar disinfection among others. All the above-mentioned systems have been associated with improved microbiological quality of water (Cairncross et al., 2016).

1.2 Statement of the Problem

Poor and unimproved water and sanitation is a major contributor to childhood diarrhoea which have been documented in the various literature including WHO, UNICEF publications. In most cases, children are more exposed to diseases dependent to unimproved water supply and sanitation. This is due to fact that their immune, respiratory and digestive systems are still weak and in the developing process (Demographic and Health Research, 2010). Childhood diarrhoea is a major contributor of morbidity and mortality in Africa, especially the war-ravaged Somalia. The disease has continued to desolate children below the age of 5 years even after the public health stakeholders have intensified the awareness campaign in regard to the disease (Hashi, Kumie & Gasana, 2016).

Without a doubt, many childhood illnesses in Somalia are as result of consumption of unsafe water. In fact, diarrhoea remains the major problem in the lives of children in Somali. The disease is contributed by unsafe water, poor sanitation and hygiene. Diarrhoea and water-borne diseases have been directly associated with access to unsafe water and low hygiene practices (Hutton, 2013). A report by WHO 2010 termed diarrhoea as having a loose or watery stools at least three times in a day. Even though most cases of diarrhoea are insignificant, acute situations can cause dehydration which may cause death or other major problems if the cases are not acted upon early enough (UNICEF/WHO, 2010). However, in the recent past, interventions by the stakeholders to improve water quality from the source, treatment of domestic use water and introduction of safe storage systems have been associated with reduced diarrhoea cases by as much as 47% (Hutton & Chase, 2016).

Various researches have been carried out in Somalia have portrayed association between normal diarrhoea and water treatment and storage at the household level. However, available reports on determinants of diarrhoea among kids aged 5 years and below are very scarce. It is important to note that other intervening factors, for instance, distance to point of fetching water, the relationship between Water Collection Time and Domestic Consumption, would determine the quantity of water to be used in a household which is very critical to curbing disease spread. Cost of buying a jerry can of water would determine whether a mother would be willing to use the water for washing hands after wiping baby faeces or she would keep the water to prepare a meal in the evening, seasons would also impact on outbreaks of water borne diseases.

It is therefore necessary to consider water fetching process up to the point it is consumed by a child, what difficulties the mother had to go through to get the water, her awareness of any treatment method and why she preferred the one she used if any was used. This holistic view of this study would provide a more appropriate framework to fill in the gaps in understanding the association between water treatment, safe storage in the household level and diarrhoea among children who are aged 5 years and below. The data generated in this study will come up with viable strategies to handle the diarrhoea menace in the community. This will be accomplished by use of the available technologies. Also, community awareness can help achieve agenda 6, of the SDGs.

1.3 Research Questions

- i. What is the association between reported diarrhea and reported water treatment?
- ii. What is the association between reported diarrhea and hand washing behavior?
- iii. What is the association between reported diarrhea and water storage?

1.4 Research objectives

1.4.1 Main Objectives

The main objective of the study was to determine the effects of WASH conditions in curbing diarrhoea episodes among children below five years of age in Central South Somalia

1.4.2 Specific Objectives

The specific objectives that guided this research were: -

- i. To determine the prevalence/incidence rate of reported diarrhea among under five-year age children in Central South Somalia.
- ii. To relate hand washing with soap to reduction of diarrhea cases.
- iii. To determine the effect of household water storage on reported diarrhea cases.
- iv. To determine the reasons for use of different water treatment options at the household level.
- v. To establish the effect of water treatment on diarrhea episodes.

1.5 Justification and Significance of the Study

Mortality and morbidity data for diarrhoea cases is reliable in assessing the level of health of a particular population in an area. The same data is important when assessing and comparing the economic status of a region as established by UN SDGs in WHO regions. In addition, the data is a tool to prove overall water sanitation hygiene and inequalities in health. The data also forms the basis to ascertain control measures, effectiveness of intervening strategies, costs incurred and actions taken. Children with poor health and exposed to unsafe drinking water are likely to diarrhoea severely comparing to healthy children. Diarrhoea in children is more life-threatening comparing to adults as water makes a greater proportion of children's bodyweight.

Reports by UNICEF and WHO posit that young children are likely to use water during the day given their higher metabolic rates and their kidneys are less effective comparing to those of the adults (UNICEF/WHO, 2009). Most viruses that lead to diarrhoea have a common way of transmission- from the human waste to the mouth of another. This is termed as fecal-oral transmission. Hence, this information can be of help to the government and communities who can use to develop reliable technologies and storage options that are effective and acceptable.

1.6 Scope and Limitations of the Study

The study focused on communities and household members and their methods of water treatment, water storage, and handwashing behavior especially care givers of u-5 children and how it was related to occurrence of diarrhoea/AWD disease. Also, their understanding on importance of handwashing with soap. This community involved both urban/ rural, in south central Somalia zone.

As this research only focused on the caregivers, it was not possible to get to know the feelings and views of children if they were to speak for themselves. There was to be the good will of “Gate Keepers” village elders/ clan elders to get do the focus group discussions and collect data on questionnaires and speak to some of the key informants. My assumption was that security situation would prevail at the time of data collection, as security situation in Somalia is unpredictable.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

In the last thirty years, Somali have experienced armed conflicts, failed leadership, a poorly performing economy and unreliable health system and other public services. In addition, the country has faced recurrent droughts and famines which make it a difficult environment for human survival. This is primarily portrayed in the poor child health conditions, as 20% of young children succumb before they attain the age of five years. In addition to that, more than one third are underweight and almost 50% suffer from impaired growth (WHO, UNICEF, 2011).

2.2 Literature Review

The available data on child morbidity and death are scarce and unreliable. The documented death rates of children vary immensely in the last twenty years. The under-five death frequency was of late reviewed from 135 to 200 per 1,000 live births (UNICEF, 2009). This places Somalia as one of the poor performers in child survival list. However, Somali have concentrated so much in SDG six as it focuses on reduction of under-five death rate to 68/1000 lives births. This target was founded on a projected under-five death occurrence of 203/1000 live births in 1990 (Rajaratnam *et.al.*). This simply shows that no significant improvements have been realised from the 1990 baseline and thus there is a long road to be covered for the target to be hit.

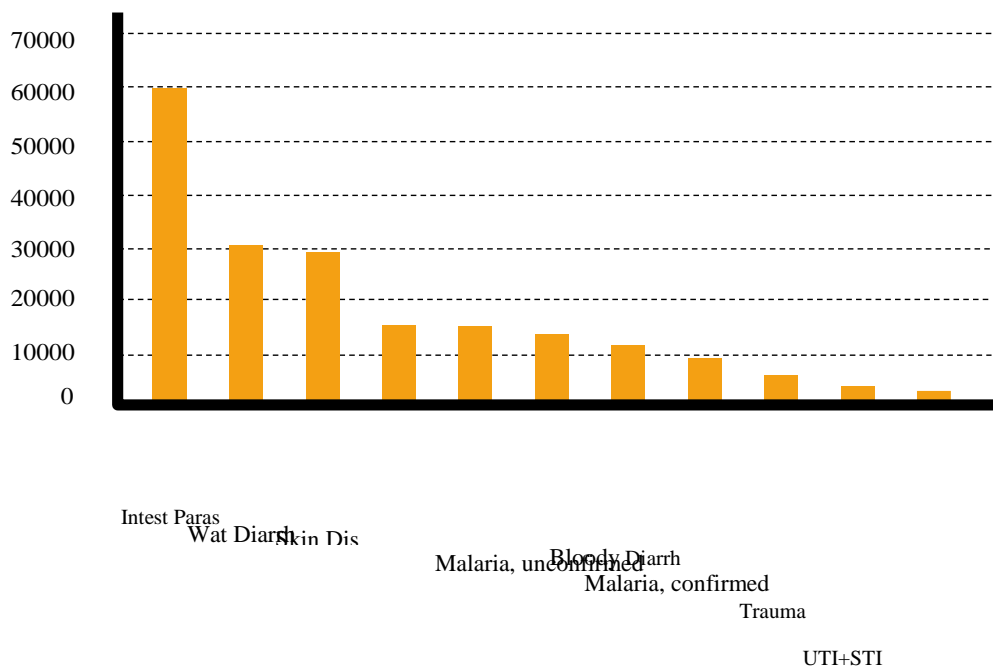
The high death rate of children under 5 years seems to be primarily attributable to pneumonia, diarrhoea and neonatal complications. This has been as a result of malnutrition and unsafe water and poor sanitation. Other causes of child deaths include malaria and measles. Available data does not show a distinct association between diarrhoea, sources of water, cost, distance in relation to quality and quantity of water to meet a household needs household. Different water treatment employed in relation to awareness campaigns.

2.2.1 Prevalence/incidence rate of reported diarrhea among under five-year age children in Central South Somalia.

Death rate of children in Somalia who are aged under 5 years is approximated at 200 deaths per 1000 live births. This makes it to be one of the highest at the global level. Pneumonia and diarrhea are the major killers each as they contribute 20-25% of under-five mortality rate.

Access to approved water source in Somalia is a major challenge. Only one third of the total population is able to access. Inappropriate sanitary facility is extremely low and majority of the Somalis practice open defecation. Use of unsafe water, poor sanitation and hygiene contribute to spread of infectious diseases, that is, diarrhoea or intestinal parasites. Majority (90%) of children under 5 years of age results from inappropriate WASH conditions. This can simply be improved through washing hands with soap.

Figure 2.1: Morbidity Pattern for Under-Fives Attending Somali MCH Clinics
CSZ



Reliable data on contributors of death rate among children are hardly found. This shortage of data can be associated with a failed health information system. Underdevelopment of the health facilities and poor management has also contributed on data scarcity. This situation is further worsened by the extreme low usage of health services by the general public. The shortage of data is mostly on factors causing child death. However, this could be as a result of deaths that take place outside the health system which are rarely recorded. In some cases,

even when they die in hospitals, the reporting has been poor and scrappy. As a matter of fact, in the recent past recording on death and health issues have been clearly regulated at the primary health care level. In this case, data MCH units are collected is meant for the health practioners for official use. Even though certain hospital data have been updated to the HMIS, there is still no dependable reporting system in place for the public health centres.

From the current available data, it is outright that there are very few reported cases on child deaths. In interviews with health practioners in agencies in Somalia, it seems that the under-five rarely die in such facilities. This is achieved because the practioners normally manage to save even extremely sick kids. Basically, there is no reliable data on death rate can be recovered from the reports done by the primary health-care centres to the HMIS. Practice of further referral and clinics do not collect any data on deceased locals of their districts. However, data on child sicknesses in the HMIS can offer guidance on contributors of child deaths as they may be anticipated to follow the same patterns. Data of this kind have been collected in some private institutions that are managed and run by different healthcare providers. The data is also compiled into clinical data meant to be used by agencies in the healthcare that plays part in supporting health sector. Information from individuals on diseases that cause child deaths are useful for operation, however, they have to be interpreted with caution at the national level as the causes of diseases vary significantly with the geographical, political and economic (World Health Organization, 2012).

2.2.2 Relating hand washing with soap to reduction of diarrhea cases.

Some measures that can prevent diarrhoea diseases from spreading have been mentioned by other studies include; proper use of water, washing hands, disposal human waste properly, vaccinations and taking the recommended nutrition's (Jailson et al., 2010). To execute these strategies, the locals must be educated about appropriate practices and utilize the community health workers. Communities must understand the correlation between hand washing with soap and diarrhea, they should be educated on how to store water in safe conditions and the water should be well treated before storage.

2.2.3 Determining the effect of household water storage on reported diarrhea cases

Social, economic, environmental factors and individual behaviors are the main causes. Malnutrition and inadequate drinking water and poor sanitation conditions.

From the healthcare reports, Pneumonia is the major cause of under-five years' children death across the world. This is followed by diarrhoea. Children under the age of one year

experience severe diarrhoea which in most cases end up being fatal. This results from feeding the unsafe water drink and substitutes to breast milk are prepared using unsafe water, that is stored in unhygienic conditions. Apart from diarrhoea, malnutrition is also another cause of high child morbidity. Malnutrition lead to underweight and stunt in growth of children. One of the major virus that lead to acute diarrhoea is rotavirus that accounts for 40% of the diarrhoea episodes that lead to hospital admission in most countries. Report from WHO indicate Somalia as one of the most affected nation in relation to death rates which are caused by rotavirus (Somalia Health Cluster, 2009).

2.2.4 Determining the reasons for use of different water treatment options at the household level.

The major health benefit for improved water supply, are a result of increased water quality which limits the ingestion of virus. Availability of the right quantity of water encourages hand washing, food cleaning and household cleaning in general. People with adequate water have better health than those which use inadequate water. This has been commonly validated by some health outcomes such as specific diarrhoea pathogens, diarrhoea morbidity and child growth (USAID, 1999). Although there have been wide range discussions about the primary importance of WASH in guarding and improving health, minimum water required for domestic water supply have not been achieved yet (WHO, 2009). However, some organizations have advocated that the minimum quantity should range between 20 and 40 litres per capita on daily basis for domestic use if health progressions have be achieved and sustained. Another frequently quoted publication by (Peter Gleick, 1996) posits that the minimum should be 50 litres per capita per day. Water is used for a wide range of activities some which are more important than others. For instance, having water to drink is more important than water to wash clothes. However, the clothes have to be cleaned for skin diseases to be avoided (Reed, 2010).

Also, it is important to note that people's necessities are not always foreseeable, for instance, some people will value water to wash hands and feet before prayer more than cleaning their clothes. Different genders have different priorities, that is, women may value water for the basic household needs, men may value water for their livestock, girls may require water to bath during menstrual and boys for swimming. Other factors to be considered when evaluating water needs are waste involved, spillage and leaks. In addition, water use varies depending with the season and climatic conditions (Reed, 2010).

Various uses of water also determine the source of water. Use of water varies and therefore if water is not for human consumption the quality may be a little lower. For instance, water used for livestock or domestic hygiene may be untreated and that to grow food may be recycled. For that reason it may be advisable to arrange for other sources in a community for the various uses. People tend to adjust their needs depending with the availability of supply. Even if water available is adequate, there are may be other restrictions to its use such as time spent by both children and women to fetch it.

2.2.5 Water, Sanitation and Hygiene (WASH) and Diarrhea Episodes

Improper sanitary settings and access to water that is not safe for human consumption are also major factors contributing to child morbidity and under-five mortality. These two factors are second from malnutrition in determining disease burden. Poor sanitary practices and poor hygiene, for instance, locals who defecate in the open and fail to wash their hands with detox and water have more influence on health outcomes. Almost 90% of the 90% of children deaths as a result to diarrhoea are believed to be as a result of poor sanitation and hygiene or unsafe water. Washing hands with soap has the potential to reduce diarrhoea infections by 40% (Fewtrell et al. 2005).

Accessibility of safe drinking water very crucial and by drinking clean water it expected that mortality of children under-five years would reduce with 350,000 deaths per annum by preventing diarrhoea (Marino, 2007). Unsafe water and poor sanitary practices are major contributors of intestinal problems and schistosomiasis. In most cases, it is the young children that are susceptible to diarrhoea infections and therefore get infected due to poor sanitary conditions and contaminated water. Persistent diarrhoea is greatly experienced during infancy. Infection from the intestine parasites also contribute highly to malnutrition. As a result, there are no significant association between lack of enough water, sanitation, hygiene (WASH) practices and malnutrition.

The recent campaigns that have been going on child health have recommended supplemental interventions to confront this challenge. Some of the recommended precautions include taking repeated doses of albendazole in every six month for deworming purposes. Aqua tabs are also recommended to purify water. However, in Somalia, access to safe water and improper sanitary practices and failure to wash hands with soap substandard. A report by UNICEF MICS 2006 indicated that only 29% of the population around the world access to safe drinking water (UNICEF MICS, 2006). Majority of the 29% population accessing safe

water reside in urban areas. In the rural areas, the figure of the population accessing clean water is at 11% and in most cases they get from surface water from untreated wells. Water treatment at the household level have not been fully adopted as only 16% of the households adopts the right way to treat their water through boiling, chlorination, filtering and solar disinfection. The households that access improved water source or treat their water appropriately are the families with people who are educated and financially stable and these families mainly reside in urban areas. A study by MICS in year 2006 in Somalia found that 39% of the families that participated in this study had an improved water source located within their premises; 38% of these families resided in urban areas and only 1% of the households resided in upcountry. The other families spent around 70 minutes on average to fetch water. In relation to sanitary facilities, 37% of the families accessed an improved latrine or flush toilets which were connected to a sewage system (UNICEF MICS, 2006).

2.3 THEORETICAL FRAMEWORK

2.3.1 Structural Functionalist Theory

Structural Functional Theory was founded on the work of Herbert Spencer and Robert Merton. Both scholars structural-functional tactic saw society as a complicated arrangement whose parts that functions simultaneously to facilitate togetherness and constancy. The theory posits that our lives are steered by social structures that are primarily established patterns of social behaviour. Social structures give shape to our lives- for instance, in family set up, the community and through religious groups. Definite rituals such as handshake or complicated religious ceremonials give the arrangement of our day-to-day lives.

According to Fletcher (1971) functionalism has proved to be of importance in sociological theory in the recent past. However, from the existing literature, functionalism has not undergone comprehensive discussion and also many criticisms have been met. It seems worthwhile, then to review the development and assessment of its achievement. Functionalism has been established as an exceedingly old in that its conventions are implied in basically all the earlier attempts to think systematically about human society. Functionalism have however been discussed extensively in Plato's work. Also, they are also present in Hegel's work on concept of totality of state and inter-relation with its parts. Further, Taclott Parsons discussed structural-functionalism theory and indicated that the beginning of functionalism as a formal theory and method in socio-logy. The scholars note that structural functionalism theory is grounded on the perceptions of the cause, influence and the condition required. The social systems within societies or communities consist of the interaction of the individuals.

Functionalism takes every dimension of the society in relation to how it plays part to the stability of the society at large and each part plays an important role. However, it is important to note that none of the part can work on its own. In relation to functionalist theory, the various dimensions of the society are predominantly made of social institutions, each which is aimed to fill various needs and each other which engulf specific impact for the form and shape of the society. According to the functionalism an establishment only occurs as it plays an important role in the running of a society. When new needs come up, new institutions will be established to meet the needs.

It is important to note that each social arrangement has social functions or effects for the running of a society at large. Formal education, for instance, has various significant functions in a society, such as interacting, learning and social settlement. Water Sanitation and Hygiene intervention's also play an important part in health of Somali children, to achieve a free from disease Somali Children. There must be a fit clean environment for children to live and play in, free from fecal contamination and clean drinking water. Hospitals alone cannot achieve a health society, attitudes and perceptions must be changed through handwashing with soap and open defecation free. There can never be growth and development in a dirty environment; children must be free of diseases for school attendance to go high. Amount of money spent treating children and time wasted by care givers taking care of sick children affects economic growth.

One of the ways to understand if WASH activities are impacting positively is to look at prevalence of diarrhoea cases in CSZ.

2.3.2 Behavioural Theory

The theory sought to clarify human behaviour by assessing the antecedents and implications existing in the individuals surrounding and the acquired associations acquired through experience. This includes; all the behaviors attained through conditioning. In this case, the conditioning takes place through association with the environment. Behaviorists consider that our reactions to environmental inducements outline our engagements.

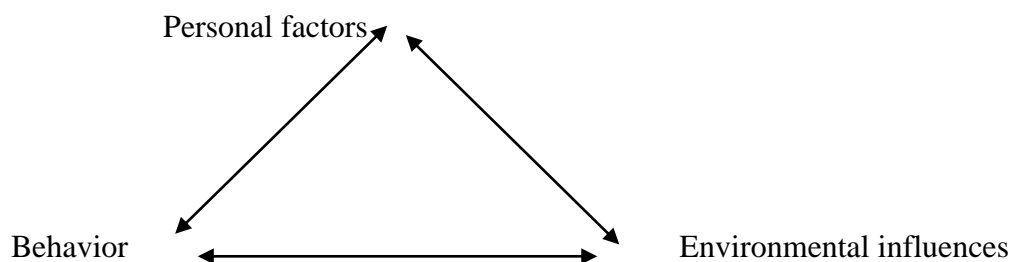
However, it is important to note that behaviourism theory in most cases considered as a problematic theoretical alignment in sociology. Social behaviourism as it is discussed in different customs of interactionism is basically a behaviourist argument, that is, the rational and behavioural dimensions of human beings for using conservative gestures for intent actions , for self-reflection and role taking. Human beings possess fundamental needs for social cooperation and that as a consequence, those behavioural facilities that facilitate cooperation.

It is expected that intents will apprehend motivational aspects that affect behaviour, following that an intention is a sign both how the affected person is willing to put in work and the effort an individual is willing to put in place in order to achieve the behaviour. However, the behaviour must be under an individual's total control or will decide whether or not to do the behaviour. On the other hand, a normative certainty is an individual's discernment of social normative pressures or important others, for instance, a partner or a child. The particular

custom is an individual's own view of a particular behaviour and the strength of motivation to fulfil or to adapt with relevant other views.

Human beings surrounding greatly influence how they perceive life and what they learn in life impact on their wellbeing including their health. Learning handwashing techniques and handling baby faeces is a life changing behaviour circle. Take for example a real-life experience I have had with my 2-year-old son, he knows he is supposed to wash his hands with soap before eating. He has learnt it from me and I have passed it down to him that handwashing with soap is the only way and no other way and this conditioning has registered in his mind.

Hygiene promoters work through out the clock to teach communities the essence of handwashing that will enable kick diarrhoea out of their lives and make children live healthy lives



Behavioral skills are reflections of what a person has learnt in life either from observing or from being taught and motivation to act and prevent occurrences like diarrhea episodes. Behavior is acquired through stimulus and response, by showing a breastfeeding mother, how important is it for her to wash hands before breastfeeding and after handling baby faeces. Is not enough to make her change her habit, you need to further explain how it will save on her time to go to hospital for treatment and how much money she will save and use it for family food, instead of treatment and medication. Because learning happens when we process information provided to us and relates it to real life experiences and make our own judgement on what is best for us.

2.4 CONCEPTUAL FRAMEWORK

2.4.1 Conceptual Framework for Diarrhea Diseases

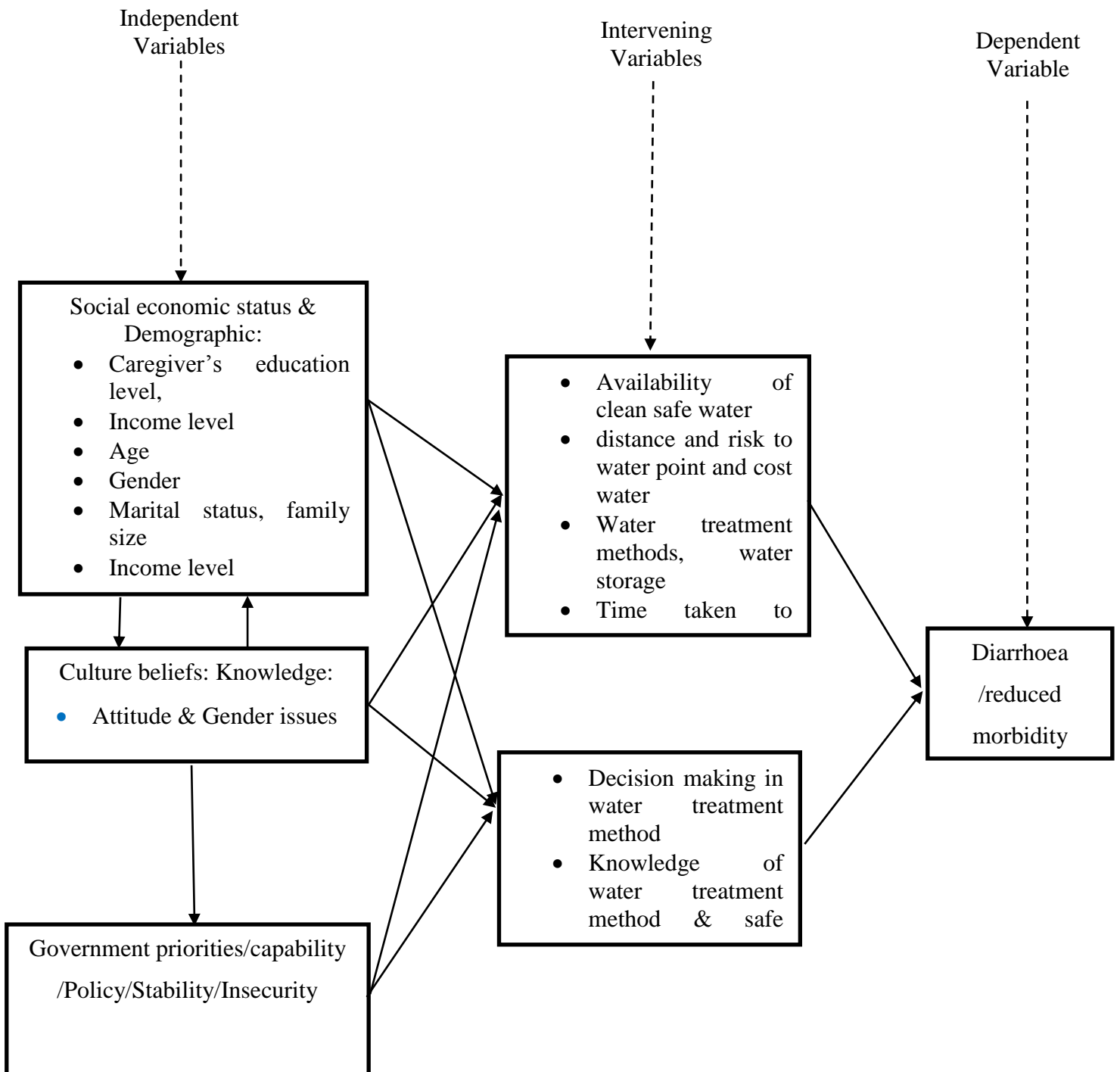
Diarrhea occurrence is subjective to the interaction of many risk aspects. Among them are:

- a) **Social economic status:** They include the mother's (care giver) level of education, their marital status and income in the household's levels.
- b) **Cultural beliefs:** These factors include knowledge attitude and gender issues.
- c) **Government policy and priorities:** These factors include government putting in place policies in the ministry of water to strengthen water systems.
- d) **Demographic factors:** These factors include age and gender of the child's

This conceptual structure is a representation which has drawn familiarities from known factors contributing to diarrhoea in children under 5 years. This structure has acknowledged probable contributors for under five diarrhoea. They include, poor household water treatment and safe storage, sources of water and distance to source of water, caregiver's education level and awareness on the availability and use of different water treatment methods, seasons and cost of buying. Poor hygiene practices of not washing hands after cleaning baby's feaces as they are other demanding need like cooking. Who actually fetches the water and risk associated with it, boy or girl and decision maker in water treatment? All this are classified as intervening variables as they provide a causal link between the dependent and independent variables.

Diarrhoea is the dependent variable and clean safe drinking water is the independent variables as failure to achieve high standard treated safe clean water will lead to diarrhoea related cases.

Figure 2.2: Conceptual framework of Independent and Intervening factors in reduced Morbidity



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that was employed in data collection and analysis for this study. This chapter covers site description, research design, target population and sampling design, unit of observation and analysis, sample size and sampling procedure type and sources of data, ethical considerations, description of data collection instruments to be used and analysis of data collected.

3.2 Site Description

Central South Somalia the site of the study stretches mostly along the Indian Ocean coastal line and river Juba and Shebelle running through it.

The areas around the rivers are fertile and they are termed as “the bread-basket of Somalia.” However most of the land is semi-arid and arid as rainfall is sparse. Administratively CSZ is under the Federal Government with Mogadishu as the central administrative unit. It has 10 regions in total, with about 58% of the Somalia population. The regions include Galgaduud, Hiraan, Middle Shabelle, Benadir, Lower Shabelle, Bay, Bakool, Gedo, Middle Juba, and Lower Juba. With population estimates of 756,710 (UNFPA, 2012)

Table 3.1: Distribution of population according to Regions and Type of Residence.

Region	Type of Residence			Percentages %	
	Urban	Rural	Total	Urban	Rural
Galgaduud	29,745	7,855	37,600	79.1	20.9
Hiraan	13,254	27,092	40,346	32.9	67.1
Middle Shabelle	13,446	50,099	63,545	21.2	78.8
Banadir	187,246	-	187,246	100.0	0.0
Lower Shabelle	31,439	97,619	129,058	24.4	75.6
Bay	19,527	88,847	108,374	18.0	82.0
Bakool	9,417	20,597	30,014	31.4	68.6
Gedo	16,881	30,522	47,403	35.6	64.4
Middle Juba	14,174	38,106	52,280	27.1	72.9
Lower Juba	30,520	30,324	60,844	50.2	49.8
Sub-Total	365,649	391,061	756,710		

(UNFPA, 2012)

Somali experiences hot weather all through the year. However, some elevated regions such as those in the north of the country and along the Indian Ocean coast experience moderate weather; they have average maximum temperatures, that is, 30° to 40° C. The average lowest temperatures experienced in the Country are from 20° C to more than 30° C.

Further, it is important to note that Somalia experiences two wet seasons, that is, from April to June and in the months of October to November. However, the region experiences unreliable rainfall. The locals recognise four seasons locally known as gu and day which are rainy seasons and the dry seasons also known as jiilaal and haggaa. The gu rainy season begins in April and lasts up to June. A dry season follows (haggaa) and lasts from July to September. Haggaa seasons runs from October to November. Finally, the locals experience Jiilaal season which runs from December to March.

In Mogadishu, the country has a huge seaport and Aden Adde International Airport. The city of Mogadishu also hosts huge markets which include the famous cattle market (Suuqa Holaha) in Heliwa district. Here, the locals survive on trade of various goods, fisheries and production of traditional cloth locally known as alindi. Another sector that has been doing well is the service sector. Firms in money exchange and money transfer have been flourishing. Other firms with high performs in the service industry are the ones dealing with telecommunication and internet provision. Also, Bakara market which is located in Mogadishu provides varieties from food, machinery, medicines, gold and modern technological devices.

3.3 Research Design

Research design is termed as the general approach that one chooses to assimilate the various modules of the study in a comprehensible and logical way, thereby ensuring that one successfully addresses the research problem; it entails the outline for the collection measurement and data analysis. It is important to note that the research problem determines the research design to adopt when undertaking the study.

3.4 Units of Analysis and Unit of Observation

The unit of analysis is the precise social entity about which data was gathered and empirical claims made while the unit of observation is the unit on which one collects data (Hoyle, Harris & Judd, 2002). Thus, the unit of analysis in this research was access to safe drinking water in curbing morbidity which results from diarrhoea prevalence.

The units of observation were largely the caregivers aged above 18 years and the key informants who included heads of community-based organizations (CBOs), International NGOs, Local NGOs and Government officials.

3.5 Target Population

Target population is understood as the large population from which a sample is selected. With this understanding, a sample can be seen as a small proportion of a population that is selected for observation and analysis (Brinker, 1988). This study targeted caregivers above the age of 18 years. Target population was grouped into rural and urban populations at the household level. This figure is based on the population estimates by UNFPA (2012). The distribution of rural and urban population in the ten regions of South Central Somalia in Table 3.1

3.6 Sample Size and Sampling Procedure

A sample is the sub-set of the population from whom the data will be collected to enable a researcher gain a basis for generalizations (Nachmias & Nachmias 1995). In this regard a single member of the sampling population is referred to as a sampling unit. Since it is from this sample that the researcher generalized, it became vital for the researcher to select a sample size carefully to ensure representativeness.

Systematic random sampling was used to select the household where responses filled in the questionnaire. As shown in Table 3.2, a sample size of 200 was selected and proportionately distributed between rural and urban areas to reflect the regional distribution in central south Somalia whose actual population distribution was shown earlier in table 3.1. From a central place in each region and in both rural and urban areas, households were sampled in each of the four directions of the compass. In each direction every 5th household was selected until the required number of households was reached. To execute this work, the researcher was assisted by 10 research assistants, whom the researcher had trained and were conversant with the study instruments.

Table 3.2: Distribution of sample by region

Region	Urban	Rural	Sample
Galgaduud	7	3	11
Hiraan	4	7	11
Middle Shabelle	5	12	17
Banadir	46	-	46
Lower Shabelle	10	23	33
Bay	5	22	27
Bakool	5	3	8
Gedo	7	8	14
Middle Juba	4	11	15
Lower Juba	10	8	18
Total	103	97	200

3.7 Methods of Data Collection.

The instrument of data collection integrated both questionnaire and interviews to ensure efficiency and effectiveness of the data collected. Research Somali speaking assistants, who assisted in data collection, were trained and simulation data collection exercise conducted just to ensure that they understood, what they needed to do. The help of research assistant was critical in ensuring that the researcher was able to understand what the respondents were saying. Without them the exercise would not have been fruitful.

3.7.1 Collection of Quantitative Data

The questionnaire was structured face to face, with measurable responses that answer, ‘how many’ and ‘to what extend’. The questionnaire had several parts on sources of water, who fetches water, how long it takes to get water, how much water is available in wet and dry seasons, risks associated with fetching water, water collection methods, water storage method, quantity of water used in a day, quantity of water, water treatment and how often under five children use the treated water, other uses of treated water, familiarity of population with water treatment methods, how important is treating drinking water, Who in the household makes the final decision to purchase water treatment products ,how many times you and children under five take a bath and do you use clean water, if under 5 in your household has suffered from some of the symptoms, monthly income level. Direct observations used as a means to validate claims made by respondents in a checklist on the house hold survey.

3.7.2 Collection of Qualitative Data

Key informant guide was used to provide insight on communities' behaviour with regards to the water sector. In addition, focus group discussions (FGDs) was used to provide deeper understanding to motivation behind water practices. They helped probe participants in the discussions to understand the feelings, values, customs and perceptions that underlie and influence behaviour.

3.8 Ethical Considerations

There were ethics considerations that had to be adhered to, in respecting the respondent's feelings and view's especially women, if they wanted to be interviewed, privately far away from men.

3.9 Data Analysis and Presentation

At the completion of data collection, quantitative data was analysed using SPSS and results presented in form of tables and figures. Qualitative data was coded thematically and used to help in explaining results of quantitative analysis.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The results of the study were outlined in this chapter. This was done based on the objectives presented in chapter one. The researcher used tables, bar graphs and pie charts to present the data. This chapter also, includes a discussion and interpretation of the findings of the study. The study set out to determine the effects of WASH conditions in curbing diarrhoea incidents among children below 5 years of age in Central South Somalia.

4.2 Response Rate

The study sampled 200 households in Central South Somalia and key informants who were health professionals from community-based organizations, non-governmental organizations and ministry of health officials in Central South Somalia. The response rate percentage was 100% and this is shown in the table below.

Table 4.1: Response Rate

Sample Category	Expected Responses	Actual Responses	Percentage
Rural	97	97	100
Urban	103	103	100
Total	200	200	100

Source: Survey Data

4.3 Socio-Demographic Characteristics of Caretakers of Under Five Children

Social demographic characteristics were examined because they have implications for provision of Water services.

4.3.1 Age Distribution

Most of the respondents fall in between 18 to 50 years and above and majority being young generation, as shown in table 4.2 below majority of the respondents are between 26 and 35 years (active child bearing age) in both rural and urban and their influence if fully engaged in community participation and decision making of most of the water projects could have a strong impact felt in terms of positive results. This age is an energetic age if given adequate training and awareness made to them in water treatment maintenance, when water pumps fittings and solar panels breakdown, they will repair and fit themselves and hence no period where communities are left without water for a longer period of time. Reducing the risks of exposing them to diarrhoea disease.

Empowering the active age group is bridge to curbing diarrhoea, when trained they still have more years ahead and would like a good life for themselves and their children and will do everything possible to achieve a healthy lifestyle if they fully understand what it means to drink clean safe treated water available only in safe water sources that are well maintained and managed.

Table 4.2: Age distribution by type of residence

Age (years)	Type of residence				Total	
	Rural		Urban		Frequency	%
	Frequency	Percent	Frequency	Percent		
18 - 25 Years	23	23.7	15	14.6	38	23.8
26- 35 Years	24	24.7	36	35	60	24.9
36- 45 Years	23	23.7	22	21.4	45	23.8
46-50 Years	16	16.5	19	18.4	35	16.6
50 + Years	11	11.4	11	10.7	22	11.5
Total	97	100	103	100	200	100

4.3.2 Distribution of Respondents' Gender

Table 4.3 shows that majority of respondents 51% in both rural and urban areas are women, as much as women are the majority in number, they rarely make decisions on their own without their husbands. If they are empowered to make decisions on their own, a great impact of diarrhoea reduction will be felt because they are the majority, they will make decisions on type of water treatment to be used. If they are freer to talk, they will engage each other when chatting on how water is affecting their lives, they will talk about.

Table 4.3: Respondents' gender by type of residence

Gender	Type of Residence				Total	
	Rural		Urban		Frequency	Percent (%)
	Frequency	Percent (%)	Frequency	Percent (%)		
Female	50	51.5	53	51.5	103	51.5
Male	47	48.5	50	48.5	97	48.5
Total	97	100	103	100	200	100

4.3.3 Distribution of Respondents' by Marital Status

This is a predominant Muslim community whereby divorce is only a solution after all other means to reconciliation have failed people in rural areas tend to stay in marriage longer in urban areas, because of limited exposure to human rights women education. In this area of study it was found that 67% are married in rural areas and 59 % in urban areas. The findings are as shown in Table 4.4.

Table 4.4: Respondents' marital status by type of residence

Marital Status	Type of residence				Total	
	Rural		Urban		Frequency	Percentage
	Frequency	Percentage	Frequency	Percentage		
Married/ Living Together	65	67	61	59.3	126	67
Single/ Not Married	20	20.6	23	22.3	43	21
Separated/Divorced/Widowed	10	10.3	14	13.6	24	10
No Answers	2	2.1	5	4.8	7	2
Total	97	100	103	100	200	100

4.3.4 Distribution of Respondent's by Income Level

A good number of respondents have no income generation in both rural and urban areas, as shown on Table 4.5 this may have resulted to poor sanitation whereby caregivers cannot afford extra amount water for handwashing, other than cooking which they feel is important, but no water is put aside for handwashing before food. Majority fall below world bank threshold of less than USD.1.9 a day, which raises many questions and reasons why inaccessibility to safe drinking water a hygienic condition is still a dream far beyond to be achieved.

Table 4.5: Respondent's income level by type of residence

Income Level	Type of residence				Total	
	Rural		Urban			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Below USD 10	18	18.6	19	18.4	37	18.7
USD 10-50	19	19.6	21	20.3	40	19.7
USD 51-100	13	13.4	15	14.6	28	13.5
USD 101-200	8	8.2	18	17.5	26	8.3
USD 201-400	7	7.2	8	7.8	15	7.2
USD 401-600	0	0	1	1	1	0.01
None/ No Income	32	33	21	20.4	53	33.1
Total	97	100	103	100	200	100

4.3.5 Caregiver Level of Education

Somalia is predominantly Muslim society and Islamic studies are much valued, hence explaining why most of respondents have no formal education but have attended madrassa. Table 4.6 shows that literacy level is still very low. Most of the respondent in rural areas (40%) have attended only madrassa as compared to urban areas with formal education and have either attained university education or completed secondary school. The table shows that 29% in urban areas have completed secondary education as opposed to 2 % in rural areas. Hence this shows most of the decision makers have no formal education in rural areas, resulting in diarrhoea cases due to lack knowledge

Table 4.6: Distribution by level of education by type of residence

Education Level	Type of residence				Total	
	Rural		Urban			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
None	34	35			34	17.5
Madrassa	39	40			39	20
Part Primary	19	20			19	10
Completed Primary	3	3			3	1.5
Part Secondary	2	2			2	1
Part Secondary			16	16	16	8
Completed Secondary			30	29	30	4.5
Part college			28	27	28	13.5
Completed College			14	14	14	7
Part University			8	8	8	4
Completed University			5	5	5	2.5
Post graduate			2	2	2	1
Total	97	100	103	100	200	100

4.3.6 Size of Family Members

Number of children in Somali community is an important factor and children are considered blessings, Table 4.7 shows that the family size of the respondents is big for a middle-income earner to maintain and sustain. This shows that the majority of the respondents with smallest family members had 5 members at most. This shows that the caregivers of these families found it difficult to sustain their families with clean safe water for consumption. Therefore, the study asserts that the due to large size family members in South Central Somalia, the access of clean water was limited hence there was increase in diarrhoea cases.

Table 4.7: Distribution by family size by type of residence

Family Members	Type of residence				Total	
	Rural Area		Urban Area			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent
1-5 Members	5	5.2	11	10.7	21	10
6-10 Members	37	38.1	39	37.9	76	38
More than 10 Members	45	46.4	48	46.6	93	47
Other Extended	10	10.3	11	10.7	21	10
Total	97	100	103	100	200	100

4.4 Childhood Diarrhoea Prevalence

4.4.1 Prevalence of reported diarrhoea among under five-year age children in Central South Somalia.

Number of children under 5 years served in the last two weeks of data collection with acute diarrhoea over the total children in community was very high in both rural and urban. Bloody diarrhoea being high in rural with 27.8% against urban 17.5%. To achieve clean water and sanitation goal number 6 which will ensure healthy lives and wellbeing for all, goal number 3 that states that there is need to invest more in water services by the development world and government.

Key informants are well aware about the dangers associated with drinking water that is not safe and clean. Medical officers noted that under five years children get diarrhoea especially during the rainy season when dirt mix with drinking water, hence people should keep the environment safe including open defecation free environment to avoid infections. Community based organizational officer notes;

“During the rainy seasons there are high risks of diarrhoea so the people should be asked to take care of the environment to avoid dirt getting in contact with water.

Children also like playing in stagnant water exposing them to risks of drinking the contaminated water and contracting diarrhoea. According to Health Officer, Baidoa, SCZ;

“Drinking of dirty water and stagnant water that should be treated, children playing in areas where there is stagnant water hence improving on this.

In general childhood diarrhoea in the area of study indicate a consistent decrease over the last year suggesting increase in quality water services according to health sector key informants.

The results showed rural areas seems to be much more affected than urban areas, hence need to increase clean safe water services in this area. Water sources are not adequate to cater for the whole population, leaving caregivers to scamp for the little available water resources, sometimes bring in conflict. The water sources are not well protected exposing them to contamination easily. As the distance to the water point increases, sometimes three to four kilometres people are forced to use alternative sources that are not safe, considering the fact that female caregivers are the majority and due to insecurity in the region when the distance becomes too long it exposes them to dangers like rape. An official from the Ministry of Health notes;

“Mostly those who fetch water in the Somali community are women. When the source of water is far they might face numerous dangers including rape”

When children are left for longer period by caregivers most under a watchful eye of fellow children, during this period the parents are away, they end up playing in dirt or eating dirt, exposing them to diarrhoea, as shown in Table 4.8

Table 4.8: Under five diarrhoea incidence and prevalence by type of residence

Diarrhea type	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Watery diarrhea	70	72.2	85	82.5	155	72.6
Bloody diarrhea	27	27.8	18	17.5	45	27.8
Total	97	100	103	100	200	100

4.4.2 Improved Water Sources

Due to good infrastructure and less security concerns urban areas tend to benefit more in terms of water accessibility. Table 4.8 shows that urban areas have more access to piped water than rural. It is evident from the results that majority of the locals’ access unsafe water sources, with only 45.6% having access to protected water sources. In rural areas the study established that that only 44.3% had protected well water leaving the rest exposed to germs and bacteria. This causes diarrhoea incidence in rural areas to be on the rise as compared to urban, who have more access to safe clean water. Hence need to increase access to improved water sources.

Table 4.9: Improved Water Sources by Type of Residence

As represented in table 4.9 below there is no much difference in rural urban safe water sources, but coverage of piped water needs to be increased to realise safe drinking water for under five children with 28.9 % and 27 % of piped water in Rural urban respectively.

Water Sources	Type of residence				Total	
	Rural		Urban			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Piped water	28	28.9	28	27	56	27
Protected well	43	44.3	47	45.6	90	46
Tube well/Borehole	16	16.5	18	17.5	34	17
Truck /Cart	10	10.3	10	9.7	20	10

Total	97	100	103	200	200	100
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4.4.3 Distance to the Water Point

In rural areas water points are scattered at different distances depending on the terrain of the areas, those around river Shebelle and Juba are closer to water points. Table 4.10 shows that majority of the respondents suffered from water scarcity due to the increased length on accessing the water. This therefore inhibits the locals from accessing clean water for consumption therefore exposing them to diarrhoea. Due to poor infrastructure and limited access to water sanitation, respondents therefore opted for consumption of unfit water hence increasing the rate morbidity. Urban areas accessibility is better that rural with 39.8% walking for less than 15 minutes, while 32% in rural areas walking for at least an hour to get clean safe water for drinking.

Table 4.10: Walking distance to water point by type of residence

Distance to water point	Type of residence				Total	
	Rural Area		Urban Areas		Frequency	Percent %
	Frequency	Percent %	Frequency	Percent %		
Less than 15 minutes	21	21.6	41	39.8	62	22
15-30 Minutes	26	26.8	21	20.4	47	27
31 Minutes- 1 Hour	31	32	10	9.7	41	32
1-2 Hours	11	11.3	4	3.9	15	11
2-4 Hours	3	3.1	1	1	4	3
4-6 Hours	2	2.1	1	1	5	2
Don't Know	3	3.1	25	24	28	3
Total	97	100	103	100	200	100

4.4.4 Everyday Average Water Usage

Livestock keeping is the main livelihood of Somali community with camels and goats being the main domestic animals. Table 4.11 shows that much water is used for livestock consumption in rural 26.8 % than it is used for drinking. With only 19.4 % used for livestock in urban areas. This should inform the government to build more borehole in rural areas to help cater for livestock so that human consumption has access to safe drinking water than when they are scampering for what is left after their animals have drank. Majority of caregivers being nomads, they will give priority to their animals and forget the under 5 children if they don't have access to enough water for livestock.

Table 4.11: Water usage by type of residence

Water usage	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Drinking	14	14.4	13	12.6	27	14.4
Cooking	12	12.4	14	13.6	26	12.4
Cleaning	14	14.4	15	14.6	29	14.3
Laundry	18	18.6	24	23.3	42	18.7
Bathing	13	13.4	17	16.5	30	13.4
Livestock	26	26.8	20	19.4	46	26.8
Total	97	100	103	100	200	100

4.5 Relating Hand Washing with Soap to Reduction of Diarrhoea Cases.

Clean hands means a free diarrhoea population, As shown in Table 4.12, urban areas have access to soap 40% more than rural areas 22% , the reason why they wash their hands with soap mostly. A medical officer working in the area notes;

“No they don’t have soaps only those who stay in town centre have soap they don’t also use the soap to wash their hands, it’s very difficult for other to buy the soap. They can’t afford or buy washing powder, washing soaps”

Table 4.12: Hand washing after defecation by type of residence

Hand Washing	Type of residence				Total	
	Rural		Urban			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Water Only	37	38	27	26	64	38
Water + Soap	21	22	41	40	62	22
Other	39	40	35	34	74	40
Total	97	100	103	100	200	100

Children use plastic container as toilet and the stool is discarded in the latrine. They don’t use the latrine directly as a result their hands and that of care givers are infected with faeces. After handling the baby faeces most of them wash their hands with water only without soap, hence increasing risk of diarrhoea infections. Mostly they use soap for bathing. Handwashing is also practised along religious guideline before praying. Key informant from ministry of health indicated that people have soap from non-governmental organizations but few of them use it due to lack of knowledge. A youth group leader indicated that there is a misconception

that soap is used for bathing not handwashing, therefore those with soap mostly use it for other activities like laundry. A Youth Group Leader indicates;

“They use soap for bathing (laughter) but not meant for hand washing.

Women wash more than men because they do most of household chores, but mostly they wash their hands with water only. Lack of knowledge of the importance of water and water is the main reason for not using it. A hand washing facility need to be placed near the toilet to encourage handwashing, when its far people do not remember to wash their hands they go away and continue with other things they were doing before going to the toilet.

4.5.1 Occasions When Hand Washing is Practiced

The five critical times during which hands washing with soap is important to reduce fecal-oral transmission of diseases as listed in Table 4.13 as conducted in the study. Many respondents washed their hands after defecation in both rural 33% and urban 34% but rarely after wiping baby’s feaces and before feeding the baby, which affected diarrhoea control circle whereby contamination continued to occur in the process of handling the baby.

Table 4.13: Occasions when hand washing is practiced

Hand Wash	Rural Areas		Urban Areas		Total	
	Frequency	%	Frequency	%	Frequency	%
After defecation	32	33	35	34	67	34
Before eating	28	29	31	30.1	59	30
Before feeding child	13	13.4	13	12.6	26	13
Before breastfeeding	8	8.2	7	6.8	15	7
Before handling food	8	8.2	9	9	17	9
After wiping a baby’s bottom	8	8.2	7	6.8	15	7
Total	97	100	103	100	200	100

4.5.2 Areas Where Handwashing is Done

The nearer the handwashing station the easier people will wash hands, if the station is far from toilet most likely majority of population will miss washing their hands after defecation. As shown on Table 4.14, handwashing areas is very important, because it will determine whether someone washes their hands after defecating if a handwashing station is placed right outside the toilet than when inside the house, they tend to forget and touch baby’s food when they came back to the house before washing house. On this note a handwashing station should be always outside the toilet, together with soap to kill the germs causing diarrhoea. In

urban areas 11.6 % have a handwashing station inside or near toilet as compared to rural with only 5.2 %.

Table 4.14: Handwashing Areas by Type of Residence

Hand wash area	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	%	Frequency	%	Frequency	%
Sink in the house	6	6.2	17	16.5	23	6.2
Sink outside the house	7	7.2	6	5.8	13	7.2
Designated washing area inside house	3	3.1	6	5.8	9	3.1
Designated washing area outside house	3	3.1	5	4.9	8	3.1
Inside or near a latrine/Toilet	5	5.2	12	11.6	17	5.3
At the water source	10	10.3	10	9.7	20	10.3
Anywhere inside house	35	36	36	35	71	36.2
Anywhere outside house	28	28.9	11	10.7	39	29
Total	97	100	103	100	200	100

4.6 Effect of Household Water Storage on Reported Diarrhoea Cases.

Plastic Containers which are the majorly used are cleaned but not well cleaned to required standards. Some don't even have storage containers and even containers to fetch water from, because they cannot afford. People use drums that are rusted inside, mostly fuel drums that cannot be cleaned easily because they are closed.

As shown in table 4.15, majority of the respondents 59.8% in rural and 72.8 % in urban of population are storing treated water in safe storage containers that were covered with tight fitting lid. This means more than half the population have safe storage containers, but coverage need to be increased to cover more population. Water quality and water availability the main epicenter of diarrhoea prevention lies in type of container that water is stored in, what condition the container is, is it clean or dirty and rusted, is it available to fetch water. If a container is not available in a home, there will be no water for treating and drinking, sanitation conditions will be pathetic. It was also noted from key informant, programme officer of a CSO, that;

“They do not mostly wash the containers and are not to the required standard as I said before”,

Most of the time jerrycans are supplied to caregivers with a covered lid, but no one emphasizes to them that the containers need to be cleaned satisfactorily. What is taught to them is only to always cover the container and make sure water is treated before consumption, but no one mentions cleaning. It is assumed that they know how to clean these containers, which is a big misconception that should be seriously addressed in order to achieve effective results. A clinical officer noted that;

“Jerrycan’s that cannot be cleaned easily because they are closed, so there are many reasons why I may say it cannot be trusted with the water”

This also opens up a big debate on the kind of containers supplied by relief organization; it is an eye opener to start thinking of the shape of the container, to my thinking it should be wide open enough to enable easy cleaning as compared to the closed small mount ones. There was also a concern that when this plastic jerrycans are heated by the sun, the heat combined with plastic is not healthy, this misconception also needs to be addressed to increase jerry can coverage.

Table 4.15: Storage Container by type of residence

Storage Container	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Plastic Jerri Can	58	59.8	75	72.8	133	60.2
Metal Jerri Can	26	26.8	13	12.6	39	26.9
Clay Pot	4	4.1	1	1	5	4.1
Cement Container	2	2.1	2	1.9	4	2.1
Plastic Containers/Bottle	1	1	4	3.9	5	1
Plastic Tank	3	3.1	5	4.9	8	3.1
Cement/Stone Wall Tank	0	0	1	1	1	
Water Catchment/Dam	1	1	0	0	1	1
Don't Store	2	2	2	2	4	2
Total	97	100	103	100	200	100%

4.6.1 Quality of Stored Drinking Water

Satisfaction rate can tell us the impact of the type of storage containers used, As per Table 4.16, majority of respondents' in rural areas 10.3% were very unsatisfied with their storage containers as compared to those in urban areas 7.8% unsatisfied and 17.5% very satisfied. The findings also show that the urban respondents were very satisfied in storing drinking water as compared to the rural respondents.

Table 4.16: Satisfaction on Stored Drinking Water by type of residence

Satisfaction	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Very Unsatisfied	10	10.3	8	7.8	18	10
Unsatisfied	22	22.7	14	13.6	36	23
Neither Unsatisfied/Satisfied	11	11.3	19	18.4	30	11
Satisfied	38	39.2	44	42.7	82	39
Very Satisfied	16	16.5	18	17.5	34	17
Total	97	100	103	100	200	100%

4.7 Reasons for Use of Different Water Treatment Options at the Household Level.

There is belief that chemicals used in treating water are harmful to one's productivity and due to poverty cost is another issue in rural areas. Water treatment is mostly available in urban Centre's but limited in rural areas, aqua tabs and chlorine are mostly used, although a small population still boils water for drinking. Aqua tab seems to be used a lot in urban center's this is an indication that, people in urban areas can afford to buy aqua tab as compared to those in rural areas who wait for NGOs to distribute to them. Chlorine is common in rural areas because this is distributed by NGOs and used at water source, this means that from water source to the house handling must be of high standards of cleanliness to avoid infections as compared to aqua tab that is put at point of use.

Table 4.17: Water treatment options by type of residence

Storage Container	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Ceramic Water Filter	15	15.5	20	19.4	35	15.6
Bio-Sand Filter	10	10.3	8	7.8	18	10.3
Siphon Filter	3	3	3	2.9	6	3.2
Chlorine Tablets	37	38.1	37	35.9	74	38.3
Solar Jars	5	5.2	1	1	6	5.3
Chlorofloc / Aquatab	4	4.1	13	12.6	17	4.2
None/Don't Know	23	23.7	21	20.4	44	23.8
Total	97	100	103	100	200	100

As per Table 4.17 the number of those who don't know the reason for choosing a particular water treatment option is still high that cannot be ignored, majority being in rural areas 23.7 % as compared to urban 20.4 %. Hence need to look at better ways of sensitization to ensure effective use of available water treatment options as better decisions can be made when knowledge is made available. Ceramic filters seem to be attractive also, reason being as opposed to chlorine that has a strong scent, ceramic filters tend to maintain water taste and some believe just like clay they have a good taste, making a good number of populations to prefer them. Mostly there is no much awareness on the water treatment because the chlorine and aqua tabs changes water taste and they avoid it at the expense of their health.

” They use the aqua tab may be one per twenty liters but most times they don't do it because of the change of the taste”.

To avoid the taste, they end up not using the right proportion to liters of water hence it will not be effective in treating water and we may end up believing in a good number that is using it, yet in real sense those using it effectively are so few.

” What you think can be done to increase the water treatment at homes, the community should be told of the importance of the water treatment. They generally need awareness”

Awareness came out as what can transform the lives of the population in using the available water treatment options to counter all this misconception.

4.8 Establishing the Effect of Water Treatment on Diarrhoea Episodes.

4.8.1 Usage of Treated Drinking Water

Consistency in distribution of aqua tabs need to be looked in to, so that they is no particular point that there is shortage and avoid distribution only when there is disease outbreak. Chlorine has largely been used and helped along way in preventing diarrhoea.

Number of children who always drink treated water is still far than half, only 20 out of 97 in rural and 57 out 103 in urban translating to 20.6% and 55.4% in rural areas always drink treated water. This means there is need to increase awareness in order for the number to go up, in order to reduce diarrhoea episodes. Water sources have to be protected, treated and stored safely to enable safe drinking water for these children. Most caregivers who are mothers do most of household duties, distance to the water point is more than 30 minutes there may not be enough water in the household to drink. If water is made available near the house this will save the situation as women will be able to rush or even carry their babies to the water point and have enough water for drinking.

Table 4.18: How often under 5 drink treated water by type of residence

Preference	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Rarely	15	15.5	9	8.7	24	15.6
Sometimes	57	58.7	34	33	91	58.8
Always	20	20.6	57	55.4	77	20.8
Don't Know	5	5.2	3	2.9	8	5.2
Total	97	100	103	100	200	100%

We also need to think of increasing the number by working on rarely and sometimes and ensuring they always drink treated water, because it means they already somehow know it is important to treat water, but they do not find it necessarily important to do it, so there is need to emphasise through sensitization and they will lead to behaviour change. Those who don't know seems a small number but it significantly contributes to end results because, if they get diarrhoea they will definitely infect those who always drink safe treated water. This tells us no one can be ignored in the drive to kick out under 5 diarrhoea. When children are sick they need to drink a lot of water and is must be clean safe water for quick recovery, otherwise the

road to recovery may take longer than expected because of the underlying factors in water they are drinking that are not being addressed on time.

4.8.2 Water Treatment Decision Making

Men are the heads of families in Somalia and as much as they are not the majority caregivers they greatly influence water making decisions in the households. The findings in Table 4.19 established that husbands made the decision on water treatment despite being few respondents. Majority of the findings established that 42.3% in rural areas and of the respondents established that their husbands made the decision in rural areas and 38.8% in urban areas of the respondents established that husbands made the decision of water treatment in urban set up. This show that husbands were the key decision makers in family set up in Somalia region. The study established that respondents who were not aware of the key decision makers ranged in similar frequency an indication that everybody was liable in decision making on water treatment.

Table 4.19: Decision making on water treatment by type of residence

Decision	Type of residence				Total	
	Rural Areas		Urban Areas		Frequency	Percent %
	Frequency	Percent %	Frequency	Percent %		
Husband	41	42.3	40	38.8	81	42.5
Wife(s)	28	28.9	32	31.2	60	29.1
Son	3	3.1	6	5.8	9	3.1
Daughter	2	2	2	1.9	4	2
Don't Know	23	23.7	23	22.3	46	23.8
Total	97	100	103	100	200	100

4.9 Education through Radio

Radio coverage as compared to TV is high because even a very poor family can afford a small one battery radio or solar powered one. Table 4.20 shows that most listened to radio station in both rural areas 81.5 % and urban areas 79.6 % is local station called Dalsan which broadcast in Somali. Radio is used as a media to entertain and enlighten the community on different issues regarding their community. Radio can be used to bring about behaviour change in the community with regards to handwashing and water treatment options.

Table 4.20: Most listened to radio station by type of residence

Radio Station	Type of residence				Total	
	Rural Areas		Urban Areas			
	Frequency	Percent %	Frequency	Percent %	Frequency	Percent %
Dalsan	79	81.5	82	79.6	161	81.9
Jowhar	7	7.2	11	10.7	18	7.3
Asal	3	3.1	5	4.9	8	3.1
BBC	7	7.2	4	3.9	11	7.2
Afgoi	1	1	1	1	2	1
Total	97	100	103	100	200	100

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents information on findings of the study and gives conclusions and recommendations based on the findings of the study.

Availability of water services from humanitarian world had helped reduce on diarrhoea cases, but there is need for more funds, developing systems in place and empowering government institutions. So that after projects are closed communities can take over and manager as government oversees, this will ensure a long-life cycle for projects like boreholes, as they will be maintained from time to time.

Water is also collected from various sources, wells, rivers, boreholes and rainwater by private sector vendors, who distribute to the community. Most of the water sources are unprotected and vendor water is untreated. Their water storage containers are not clean and animal activities around the water sources is worrying, hence water sold to the community by the vendors is contaminated.

“Because the drum that their using their don’t clean, every morning they just give thousands of people water and no one checks its cleanness” Community based organization, csz.

5.2 Summary of the Findings of the Study

The study set out to examine determine the effects of clean safe water conditions and effects in curbing diarrhoea episodes among children below five years of age in Central South Somalia.

5.2.1 Household Water Treatment Practices and Barriers

Lack of knowledge of the risks associated with untreated water is the main barrier to treating water at the household level in both rural and urban areas. Cultural barriers deter water treatment as there is a belief that the chemicals used are harmful to one’s reproductive health.

“NGOS give it a lot especially the chlorine to purify the water but still there are challenges because you might ask how much people use on a certain amount and further there is myth that people believe that chlorine reduces the productivity in human being so if their no government to control this it’s still a problem.” Ministry official, WASH programmes, Banadir.

Chlorine taste also deter most of respondents from using the product hence NGOs and UN need to do their market research and work together with manufacturing companies to come up with a more friendly chlorine product and intense awareness campaigns.

Overreliance on NGOs to provide water treatment products and when they are not in position to provide like due to access problems water remains untreated and children end up drinking untreated water exposing them to diarrhoea.

The number of those who still don't understand the different water treatment options is still high in rural areas as compared being in rural areas 23.7 % as compared to urban 20.4 %, hence need to sensitize both communities in rural and urban.

Husbands seem to be key determinants in deciding which treatment method to be used; wives who are most of the caregivers should be empowered economically to be able to make buying decisions on their own.

5.2.2 Stakeholders Water Management

NGOs play a role of either digging the boreholes for the community, treating the water and public sensitisation on waters sources and private sector role is to fetch water from the source and distribute it to the households. In some instances, the communities have WASH committees to manage water sources. The key informants expressed concerns in regards to the limited role that the government plays in water management and attribute this to the continuous poor quality of water. The region is in dire need of a regulatory framework for water sources management and this is expected to enforce the appropriate practices.

The key informants feel that NGOs and government only intervene and for a short period when there are outbreaks of diseases and once it is contained, they leave the communities vulnerable. This is an indication that long term solutions are required to deal with the health risks associated with unsafe water.

Rural population was very unsatisfied with quality of their drinking water as compared to urban who seem to be more confident in the type o water they were taking.

5.2.3 Hygiene on Children Faeces

Poor handling of children faeces is caused by cultural belief that children faeces is not harmful. Hence need to educate caregivers on dangers associated with not washing hands after handling baby faeces.

Hand washing area is critical in reducing diarrhoea because in urban areas with handwashing areas near or inside the toilet diarrhoea cases seem to have reduced by half as compared to rural with handwashing facilities not near or inside toilet..

Critical hand washing occasions need to be observed keenly in both urban and rural population seems to be well aware of washing hands after defecation, but they do not wash their hands after wiping baby's faeces which transmits diarrhoea.

Health education through the mostly listened to radio station should be utilized in terms on hygiene promotions, water treatment and storage options. This will increase coverage area reducing thus reducing the prevalence of diarrhoea.

5.2.4 Mode of awareness campaign

Education through the mostly listened to radio station should be utilized in terms on hygiene promotions, water treatment and storage options. This will increase coverage area reducing diarrhoea.

5.2.5 Households Storing Water in Safe Storage Container

Most water tanks were dirty and rusted and jerrycans are closed and could not be cleaned easily. It was observed that most household had storage containers with a cover, hence safe for drinking. This does not mean that the water is safe unless water treatment was done at household level, since water sources e.g. the rusted tanks were not safe. Key informant noted that some do not even have the containers to fetch the water and even the storage facilities because they cannot afford.

5.3 Conclusions

5.3.1 Clean Safe Drinking Water

In conclusion it was seen that access to safe drinking water has a critical role to play in curbing diarrhea episodes in under 5 children, this is evident in the data collected from this study. Clean safe water makes a big difference in a community, it determines the kind of lifestyle that children lead in terms of healthy lifestyle or unhealthy lifestyle due to diarrhea outbreaks. Clean water is a basis for baby's wellbeing, if water sources are always

chlorinated and communities educated on importance of clean containers for fetching water and this container made available by NGO's increasing coverage on providing jerycan's, then the episodes of diarrhea outbreaks will go down further. Other benefits of ease availability of clean safe water mean caregivers will have more time with their children and this will impact positively of their development, because they will spend less time walking long distances in such of water. When water is near tendencies are caregivers will use enough water to clean vegetables, fruits and utensils and have extra water to wash their hands after handling baby's faeces and coming from toilet. This will ensure a clean safe environment free of disease.

Access to clean water should not be a luxury of the developed world only, piped water to all homes should be treated as a human right apart from being sustainable development goal number 6. When homes, schools, mosques and work places have water readily available diarrhea will be a thing of the past, a forgotten story.

5.3.2 Cultural Beliefs

Beliefs that chlorine reduces productivity greatly hinders water treatment as people fear that their children will grow up and not be able to give birth. This need to be looked into and awareness made to make it clear and let people understand that this is just a safe water treatment option that can indeed save children's lives.

5.3.3 Lack of Knowledge on the Risks Associated with Untreated Water is the Main Hindrance to Treating of Water at Household Level

There is limited knowledge of how to protect water sources and public education is recommended in order to improve the quality of water in the community. Use of radio is mentioned as the most ideal channels for reaching the general public. The two most listened channels if used effectively can bring behavior change towards chlorine and handwashing after visiting toilet and wiping baby faeces. Sensitization can also be done by sanitation officers and including it in school curriculum so that children grow up knowing importance of handwashing and clean treated water, hence along term positive effect on future generations.

“To improve the quality of the water there must be extensive community awareness on the importance of clean water and the problems of dirty water” Ministry of Health Official.

5.3.4 Long Term Solutions/Sustainability

Key informant feels that the government and NGOs only intervene when there is an outbreak of diarrhea and afterwards they move on with other activities and forget to find a long term Means of ensuring that standards of clean safe water are maintained every day. More engineers on water need to be trained, policies put in place that will ensure continuity of implementation. The performance of WASH services varies from time to time. Lack of proper maintenance affects the water quality, for example, variations in pressure allow contaminants through the ruptures in the pipe. Improper maintenance of hand pumps in the countryside makes people to use alternative and probably less protected sources. Improving the state of water supply and then allowing even occasional short-term dwindling can facilitate entry of contaminants. If communities get back to their initial situations where they must depend on unsafe water and poor sanitation services, then the investments will get wasted effectively. Sustainability of both water supply systems and household water treatments need to be maintained to achieve good results.

5.4 Recommendations

To improve water in the community and achieve universal and equitable access to safe, affordable drinking water for all by 2030, the following need to be addressed: -

1. Regulatory Framework on Water Sources Management, this includes protection of water sources that will avoid contamination, Training of additional experts in water management to come up with policies and processes that will see increase in water quality management and Public Health Policy on water handling.
2. Public Sensitization, on the importance and how to protect water sources and how to treat water and Free or subsidised distribution of water treatment products.
3. More Water Experts Trained, there is need for the government to invest in training of more personnel who will can deal with water related matters. Who can analyse various water related problems and come up with solutions.
4. Subsidized Water Treatment Products, affordable water treatment options should be made available to all pregnant and nursing mothers to give them an opportunity to give their babies clean safe water making the babies healthy.

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APPENDICES

APPENDICE A: HOUSEHOLD QUESTIONNAIRE

SECTION 1: SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

1. Please tell me what age bracket you fall in.

- (1) 18 - 25 years (2) 26 - 35 years (3) 36 – 45 years (4) 46 - 50 years (5) 50+ Years

2. Gender, Setting (Rural/Urban)

	Fill in	Rural	Urban	Female	Male
District					
Village					
Gender					
Setting					
Respondent's Name					
Mobile Phone:					

3. Which option shows your marital status?

- (1) Married/living together (2) Single/Not married (3) Single/Not married (4) Separated/divorced/ widowed (5) No answers

4. what is the highest level of education that you have attained so far

- (1) None (2) Madrasa (3) Part Primary (4) Completed Primary (5) Part Secondary (6) Completed Secondary (7) Part College (8) Completed College (9) Part University (10) Completed University (11) Post Graduate (Masters or PhD)

5. Please tell me your employment / work status.

- (1) Still in school/Student (2) Employed/working in the formal sector (3) Employed/working in the informal sector (4) Self-employed (5) Unemployed (6) Incapacitated/unable to work

6. Can you please tell me, where does your gross monthly household income fall?

- (1) Below USD 10 (2) USD 10 – 50 (3) USD 51 – 100 (4) USD 101 - 200 (5) USD 201-400 (6) USD 401-600 (7) None/No Income

7. Please tell me how many members are you in your family?

- (1) 1-5 Members (2) 6-10 Members (3) More than 10 (4) Other extended (5) Don't Know

9. On average how long does it take to get water and come back in minutes

- (1) Less than 15 minutes (2) 15 - 30 minutes (3) 31 minutes – 1 hour (4) 1-2 hours (5) 2-4 hours (6) 4-6 hours (7) Don't know

10. What container do you normally use for collecting water?

- (1) Plastic Jerri can (2) Metal Jerri can (3) Collapsible Jerri can (4) Clay pot (5) Plastic containers/bottle (6) Saucepan (7) Basin (8) Don't know

11. On average, how much water would you say you use every day for:

- (1) Drinking (2) Cooking (3) Cleaning (4) Laundry (5) Bathing (6) Livestock?

SECTION 2. WATER STORAGE

12. Please tell me what do you use to store drinking water

- (1) Plastic Jerri can (2) Metal Jerri can (3) Clay pot (4) Cement container (5) Plastic containers/bottle (6) Plastic tank (7) Cement/Stone wall tank (8) Plastic paper bag (9) Water catchment/Dam (10) Don't Store

13. How satisfied are you with the quality of your drinking water?

- (1) **VERY UNSATISFIED** (2) **UNSATISFIED** (3) **NEITHER UNSATISFIED NOR SATISFIED** (4) **SATISFIED** (5) **VERY SATISFIED**

SECTION 3. WATER TREATMENT

14. Please tell me do you do anything to your water to make it safe for drinking?

- (1) Yes (2) No

15. How do you treat your drinking water?

- (1) Boiling (2) Adding bleach/Chlorine (3) Strain it through a cloth (4) Use filter (Composite, sand, ceramic) (5) Solar disinfection (6) Let it stand and settle (7) Aqua tabs (8) Chlorofloc (9) Don't know (10) Other SPECIFY

Q19. How often do you treat your drinking water?

- (1) **RARELY** (2) **SOMETIMES** (3) **ALWAYS**

20. Who in the household makes the final decision to purchase water treatment products?

- (1) Husband (2) Wife(s) (3) Son (4) Daughter (5) Don't Know

SECTION 4. HANDWASHING WITH SOAP

21. On which occasions do you wash your hands?

22. On each of these occasions, please tell me what you usually use to clean your hands?

Hand washing occasion	WATER	SOAP	Water + Soap
After defecation	1	2	3
Before eating	1	2	3
Before feeding child	1	2	3
Before breastfeeding	1	2	3
Before handling food	1	2	3
After wiping a baby's bottom	1	2	3

23. Please tell me: How often would you say you wash your hands after defecation?

(2) (1) NEVER (2) RARELY (3) MOST TIMES (4) ALWAYS

16. 24. Where is your handwashing station

(1) Sink in the house (2) Sink outside house (3) Designated washing area inside house (4) Designated washing area outside house (5) Inside or near a latrine/Toilet (6)At water source (7) Anywhere inside house (8) Anywhere outside House

SECTION 5. COMMOM SYMPTOMS

25. Please tell me: Has any child under 5 in your household suffered from any of the following in the past 2 weeks?

(1) Watery diarrhoea (2)Bloody diarrhoea

APPENDICE B: OBSERVATION CHECKLIST – HOUSEHOLD SURVEY

Serial Number.....

This observation checklist was done in each household after the face to face interview is completed and compared to household survey for quality checks.

SECTION 1: WATER SOURCES

1. What is the source of water at the household?
 - Pipe
 - Protected
 - Tube well/Borehole
 - Truck /Cart
2. What type of containers does the household use for storing drinking water?
 - Plastic Jerri Can
 - Metal Jerri Can
 - Clay pots
 - Cement container
 - Plastic Containers/Bottle
 - Plastic Tank
 - Cement/Stone Wall Tank
 - Water Catchment/Dam
 - Don't Store

SECTION 2: CLEANLINESS OF CONTAINERS FOR STORAGE OF DRINKING WATER

1. Is the container for drinking water covered/closed? (1) Yes (2) No
2. Does the container have a tight fitting lid? (1) Yes (2) No
3. Does the container it have a narrow neck? (1) Yes (2) No
4. Does the container it have a spigot? (1) Yes (2) No
5. Is the container out of reach for animals? (1) Yes (2) No
6. Is the container clean (not smeared with mud or dirt or no algae)? (1) Yes (2)NO

7. Container is not broken or cracked on some parts (vessel integrity)? (1) Yes (2) NO

SECTION 3: GENERAL HANDWASHING

8. Where hands are normally washed, where is the water stored?

- Faucet/tap
- Tippy tap
- Bucket
- Bottles
- Others specify.....

9. Is water available in the container at the time for the interview?

10. Is there any cleaning agent?

SECTION 5: HANDWASHING FACILITY

- | | | |
|---|---------|--------|
| 11. Is there hand washing station dedicated for the toilet? | (1) Yes | (2) No |
| 12. Is water available at the time for the interview | (1) Yes | (2) No |
| 13. Where is the water stored? Inside or outside the latrine? | (1) Yes | (2) No |
| 14. Is there any cleaning agent? | (1) Yes | (2) No |

APPENDICE C: FOCUS GROUP DISCUSSION GUIDE

I N T R O D U C T I O N :

My name is, I am collecting masters research data on behalf of a student of University of Nairobi .The program is aimed at understanding better ways humanitarian organizations can use to reduce child morbidity as a result of providing safe drinking water to the . We are interested in status of general life in Somali, secondly the Water conditions, and lastly societal issues.

We will have a focus group discussion which will take two hours. Everybody has the right to speak their mind without any influence or intimidation. Let's give one another time. Start with your names and age of the person speaking is important. We will start with the first question.

RESPONDENTS' INTRODUCTION:

- Name
- Age
- Current occupation
- Hobbies

<p>Ice breaker</p> <p>Objective:</p> <p><i>To establish Dreams, aspirations and goals</i></p>	<p>Let us talk about dreams & aspirations. I would like you to imagine:</p> <ul style="list-style-type: none"> • What two things do you like about your life today? Why? • What is the role of men in the household your area? What is the role of women? What is the role of male children? What is the role of female children? <ul style="list-style-type: none"> ○ PROBE ON: Cooking, fetching water, storing water, treating water, taking care of livestock, gardening, taking care of children, Security, buying food, paying rent , cleaning the house, laundry
<p>Water</p> <p>Objective:</p> <p><i>To understand the general uses of water, their source</i></p>	<p>Now let's talk about water and how you use it in your daily life:</p> <ul style="list-style-type: none"> • Let's start with, where do you normally get the water used in your household? During both rainy and dry season. • Please describe the water source – what does it look like? How many people go there? <ul style="list-style-type: none"> ○ Do people take animals there also? ○ Are there people controlling how water is fetched? How do they control the people fetching water? ○ Do you queue? Do you pay? How much? ○ Is the source well covered? Is it safe for the public to use? • Do you have different sources of water for the different uses in the household? What would these sources be? Why the different sources? • Who takes responsibility of fetching water in your household? Why? <ul style="list-style-type: none"> ○ How many times does this person fetch water from the source? ○ How much quantity do they carry? How do they carry it? ○ Are there occasions where the person responsible misses school or work so as to fetch water for the household? When are these occasions? How frequently? ○ What time of day do they go to fetch water? Whom do they go with? Why?

<p>Hygiene</p> <p><i>Objective:</i></p> <p><i>To understand handwashing practices</i></p>	<p>Let's talk about personal hygiene:</p> <ul style="list-style-type: none"> • There are certain occasions when you feel that you must clean your hands. Please tell me occasions where you often clean your hands? Why? What do you normally use to clean your hands? What else? Why? How frequently does this happen?
<p>Diseases</p> <p><i>Objective:</i></p> <p><i>To establish common diseases: General and WASH related</i></p>	<p><i>Now let's talk about diseases and illnesses experienced in your area:</i></p> <ul style="list-style-type: none"> • Which diseases would you say are a major problem in your area? Why do you say so? • What are the common diseases that you see in your neighbourhood? Which else? <ul style="list-style-type: none"> ○ What do you think causes these diseases? Why? How do you think they can be prevented? How? • Have you ever had to take care of someone who was sick in your household? How did you do this? What measures did you take? What changes did you make in your household? • Which diseases have children in your household suffered from in the past three months? • What do you do in your household to keep members of your house from getting sick? at else?
<p>Conclusion</p>	<ul style="list-style-type: none"> • Is there anything you would like to comment about the water, sanitation and hygiene situation in this region?