

IMPACT OF WATER SUPPLY AND SANITATION ON UNDER-FIVE CHILDREN
DIARRHEAL MORBIDITY IN BUTAJIRA, GURAGE ZONE, ETHIOPIA

BY

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ABSTRACT

Background: *Diarrheal diseases are still a major cause of under-5 children morbidity and mortality in developing countries around the world. The mortality and morbidity risk of these children can be reduced by improving water supply and sanitation services.*

Objective: *To assess the impact of water supply and sanitation accessibility on under-five children diarrheal morbidity prevalence in Butajira town, Gurage Zone, SNNP Region.*

Method: *A descriptive community based cross-sectional study with both quantitative and qualitative data methods was employed from April 10th to May 10th 2013 in Butajira, Gurage zone. A total of 165 households were surveyed. A total of 50 residents were engaged in a focus group discussion. Bi variate and multivariate analysis was done by SPSS version 16.*

Results: *Improved water supply coverage of the town is 98.8%, the average per capita water consumption is 9.81 liters per day (± 6.49 SD) and improved latrine coverage is 94%. From water supply factors, only distance of source for drinking water, hand washing facility around latrine have strong statistical association on final step of multivariate analysis, $P = 0.037$ [OR: 0.977 (0.955, 0.999) 95% CI] and $P = 0.031$ [OR: 2.436 (1.083, 5.481) 95% CI] respectively. Concerning sanitation factors, which are analysed by multivariate analysis, only functionality of the latrine found to have impact on children diarrhea, $P = 0.024$ [OR: 14.402 (1.425, 145.574) 95% CI]. The 15 days childhood diarrheal prevalence of the area has found decreased by 9.5%. From the focus group discussion the main problem of water supply is interruption and from sanitation cleanness of latrine are the main current problems in the town.*

Conclusion: *Distance of water source from home and non-functionality of latrine had an impact on childhood diarrhea. Sanitation factors are more necessary in controlling diarrhea than water supply factors.*

DEDICATION

This work is dedicate to my adored families my father Sisay Demo and my Sister Eskedar Sisay. Your presence makes me enthusiastic for life

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LIST OF ABBREVIATIONS

DHS – Demographic and Health Survey

EDHS – Ethiopian Demographic and Health Survey

FGD – Focus Group Discussion

HH – House hold

JMP – Joint Monitoring Program

MDG – Millennium Development Program

MOH –Ministry of Health

OR – Odds Ratio

ORS – Oral Rehydration Solution

SNNPR – south Nations Nationalities and Peoples Region

SPSS – Statistical Package for Social Science

UN – United Nations

UNDP – United Nations Development Program

UNICEF – United Nations Children’s Fund

WHO – World Health Organization

WSS – Water Supply and Sanitation

CHAPTER ONE: INTRODUCTION

1.1 Background

Generally, safe drinking water can be defined as, water that is safe to drink and available in sufficient quantities for hygienic purposes. Basic sanitation also can be defined as, the lowest-cost option for securing sustainable access to safe, hygienic and convenient facilities for excreta and sewage disposal that provide privacy and dignity while ensuring a clean and healthful living environment both at home and in the neighbourhood of users (WHO and UNICEF, 2010).

Drinking-water coverage of the world in 2011 was 89%. That means still 768 million people relied on unimproved drinking-water sources. Sanitation coverage in 2011 was 64%. By the end of 2011, there were 2.5 billion people who still did not use an improved sanitation facility. The number of people practicing open defecation is around 1 billion, which is 15% of the global population (WHO and UNICEF, 2013).

Every year, unsafe water, coupled with a lack of basic sanitation, kills at least 1.6 million children under the age of five years. Around, 1.1 billion people did not have access to an improved source of drinking water. Among these, 84% of the population lives in rural areas. More than 40% of the world population, 2.6 billion people, do not use a toilet, but defecate in the open or in unsanitary places (WHO and UNICEF, 2010).

Diarrheal diseases are still a major cause of under-5 children morbidity in developing countries around the world. Responsible for approximately 800,000 deaths of children per year, causing a higher number of under five children deaths than malaria and HIV combined (WHO and UNICEF, 2007).

One of the key factors contributing to the frequency and burden of diarrheal disease in a majority of developing countries is the obvious lack of water and sanitation (Peterson & Michael, 2007). But, this problem can be improved by supplying improved water and accessing improved sanitation services. Water and sanitation infrastructure lowers the odds of children under-5 to suffering from diarrhea by 7-17%, and reduces the mortality risk for these children by about 5-20% (Fink, 2010).

Even if, more progress has been made in the water sector, 21% of the population in developing countries still does not have access to adequate drinking water. The situation is most severe for Sub-Saharan African countries, where 63% of the population lacks access to basic sanitation and 45% of the population lacks safe drinking water supply (UNDP, 2007).

In Ethiopia access to water supply and sanitation is the lowest in Sub-Saharan Africa and the entire world. According to data from the demographic and health survey, access to an improved water source estimated 53.7% (94.5% for urban areas and 4.7% for rural areas) and 17.8% for improved sanitation (46.3% in urban areas, 9.4% in rural areas) (EDHS, 2011).

1.2 Statement of the Problem

Diseases, including childhood diarrhea, are often caused by many factors. There is a strong connection between childhood diarrhea and the quality and use of water and sanitation services. Water and Sanitation services (WSS) interventions can play an important role in combating the incidence of diarrheal diseases among children under-5 years of age (WHO and UNICEF, 2004).

Diseases associated with unimproved water supply and poor sanitation causes a large burden of diseases worldwide, diarrhea alone causes 4 billion cases and 1.9 million deaths each year or 19% of all deaths among children in the developing world. Africa and South East Asia combined contains 78% of all diarrheal deaths. Sub Saharan Africa contains estimated 22% of all deaths (Boschi-Pinto et al., 2008).

According to latest EDHS report the prevalence of diarrhea among children less than five years of age is 13%; this is higher on children lives in households that drink water from unprotected source and on children live in rural areas, 14% and 18% respectively. The report also showed that the prevalence is also highest on children from households that are using unimproved sanitation, 13.7% (EDHS, 2011).

In Butajira, the town's health office report shows, diarrhea is the second top morbidity cause of children less than 5 years of age in the town.

1.3 Significance of the Study:

Most studies try to address water and sanitation factors that impact diarrheal morbidity; they have found an association in rural areas or in areas where improved water and sanitation lacks, but this study tries to identify the impacts due to improved water and sanitation, and also assesses the main factors which indicates quality of water supply and sanitation services in relation to under – 5 children diarrheal morbidity.

Therefore, this research is done to determine service factors which have strong influence or an impact on childhood diarrheal morbidity and to indicate factors that should be improved to promote health status of children. And also to measure the reduction in diarrheal disease

incidence due to water and sanitation improvements comparing with previous studies done around the study area.

The findings of the study will be useful to draw appropriate recommendations to organizations that are working on water supply and delivering sanitation services, policy makers, program planners, and concerned government and non-government officials to make an informed decision towards the prevention of childhood diarrheal diseases and to provide quality water and sanitation services for the improvement of public health in urban areas. Furthermore, the study will also provide valuable base line information for further studies.

Since, very limited studies have done on the effect of water, sanitation and socio-economic factors associated with under-five diarrheal morbidity prevalence in Gurage Zone and not studied about the impact of these improvements in urban context yet in Burtajira town and due to the above mentioned reasons, this study will be employed in the town of Butajira.

CHAPTER TWO: LITERATURE REVIEW

2.1 Diarrheal Morbidity Prevalence on Children Under Five Years of Age

Diarrheal diseases are a major cause of morbidity on children under-5 of age in developing countries around the world. The latest estimates published by the World Health Organization indicate that, diarrheal disease are responsible for approximately 800,000 deaths of children under the age of five per year (WHO and UNICEF, 2007).

The annual burden of diarrheal disease is 3.5 billion episodes and results in 1.8 million deaths (20 % of all deaths) among children under age five (Kosek, Bern, & Guerrant, 2003). Acute diarrhoea can result in severe dehydration, and persistent diarrhea may predispose children to malnutrition (Briend, 1990), (Schorling, J .B., J. F. McAuliffe, M. A. de Souza, 1990), (Guerrant, R. L., A. M. Aldo Lima, 1992).

In developing countries, among under-5 children, around 4 billion diarrheal cases and 1.9 million deaths (19% of all deaths) occur each year. Among these, Africa and South East Asia combined contains 78% of all diarrheal deaths. Sub Saharan Africa contains estimated 22% of all deaths (Boschi-Pinto et al., 2008).

In Ethiopia estimated deaths due to diarrhea is 86,000 per year (Boschi-Pinto et al., 2008). The prevalence of diarrhea among children less than five years of age is 13%, this is higher on children lives in households that drink water from unprotected source and on children in rural areas, 14% and 18% respectively. The prevalence is also highest on children from households that are using unimproved sanitation, 13.7% (EDHS, 2011).

2.2 Determinants of Diarrheal Morbidity

2.2.1. Water Supply and Sanitation Services

Water intended for human contact that is exposed to the environment is a potential source of diarrheal disease. In developing countries, in particular, surface water is often contaminated with pathogens (including bacteria, viruses, and parasites) due to contact with human and livestock waste. Drinking, handling, cooking, and bathing in such water exposes people, especially young children, to a wide range of health risks, including diarrheal diseases (Peterson & Michael, 2007).

Almost half of the people in the developing world have one or more of diseases associated with inadequate water supply and sanitation, such as diarrhea, intestinal helminthes infections, dracunculiasis, schistosomiasis, and trachoma. More than half the hospital beds in the world are occupied by people who have these diseases. Majority, 88% of diarrheal disease is attributed to unsafe drinking water, inadequate sanitation, and poor hygiene, which is the second leading cause of death in children less than five years of age, after respiratory illnesses (UNITED NATIONS, 2003). Inadequate access to safe water and sanitation services, kills and sickens thousands of children every day (WHO and UNICEF, 2010).

Improvement of water supply and sanitation facilities can be preventive measures for diarrhea control among young children. The estimated prevalence of diarrhea decreased with improvement of water supply and sanitation facilities is 45% and 44% respectively (Gross, Schell, Molina, Leão, & Strack, 1989). Population groups that consistently use more water have better health than groups that use less water (Esrey & Potash, 1991).

The study in Egypt on the impact of improved water and sanitation, showed that children living in a house which have improved sanitation had less diarrhea (9.26%) than without improved sanitation (8.40%) (Roushdy, Sieverding, & Radwan, 2012). A study done in Yemen also showed that storing water due to interruption has an association with water pollution and childhood diarrhea (Lechtenfeld, 2012).

Based on a more recent point estimates, done by Isabel & Günter, depending on the technology level and the sub-region chosen, water and sanitation infrastructure lowers the odds of children under-5 to suffering from diarrhea by 7-17%, and reduces the mortality risk for these children by about 5-20% (Fink, 2010).

The finding of a study done in Keffa Sheka zone, SNNPR, Ethiopia shows increase in per capita water usage decreases childhood diarrhea (Teklemariam, Getaneh, & Bekele, 2000). According to a study done in Nekemte town, cleanness of sanitation facility also found to have an association with childhood diarrhea (Girma, 2008).

2.2..2. Socioeconomic Factors

In developing countries, child health is determined by a large number of factors. However, there is an agreement that childhood mortality and morbidity from different causes are significantly related to socioeconomic status of the child's parent, which forms the immediate environment to the child (Kinfu, 1992).

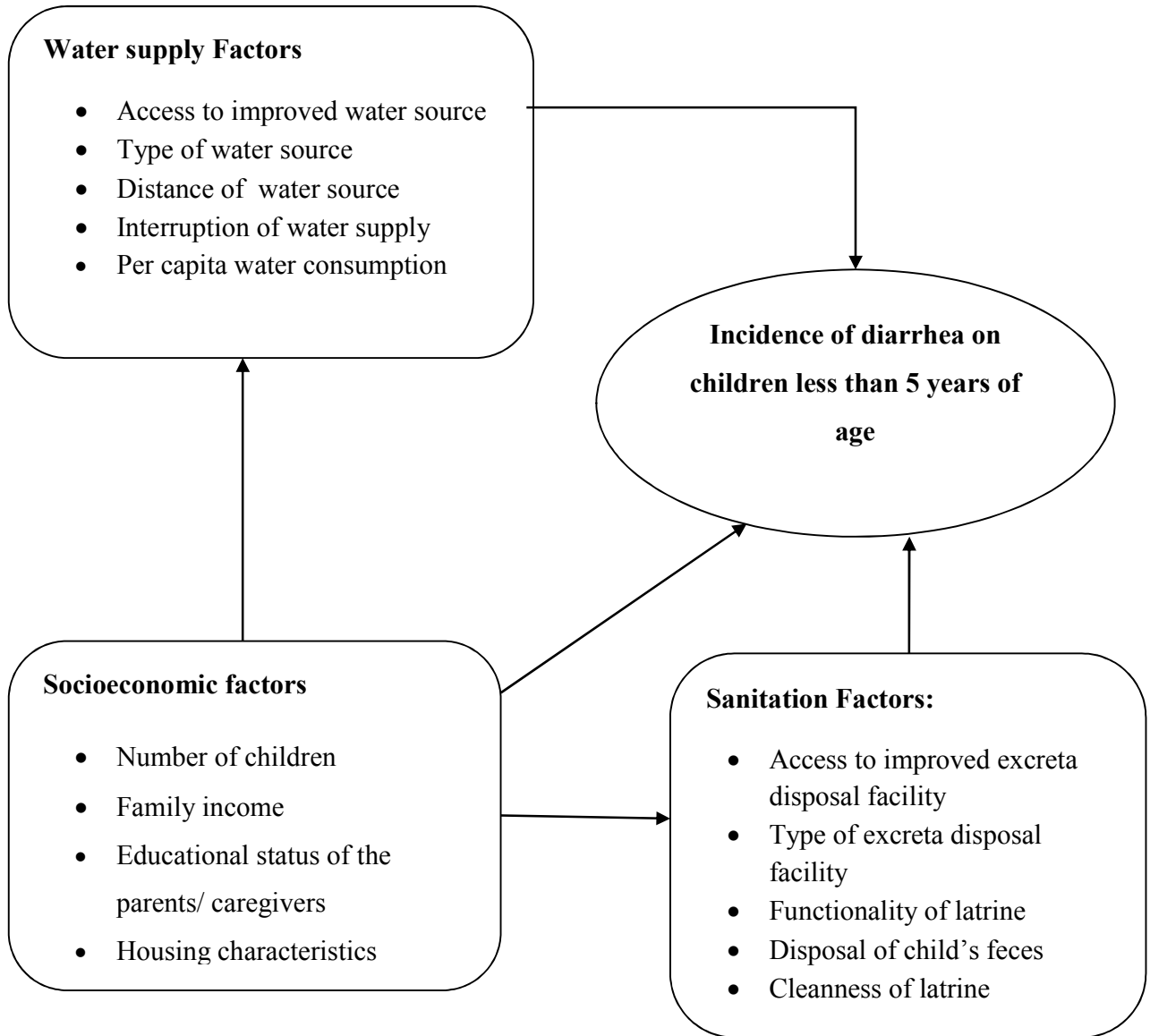
Different studies have tried to show the relationship of family literacy status and family income with the occurrence of childhood diarrhea, more than any other socioeconomic status variables. And, many studies have shown a negative and significant relationship between the levels of family literacy status as well as family income and diarrheal morbidity in children (Mulugeta, 2003). A cross-sectional survey conducted in The

Republic of Congo showed that, highly educated mothers reported fewer diarrheas (Mock, Sellers, Abdoh, & Franklin, 1993). A follow-up study from Zaire also indicated that both mother's and father's education were significantly associated with childhood diarrheal incidence (Manun'ebo MN, Haggerty PA, Kalengaie M, Ashworth A & Kirkwood BR, 1994).

A study in an urban area of SNNP region, Ethiopia also discovered that family income was significantly associated with childhood diarrheal morbidity. There are also other factors that influence diarrheal morbidity on under-five children. These factors include family size, maternal age and place of residence. Family size has been suggested as an important risk factor for childhood diarrhea. When many people live together, the chance of contact with pathogens increases, and hygiene may deteriorate. A study also revealed that mothers having five or more living children reported more frequently that their child had had diarrhea (Teklemariam et al., 2000).

The place of residence is one of the predictors of child health in general, diarrheal disease in particular. In developing countries, socioeconomic status, access to health services and environmental conditions all affect the health of children of the rural areas. Children in urban areas where proper sanitation and water are available, and where modern treatment is more frequent will have a lower prevalence of diarrhea. Studies indicated that children living in urban areas were less likely to have diarrhea compared to those in rural areas (Mulugeta, 2003).

Figure 1, Conceptual Frame work



CHAPTER THREE: OBJECTIVES OF STUDY

3.1. General Objective

- To assess the impact of water supply and sanitation accessibility on under-five children diarrheal morbidity prevalence in the town of Butajira, Gurage Zone, SNNP Region.

3.2. Specific Objectives

- To determine the two-week period prevalence of diarrhea on under-five children in the study area.
- To identify main determinants of water supply and sanitation services that has strong association with childhood diarrhea.
- To compare between water supply and sanitation services based on their impact on childhood diarrhea.
- To determine the amount of decrease of childhood diarrheal prevalence due to accessibility of water and sanitation.

CHAPTER FOUR: METHODOLOGY

4.1. Study Design and Period

A descriptive community based cross-sectional study design with both quantitative and qualitative data methods was employed. The study was conducted from April 10th to May 10th 2013 in the community of Butajira Town, Gurage zone.

4.2. Study Area

The study was conducted in Butajira town, Gurage Zone, South Nations, Nationalities and Peoples Region (SNNPR), Ethiopia. Butajira town is one of 2 reform towns of Gurage zone and one of 20 reform towns in SNNPR. The town is located 135 Km from The capital of Ethiopia, Addis Ababa. According to the 2007 population census the town's total population was approximated to 38,531 and with about 7,863 households (FDRECC, 2008) and is estimated to be 51,931 total population and 11,540 households; when projected for 2013 by considering 5.1 % as rate of natural increase of urban areas in the country Ethiopia. Butajira Town has 5 urban kebeles. There are a total of 11 Health Extension workers working in each of Kebeles of the town implementing the health extension program.

4.3. Source Population

The source population for the study was all households' mothers/caregivers with under-five children in the communities of Butajira town. There are 10,560 households with under-5 children in the town.

4.4. Study Population

The study population was the sample of households with under-five children found in all 5 kebeles. There are 165 sample households. If there was more than one child in the household, the index child was selected by lottery method to collect information on child's health characteristics.

4.4.1 Inclusion Criteria

- ❖ households with under-five children
- ❖ mothers/caregivers volunteer to participate in this study

4.4.2 Exclusion Criteria

- ❖ Mothers /caregivers who was unable to give information of demographic and health characteristics of index child may be due to health problem.

4.5. Sample Size Determination

The study sample size was determined by statistical calculation. The sample size was calculated by taking $p = 11\%$, expected proportion of the population with the event of outcome (prevalence), (by taking the urban SNNPR regional childhood diarrhea two-week period prevalence from EDHS 2011) as the study was carried out in urban communities. As this value gives sample size sufficiently large to guarantee using the following assumptions: desired precision 5% and 95% confidence level and 10 % for the anticipated none –response rate.

Hence, the formula used to calculate the sample size

$$\begin{aligned}n &= \frac{(Z_{\alpha/2})^2 * P * (1 - P)}{e^2} \\ &= \frac{(1.96)^2 * 0.11 * (0.89)}{0.05^2} \\ &= 150\end{aligned}$$

Z = the number of standard error corresponding to 95 percent confidence interval which is 1.96.

P = the proportion of study population exposed for the risk factors

e = the margin of error that the researcher tolerates which is 0.05

n = the total sample size.

Accordingly, the required sample size = $(150 + 10\%) = (150 + 15) = 165$

4.6. Sampling Procedure

The total sample size 165 was distributed probability proportional to size to kebeles according to the size of households and number of under-5 children. The study units for the study in each kebele were selected by using systematic randomly sampling. The first household within a kebele was selected by lottery method. Once the first household was selected, the consecutive household was systematically picked by adding 'k' to the one previously selected ('k' being the number of household with under-5 children in the kebele divided by the required number of households from that particular kebele).

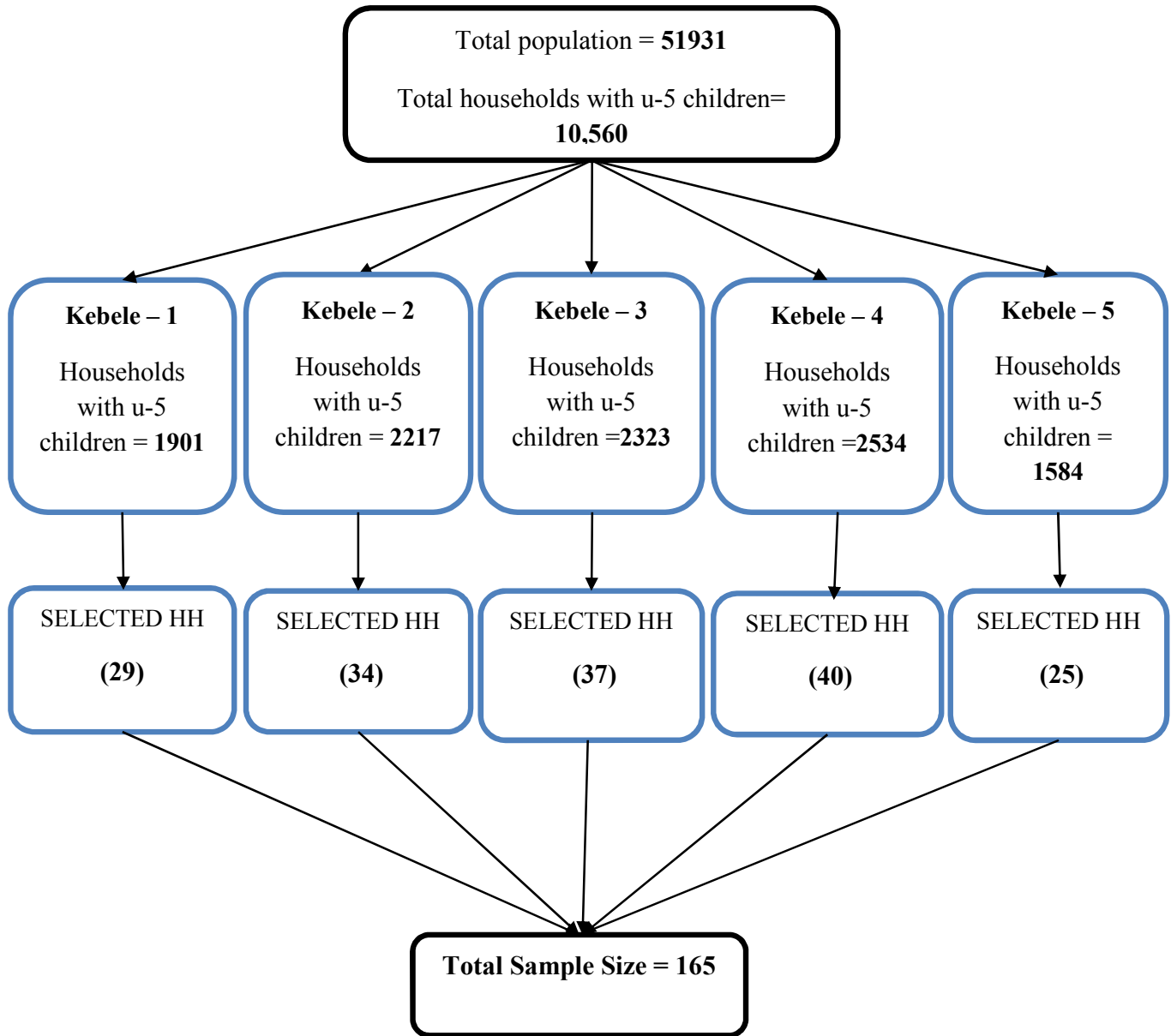
The formula used to calculate k will be

$$k = \frac{N}{n}$$

$$k = \frac{10560}{165}$$

$$k = 64$$

Figure 2, Schematic Representation of Sampling Technique



4.7. Data Types, Sources and Data Collection

4.7.1 Data Types

The study was relay both on quantitative and qualitative data which was collected through different data collection methods such as; structured questionnaire interview, focus group discussion, observation and reviewing existing data sources (reports and charts) using data compilation sheet. Structured questionnaire was the most pertinent methods of data collection to have information on socio economic, demographic, water supply and sanitation facility settings of the study population.

There were focus group discussions in each of kebeles. Each focus group consists of an average of 10 volunteers from the target population. The discussants were selected based on their equal status of social and educational background in order to avoid biasness.

4.7.2 Data Sources and Data Collection

The two main data sources namely primary and secondary were used in the study. The primary data was collected from focus group discussion members and mothers using structured and semi structured interview questions and observation. In addition to this, secondary data was collected from different sources. The sources include: water supply institution report, health sector and health center report, maps and charts. The questionnaire was designed from demographic and health survey (DHS) and ministry of health (MOH) survey standard questionnaire. Changes were made to adopt the questionnaire to the current research objectives and context. In addition, a short pilot of the

questionnaire was carried out as part of the data collectors training and final adjustments made to the questionnaire.

Eleven urban health extension workers who have diploma in nursing for data collection and two health extension supervisors who have bachelor degree in health science fields for supervision was recruited and trained before data collection.

Training for data collectors and supervisors was given for two days by preparing and using training tools prior to the start of the data collection process by principal investigator. But, orientation was given to the supervisors separately on how to supervise the data collectors and check completeness and consistency of the questionnaire.

FGD was conducted in 5 kebeles by the principal investigator to come up with better ideas until saturation of ideas was reached.

Reviewing of existing health sector and water supply institution reports and charts was also made by the principal investigator for the sake of gathering necessary information and reliable data.

4.7.3 Data Quality

To maintain the quality of data the questionnaire was developed after reviewing relevant literatures to the subject to include all the possible study variables that address the objectives. It was prepared first in English and then translated in to Amharic and back to English to ensure reliable information. Pre-test of questionnaire and training of data collectors and supervisors was conducted to ensure the quality of data. Any ambiguous terms, phrases and questions identified during the pre-test was corrected and changed. Written pre-test feedback and orientation based on feedback was given for data collectors

and supervisors prior to actual data collection. Additionally, the completed questionnaires were checked day to day during data collection for completeness, clarity and consistency by the supervisors and the principal investigator. Any mistake detected was corrected before the next day data collection and the incomplete ones sent back to the data collectors for check-up under supervision.

4.8. Study Variables

4.8.1 Dependent Variable:

- The occurrence of any episode of diarrhea on a child in the two weeks period before the survey.

4.8.2 Independent Variable:

- Water Supply Factors: Access to improved water source, distance of water source, type of water source, quantity of water (power of water), waiting time at water source, interruption of water supply, per capita water consumption, etc...
- Sanitation Factors: Access to improved excreta disposal facility, functionality of latrine, type of excreta disposal facility, Condition of latrine, disposal of child's feces, cleanness of latrine etc...
- Socioeconomic Factors: Number of children, family income, age of the child, educational status of the parents, Method of water drawing and storage, etc...

4.9. Methods of Data Analysis

Statistical Package for Social Science (SPSS Version 16) was used for data analysis. Data entry was done by Epi Data (version 3.01) to maintain data quality before the actual analysis. Data cleaning was executed by using frequencies and cross tabulations to check accuracy, outliers, consistencies, and missing values. Accordingly, incorrect entries were identified and re-entered. With the help of this program SPSS, descriptive analysis like means, standard deviations, percentages, etc. was used to describe the study population in relation to socioeconomic, water and sanitation factors and other relevant variables.

Bivariate analysis was used to assess the relationship of several independent variables with the dependent variable by using chi-square test and calculating p-value. The chi-square test was used to identify independent variables, which explain the dependent variable that was retained for further analysis at the multivariate stage. Variables which have p-value < 0.25 on bivariate analysis were used as candidate for multivariate analysis. Furthermore, multivariate analysis was carried out to explore the net effect of all independent variables on the dependent (diarrheal morbidity) variable by controlling possible intervening variables.

4.10. Ethical Consideration

The study was conducted after securing approval from Jimma University Ethical and Research Committee and from local administration of Butajira town health office. Informed verbal consent was obtained from the mothers/ caretakers of the children. The individual autonomy was respected. Children who are found to be sick during the visits were told to consult the nearby health institution for better management.

4.11. Dissemination of Finding

Upon completion of this study a copy of the study will be given to Jimma University Ethics and Research office, to the School of Environmental health Sciences, College of Public Health and Medical Sciences, Ministry of Health, SNNPR Regional Health Bureau, Gurage Zone Health Department, Butajira Town health office, Butajira Town Water and Sanitation Service Office, and other concerned organizations.

4.12. Operational Definitions

Impact: means strong or dramatic effect that independent variables impose on the dependent variable.

Access to improved water source: means either direct connection to the home or a public facility within a short distance from the home.

Condition of Latrine: households with functional latrines and whether the family disposes the feces of their under 5 children in the latrine, no observable feces in the compound, observable fresh or old feces through the squat hole or on the slab.

Diarrhea: is defined as more than three loose stools passed in a twenty-four hour period, as reported by respondent mother/caregiver of the child.

Functional latrine: latrine that provides services during data collection even if the latrine requires maintenance.

Index child: refers to a child that was included in the study from a household to have information on the demographic and health characteristics.

Quantity of water used per capita per day: all the water collected by or delivered to the household and used for personal purposes and calculated as:

Per capita water Consumption

$$= \frac{\text{Frequency of collection} \times \text{Capacity of container}}{\text{Household size}}$$

Sanitation facility: is defined as a functioning excreta disposal facility, typically a toilet or latrine.

Waiting time at water source: is the time which takes to fetch the water from the source but, is not include the time which takes to arrive at the source of water.

Interruption: is irregular water supply or temporary inaccessibility of water.

4.13. Limitation of the Study

The study about impact of water supply and sanitation services on under-5 children diarrheal morbidity may be a broad subject matter. It is difficult to measure impact directly. It is also difficult to address all issues in such a small research project. Therefore, this research is restricted in space and content. Since the study only investigates the role of water and sanitation services on under-5 diarrheal morbidity it has a limitation in investigating the seasonal differences in the occurrence of diarrheal morbidity prevalence. Recall bias by mothers/caregivers during interview of two weeks occurrence of childhood diarrhea may also be one limitation of this study.

CHAPTER FIVE: RESULTS

5.1 Focus Group Discussion Results:

5.1.1. Water supply:

A total of 50 female discussants from 5 kebeles of the town were participated in 5 focus group discussion groups. The results from the focus group discussion show that, most of the discussants use pipe water as their main drinking water source. But, there are some discussant issued they didn't use pipe instead they are using protected spring. Therefore the main water sources for the town are pipe water (private and public) and protected spring. Any of the respondents do not mentioned river water as a source of water for drinking purpose.

Most of the participants in the FGD said that there was a big problem regarding drinking water previously, due to lack of access of pipe water in their area. Most of the discussants said they will get drinking water from private water sellers in their area or they must to go long distance to fetch from public pipe water sources what they called it “*Bono*”. Also most of them said they were used river water for other domestic purposes.

The respondents or discussants of the focus group generally agreed by the improvement in coverage of water supply compared to the previous times. For example one discussant from kebele 01 said that “... *I don't think water problem is not a big deal currently, but previously because of water supply is not accessible in our area we used to go to river to wash our cloths and to fetch water used for other domestic purposes, we were used pipe water that we got commercially from private places only for drinking purpose.*” Other 52 years old discussant from kebele 02 also mentioned the same idea by saying “... *we even used river water without any treatment for drinking purpose, which is because of problem*

of access of water supply in the kebele, only few households were had pipe water in their compound. Currently I think every household have pipe water in its compound.”

As most of the discussant said the major problem now a day's regarding access to water supply is the interruption of water. This is a big problem they faced right now as they mentioned. They said water will be available in most part of the town at night, so they need to wake up in the mid night to fetch water. One discussant from kebele 04 discussed this situation “... we have installed pipe in our household but it is better to be called fake, because we have not fetch water from it when we need. We always wake up from our sleep at the midnight and store water. This situation even get worse, sometimes water may not available for 3 and more than 3 days. In this time we will be in a very hard situation and we could not found tap water for drinking purpose”. In such situation they are forced to buy packed water or go to river to find drinking water. There are also some discussants expressed a lot of queue in public water sources and lack of public water sources in their area as a problem of water supply.

There are discussants that respond about problem of drinking water now a day's. They said that their area is incorporated in the town area very recently; previously they were in the rural part of the woreda administration. According to the respondents still they do not get pipe water, even though they can afford to bring in to their home because, water supply and sanitation agency doesn't install pipes in their area. For example one of the discussant from kebele 03 said “... we are fetching drinking water from the spring, there is no public or private pipe water source in our area. The government bodies promised us to install public water, but there is nothing done yet. Therefore, we are drinking river water in this time”.

The other problem in some areas of the town is the interruption of water, this imposes a very high burden problem for those who are living in these areas and using public water sources. Because they are using public source, they can only get water if it is not interrupted (or always available), their only option is fetching in the day time. That means they can't wake up and fetch water in mid night as of those who have water in their compound.

Ground water or well water is not available privately in the town it is mainly due to the ground water table is very far. There for the only drinking water sources in the town are pipe water and river water. There is no respondent that answers using packed or bottled water as their main drinking water source.

5.1.2. Sanitation

Concerning sanitation facilities there are two different ideas about the previous times. Some of discussants from kebeles like 02 and 03 said that they didn't faced sanitation problems, it is mainly due to they have built and using latrine by the time they made their homes. Therefore they didn't mention any sanitation problems in the previous times.

But there are some discussant told they didn't use latrine because of their area is more rural that it is not common to have latrine, in turn members of the households defecate inside bush or in their backyard. Some of the discussant also says they are using public latrine by discussing cleanness as a main problem.

But, other discussants, those came from kebeles like 04 and 01, mentioned some problems regarding latrine facility. For example they have mentioned that there were latrine problem in their area that means they weren't use latrine previously. For example one discussant

from kebele 04 expressed “... *We weren't using latrine, it was not our concern.*” Because of they do not have latrine in their home and area. Therefore they used to defecate in the bush and in their backyard.

Referring to the present situation most of the discussants explained they used latrine but some discussants from the rural area of kebele 03 mentioned there are some households those do not started using latrine and still defecating in their backyard and open field. But most of the discussants confirmed that they are using latrine.

Regarding the current problems of latrine some of the participants said that they have a problem in public latrines. For example a 32 years old discussant from kebele 02 said “... *These public and communal latrines are used for many households therefore they have serious sanitation problems because, peoples do not clean it regularly by expecting others to clean it.*” So they have offensive odour. This in turn leads the residents around them to some communicable diseases such as common cold, typhoid fever and respiratory tract infections.

One discussants from kebele 05 also said “... *some people do weird practice; there are some areas that used plastic bags for defecation and throw them to the road. It is due to lack of functional latrine around their area...*” Since they are polluting the environment with feces this shows there is a big problem of latrine in some areas.

Most of the respondents from all focus group discussion discussed that latrine utilization in their areas is improving with time. For example one discussant said “... *latrine is not a problem in our area; we have built and started using latrine before 10 years. I don't think*

latrine is a big problem in our area.” By saying this she revealed that latrine is not a problem.

But one of the discussant from another kebele said that, latrine is steel a problem in our community. *“...most people doesn't have latrine, therefore they use communal latrine. But most of the latrine is not clean, because the people don't clean by expecting others to clean it. In most times, the communal latrine is too disgusting to use. There are some peoples that use plastic bags called 'festal' to defecate. They defecate with festal and throw it on the road during the night time.”*

When we see the cumulative response, many areas of the town have latrine. But some areas in which a lot of people live together in small area (slum areas) and rural parts of the town, there is still a problem of latrine utilization. Among the problems, some of them do not have a place to build private latrine therefore they are using public latrine and are led in to a problem of defecating in to plastic bag. The other problem is in the rural areas they lack awareness about the importance of having latrine, therefore they didn't start using yet even after incorporated in to the urban areas.

Almost all of the respondents conclude that water utilization problem is improving through time, but there is still a problem in interruption and the like. Also they have agreed that there is improvement in sanitation facilities they described that some latrine problems are even getting worth than previous times.

5.2 Quantitative Results (Questionnaire)

5.2.1 Socioeconomic and Demographic Characteristics

A total number of 165 households with at least one under-five children were included in the study. The mean age of the respondents was 29.65 years (± 7.1 SD). Among respondents 88 (53.3%) are Muslim by religion and 121 (73%) are Gurage by ethnic group. Majority, 71 (43%) of the respondents are educated to primary school. Most, 139 (84.2%) of the fathers are educated. Eighty seven (52.7%) of the respondents are housewives and 54 (32.7%) are privately employed. Sixty two (37.6%) of the fathers are merchants. Among respondents, 87 (52.7%) of the families use television as their main information source while 28 (17%) of the family have no source of information. One hundred forty seven (89%) families does not have any animals in their house. Majority, 158 (95.8%) of the families doesn't have any extra source of income. Of the families got interviewed 100 (60.6%) live in a house which floor is made of soil. And 153 (92.7%) live in a house the roof made of corrugated iron. Most, 147 (89.1%) families live in a separate house from animals. Among responders 130 (78.8%) house type is house with its own compound, while 35 (21.2%) have shared compounds. The mean house hold size of the study population was 5.29 (± 1.97 SD).

Table 1, Description of socioeconomic characteristics

Variables	Response Category	Frequency	Percent (%)
Relation with the Child	Mother	148	89.7
	Care giver	17	10.3
Family Size	<4	69	41.8

Variables	Response Category	Frequency	Percent (%)
	5-10	88	53.3
	>10	8	4.8
Age of Mother	16-25	47	28.5
	26-35	98	59.4
	36-45	11	6.7
	>46	9	5.5
Educational status of mother/care giver	Illiterate	38	23
	Read and Write	14	8.5
	Primary(1-8)	71	43
	Secondary(9-10)	14	8.5
	Above	9	17
Father Education	Illiterate	15	4.5
	Read and Write	38	11.5
	Primary(1-8)	140	42.4
	Secondary(9-10)	51	15.5
	Above	84	25.5
Occupation of Mother	Housewife	87	52.7
	Government	22	13.3
	Private	54	32.7
	Other	2	1.2
Father Occupation	Farmer	23	13.9
	Government	41	24.8

Variables	Response Category	Frequency	Percent (%)
	Merchant	62	37.6
	Other	39	23.6
Religion	Orthodox	54	32.7
	Protestant	22	13.3
	Muslim	88	53.3
	Other	1	0.6
Ethnicity	Gurage	121	73.3
	Silte	21	12.7
	Amhara	14	8.5
	Other	9	5.5
Information Source	Television	87	52.7
	Radio	50	30.3
	No source	28	17.0
Reading Magazines	Yes	50	30.3
	No	115	69.7
Animals in the house	Yes	94	28.5
	No	232	70.3
Extra source of income	Yes	7	4.2
	No	158	95.8
Housing Floor material	Soil	100	60.6
	Wood/Timber	1	.6
	Cement	64	38.8
Housing Roof Material	Grass	12	7.3

Variables	Response Category	Frequency	Percent (%)
Type of House	Corrugated Iron	153	92.7
	Condominium	14	8.5
	Kebele House	21	12.7
	House with compound	107	64.8
	Cottage	12	7.3
	Other	11	6.7

5.2.2 Index Child Characteristics

The mean age of the index child is 27.41 months (S.D ±14.13). Most, 87 (52.7%) of index child are female and 78 (47.3%) of them are male by sex. About 49 (29.7%) index children are the first for the family and 116 (70.3%) are the second and above by birth order. One hundred sixty three (98.8%) of index children are ever breast fed. Currently 89 (53.9%) of the children are not feeding breast milk, and 70 (42.4%) are taking breastfeeding partially. Majority, 160 (97%) of children takes measles vaccination. Most, 161 (97.6%) of the respondent mothers doesn't have diarrhea between the last two weeks. Forty one (24.8%) of children got diarrhea between the last two weeks whereas 124 (75.2%) doesn't have diarrhea. From the children that got diarrhea 18 (10.9%) are taken to health institutions, 6 (3.6%) take ORS and 8 (4.8%) takes medicine inside home by the order of parents or care takers.

Table 2, Description about index child

Variables	Response Category	Frequency	Percent (%)
Gender	Male	78	47.3
	Female	87	52.7
Birth order of the child	First	49	29.7
	Second and above	116	70.3
Breastfeeding	Yes	163	98.8
	No	2	1.2
Current breastfeeding	Only breast milk	4	2.4
	Partial breastfeeding	70	42.4
	No breast feeding	89	53.9
Measles vaccination	Yes	160	97
	No	5	3
Mother diarrhea	Yes	4	2.4
	No	161	97.6
Child diarrhea	Yes	41	24.8
	No	124	75.2
Measures taken to stop diarrhea	Taking to health	18	10.9
	Increasing amount of food	3	1.8
	Giving ORS	6	3.6
	Giving cereal based fluid	1	.6
	Decreasing amount of	2	1.2
	Give medicine in home	8	4.8
	Other	3	1.8

5.2.3 Water Supply:

Among the total households studied 163 (98.8%) use tap/ pipe water. Most, 143 (86.7%) of the families have a water source between less than 50 meters and 22 (13.3%) of families will go longer than 50 meters to fetch water. Majority, 132 (80%) takes less than 30 min to fetch water from the source, while 31 (18.8%) takes 1–2 hrs to fetch water from the source. 134 (81.2%) of the respondents say they will store water inside home. Among respondents, 110 (66.7%) of them says interruption is the reason for storing water inside home. Seventy seven (46.7%) takes water with tube while 78(47.3%) takes water directly from the tap. The average per capita water consumption was 9.81liters per day (± 6.49 SD).

Table 3, Description of water supply characteristics

Variables	Response Category	Frequency	Percent (%)
Drinking water source	Tap	163	98.8
	Protected spring/well	2	1.2
Time to fetch water	Below 30 min	132	80.0
	1 -2 hr	31	18.8
	Above 2hrs	2	1.2
Reason for long time	A lot of people/Queue	48	29.1
	Hard to fetch	7	4.2
	Other/Interruption	36	21.8
Method of fetching	Directly	78	47.3
	Using tube	77	46.7
	Using other materials	10	6.1
Distance of water from	<50	143	86.7

Variables	Response Category	Frequency	Percent (%)
home	>50	22	13.3
Cleanness of water storing material	Very clean	132	80.0
	Clean but need washing	31	18.8
	Dirty with algae formed	2	1.2
Method treating water in the house	Boiling and cooling	3	1.8
	Adding chlorine	2	1.2
	Without treatment	160	97.0
Hand washing material	Inside latrine	6	3.6
	On the gate of latrine	70	42.4
	With close distance from latrine	33	20.0
	No hand washing material	56	33.9

5.2.4 Sanitation:

From the households that are covered in the study 156 (94.5%) use latrine. And 155 (93.9%) of the latrine are functional. All, 4 of them (100%) practice open defecation when the latrine is not functional. From the total latrines 85 (51.5%) are maintained and 71 (43%) need maintenance on one part of it. From the total households that included in the survey 136 (82.4%) use standard pit latrine and 20 (12%) are VIP type of latrines. Most, 108 (65.5%) of the latrines doesn't have cover for the pit hole but 48 (29.1%) have cover. From the total households 100 (60.6%) have hand washing facility next to the latrine. One hundred nine, (66.1%) of the latrines found less than 6 meters from the house. The mean age of latrine is 4.4 yrs (S.D \pm 3.68). 149 (45.2%) of the families built the latrine based on self-initiation. 73 (44.2%) of the latrines are clean with some smell. Whereas 66 (40%) are

clean with no smell and 18 (10.9%) are smelly and disgusting with flies and feces. 156 (94.5%) of the families children less than 5 years doesn't use latrine. 153 (92.7%) of the families says that they will dispose under-5 children feces in the toilet.

Table 4, Sanitation description

Variables	Response Category	Frequency	Percent (%)
Latrine	Yes	156	94.5
	No	3	1.8
Functional	Yes	155	93.9
	No	4	2.4
Where did you use if not functional	On the field	2	50
	Backyard	1	25
	other	1	25
Status of latrine	Maintained	85	51.5
	Need maintenance	71	43.0
Which part needs maintenance	Superstructure	26	15.8
	Slab	21	12.7
	Roof	21	12.7
	Pit hole	3	1.8
Type of latrine	Standard pit latrine	136	82.4
	VIP	20	12.1
Distance of latrine from home	<6 m	105	63.6
	6-10 m	42	25.5
	>10m	12	7.3
Cleanness of latrine	Very clean with no smell	66	40.0
	Clean with some smell	73	44.2

Variables	Response Category	Frequency	Percent (%)
	Smelly disgusting with flies and feces	18	10.9
	Very smelly disgusting with flies and feces	2	1.2
Under – 5 children latrine usage	Yes	3	1.8
	No	156	94.5
Disposal of children feces	Disposed outside of compound	5	3.0
	Disposed in latrine	153	92.7
	Other	1	.6

5.2.5 Bivariate Analysis Result:

5.2.5.1. Socioeconomic factors:

Among socioeconomic factors, age of the mother, educational category of mothers, information source, and type of the house have an association and are eligible to multivariate analysis.

Table 5, Bivariate analysis results of socio economic factors

Variables	Crude OR (95% CI)	P value
Age category of mother		
< 25	7.40 (1.567, 34.935)	0.011
26 – 35	7.333	0.008

Variables	Crude OR (95% CI)	P value
	(1.690, 31.815)	
>36	3.500 (0.549, 22.304)	0.185
Maternal Education		
Illiterate	0.23 (0.021, 2.513)	0.230
Read and Write	0.05 (0.005, 0.572)	0.016
Primary(1-8)	0.17 (0.019, 1.466)	0.107
Secondary(9-10)	0.35 (0.039, 3.180)	0.352
Information Source		
Television	3.624 (0.856, 15.343)	0.080
Radio	1.389 (0.370, 5.219)	0.626
Type of House		
Kebele House	1.80 (0.575, 5.628)	0.313
House with compound	3.29 (1.249, 8.667)	0.016

Variables	Crude OR (95% CI)	P value
Cottage	2.68 (0.725, 9.927)	0.139

5.2.5.2. *Water supply factors:*

Distance from toilet, reason for waiting long time, distance of water source from home, method of taking water, place of hand washing, reason not having hand washing have association in Bivariate and were eligible for further multivariate analysis.

Table 6, Bivariate analysis result of water supply factors

Variables	Crude OR (95% CI)	P value
Distance of water source from toilet	0.836 (0.639, 1.092)	0.189
Reason for long time to fetch water		
A lot of people/queue	0.442 (0.152, 1.287)	0.134
Interruption	0.136 (0.024, 3.0.770)	0.024
Method of taking water		
Directly	0.45 (0.097, 2.094)	0.308
Using tube	0.29	0.138

Variables	Crude OR (95% CI)	P value
	(0.059, 1.480)	
Distance of water from home	0.990	0.030
	(0.982, 0.999)	
Distance of water source from the toilet	0.836	0.189
	(0.639, 1.092)	
Place of hand washing facility around toilet		
Inside toilet	2.778	0.366
	(0.303, 25.462)	
On the gate of toilet	2.436	0.032
	(1.080, 5.494)	
No hand washing	2.063	0.155
	(0.761, 5.596)	
Reason not having hand washing facility		
Taking water to the toilet	2.556	0.208
	(0.594, 11.000)	

5.2.5.3. Sanitation factors:

Functionality of latrine, cleanness of latrine, availability of hand washing, disposal of child feces has significant statistical association.

Table 7, bivariate analysis result of sanitation factors

Variables	Crude OR (95% CI)	P value
Functional latrine	17.083 (1.933, 150.961)	0.011
Availability of hand washing facility	1.794 (0.877, 3.669)	0.109
Water in hand washing facility	2.659 (1.291, 5.480)	0.008
Cleanness of latrine		
Clean with some smell	5.600 (0.323, 97.035)	0.236
Smelly disgusting with flies and feces	1.852 (0.111, 30.792)	0.667
Very smelly disgusting with flies and feces	5.667 (0.273, 117.448)	0.262
Under -5 children latrine usage	0.159 (0.014, 1.796)	0.137

5.2.6 Multivariate Analysis Results:

On multivariate analysis, among socioeconomic variables those are eligible and analyzed on forward likelihood ratio; only availability of information source in home is found to have significant association with childhood diarrhea. Children from households with no information source are 4 times more likely to have diarrhea than children from household's

without information source like TV and Radio, $P = 0.003$ [OR: 4.071 (1.62, 10.21) 95% CI].

From water supply factors that are significantly associated with under – 5 children diarrhea, only distance of water source have strong statistical association on final step multivariate analysis. Children from families that take water > 50 meters from water source more likely to have diarrhea than children from families that take water less than 50 meters. $P = 0.037$ [OR: 0.977 (0.955, 0.999) 95% CI].

Concerning sanitation factors, which are analyzed by multivariate analysis, only functionality of the latrine and hand washing around toilet are found to be significant. Having functional latrine is 14 times less likely to cause diarrhea on under – 5 years children compared to having not functional latrine. $P = 0.024$ [OR: 14.402 (1.425, 145.574) 95% CI]. Children that live in a home that have a hand washing facility are 2 times less likely to have diarrhea compared to those children that live in a house that doesn't have hand washing facility around toilet, $P = 0.031$ [OR: 2.436 (1.083, 5.481) 95% CI].

Table 8, Multivariate analysis results

Variables	Crude OR (95% CI)	Adjusted OR (95% CI)	<i>P value</i>
Functionality of latrine	14.402	2.66	<i>0.024</i>
Yes/No	(1.42, 145,57)		
Information Source in House	4.071	1.40	<i>0.003</i>
Present/Absent	(1.62, 10.21)		

Variables	Crude OR (95% CI)	Adjusted OR (95% CI)	<i>P value</i>
Hand washing around latrine	2.436	0.89	<i>0.031</i>
Available / Not available	(1.08, 5.48)		
Distance of water source from home	0.977	0.23	<i>0.037</i>
< 50m / > 50 m	(0.955, 0.999)		

CHAPTER SIX: DISCUSSION

The 15 day diarrheal prevalence of the area is 24.8% which is very high compared to the SNNP regional urban diarrheal prevalence which is 11% (EDHS, 2011), and the prevalence in the study from Keffa Sheka zone which is 15%. (Teklemariam et al., 2000) but it is very close with the study done in Nekemte town, western Ethiopia. Which is 28.9% (Girma, 2008). The similarity is may be due to the socioeconomic and demographic similarity between Nekemete town and Butajira town since both are urban areas. The difference between the prevalence between Keffa Sheka zone may be due to this paper is done in only urban area but the above contains both rural and urban data.

Educational status of the mother and father is not statistically associated with childhood diarrhea. This finding doesn't have similarity with EDHS report which states that children from illiterate mothers are more likely to have diarrhea (13.9%) than children from mothers that are educated up to primary level and above [12.6% primary level education, 10.2 % secondary level education and 10.9% more than secondary level education] (EDHS, 2011). This variation is may be due to, since the research is done in urban area, the knowledge gap between educated and non-educated mothers about child care or hygiene may be narrow and may not have significant relation.

Having source of information such as television and radio in the house found to have association with children diarrhea, children from households with no information source are 4 times more likely to have diarrhea than children from household's who have information source like TV and Radio, $P = 0.003$ [OR: 4.071 (1.62, 10.21) 95% CI]. by taking this as an indicator of wealth quintile, this finding also have similarity with EDHS report, it shows children from families with lowest wealth quintile have greater prevalence

of diarrhea (15 %) compared with children from highest wealth quintile (11.2%) (EDHS, 2011).

The average per capita water consumption from quantitative data of the study area is 9.8 liters per day. This figure does not coincide with the data from water supply service office which says the per capita water share for the people is 25 liters per person per day. This figure is less than by half from the WHO standard which says the average per capita consumption in developing countries should be 20 liters per person per day. But using the data from the questionnaire and testing it statistically association is not found. Even if it is statistically associated in bivariate analysis with childhood diarrhea the association disappeared in multivariate analysis, this finding has not similarity with the finding of research in Keffa Sheka zone, SNNPR, Ethiopia. Which founds increase in per capita usage decreases childhood diarrhea (Teklemariam et al., 2000).

The main problem observed during focus group discussion among households who are using piped water is interruption. Almost all of the participants of the focus group agreed interruption is a big challenge of the current on water supply service, most of the discussants have mentioned they are forced to store drinking water for three and more days inside home, because of the reason pipe water is not available all over the time to use directly from the pipe.

The interruption of water is significantly associated with childhood diarrhea in the bivariate analysis, but its significance disappeared at the second stage of multivariate analysis. This result has similarity with a study done in Yemen, showed that storing water due to interruption has an association with water pollution and childhood diarrhea (Lechtenfeld, 2012). Also, the study done in Egypt revealed that, access to an improved

uninterrupted water source has a significant negative effect on childhood diarrhea (Roushdy et al., 2012).

The finding of this study shows that distance of water source from house has a strong association with children diarrhea. Children from families that take water > 50 meters from water source are most likely to have diarrhea than children from families that take water less than 50 meters. $P = 0.037$ [OR: 0.977 (0.955, 0.999) 95% CI]. This finding is in consistent with the study done in Meskan and Mareko woreda, SNNP region (Mulugeta, 2003). This may be due to the water may get contaminated during transportation, and the people inclined to store water no to go long distance.

The other finding of this study is the presence of hand washing facility or material around latrine is significantly associated with childhood diarrhea. The study shows Children that live in a home that have a hand washing facility are 2 times less likely to have diarrhea compared to those children that live in a house that doesn't have hand washing facility around toilet, $P = 0.031$ [OR: 2.436 (1.083, 5.481) 95% CI]. This may be mainly due to the reason that people forget to wash their hands after using latrine if hand washing material is not available nearby the toilet. This in turn may be a cause for feco-oral transmission of pathogens. This finding has consistency with a study done in Rwanda, in which it recommends water supply around excreta disposal facilities is a must in order to control diarrheal diseases (Gasana, Morin, Ndikuyeze, & Kamoso, 2002).

CHAPTER SEVEN: CONCLUSION

The 15 days diarrheal prevalence of the area as previously studied was 34.3% (Mulugeta, 2003), this number is lowered by 9.5% in 10 years and the current prevalence of the area is 24.8%. This decrement of prevalence is may be due to the improvements and expansions of water supply and sanitation services. Compared to the above study on the area the water supply coverage was increased from 94% to 99% showing a 4% increment and sanitation coverage is also increased by 7%, from 87.5% to 9%.

The improvement in water supply and sanitation services coverage, as revealed by focus group discussants and indicated on water supply and sanitation service office report, has showed an impact in decreasing childhood diarrhea prevalence in Butjira town.

The findings of this study clearly showed that among socio economic factors included in the study, having information source have relation with childhood diarrhea. But factors like number of people living in the house (family size), type of the house, occupation of mothers and father doesn't have relation with childhood diarrhea.

From the finding of this research also found that among water supply factors distance of the water source has strong effect on childhood diarrhea. But method of fetching from water source, per capita water consumption, interruption of water supply type of water collecting material and cleanness of water storing material found to have no relation with childhood diarrhea.

Also from sanitation factors functionality of latrine and availability of hand washing around latrine have relation with childhood diarrhea, but factors like disposal of under 5 children feces, cleanness of latrine ,type of latrine doesn't have relation.

Therefore, distance of water source from home, availability of hand washing around latrine, functionality of the latrine and interruption of the water supply has impacted childhood diarrhea.

Comparing the more influencing factors, sanitation factors have more strong significance than water supply factors. This shows improvement on sanitation facilities will have a better probability in decreasing childhood diarrhea.

CHAPTER EIGHT: RECOMMENDATION

As shown in this study improvements in water supply and sanitation services has an impact on childhood diarrhea, therefore improving these problems means improving child health therefore the following recommendations are forwarded.

- Organizations that are working on accessing improved sanitation should consider providing hand washing simultaneously, because an availability of hand washing around latrine has a significant impact on decreasing childhood diarrhea.
- Water and sanitation service office should increase the concern of availing water sources in a possible short distance for the people. Since having water source in the near distance from home has a great advantage in the reduction of childhood diarrhea,
- As identified in the focus group discussion, interruption or irregular water supply /rationing/ is a big problem in the town. This problem inclines people to store water and this leads to household contamination of water, and made children less than age of 5 susceptible for diarrheal illness. Therefore the water supply office should improve the problem of water interruption and make the water regularly supplied to the town.
- Also by producing more water for the community, the water supply office should try to accomplish higher per capita water consumption of the community should be required.
- Health workers should provide education for the community to have clean latrine and to put hand washing facility in close distance from latrine for combating childhood diarrhea in the town.

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ANNEX 1, A RETROSPECTIVE DATA SHOWING WATER SUPPLY AND SANITATION SERVICES COVERAGE IN BUTAJIRA TOWN

Table 1, Latrine coverage compared to population number in 9 years in Butajira town.

Year	Population No	Number of Households	Number of Pit Latrine	Coverage of latrine (%)
2005	31114	6350	3492	55
2006	32786	6691	3881	58
2007	34548	7050	4300	61
2008	36405	7430	4651	62.6
2009	38362	7829	5245	67
2010	40423	8250	5734	69.5
2011	42596	8693	6433	74
2012	45210	9226	7242	78.5
2013	51931	11540	7758	80

Fig 1, Chart showing the number of households and available latrine in Butajira town from 2005 – 2013G.C

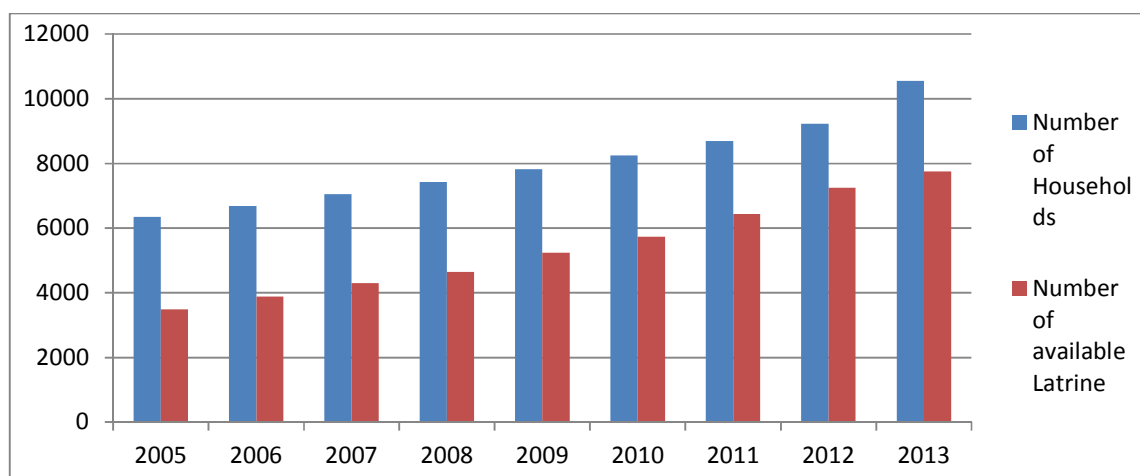
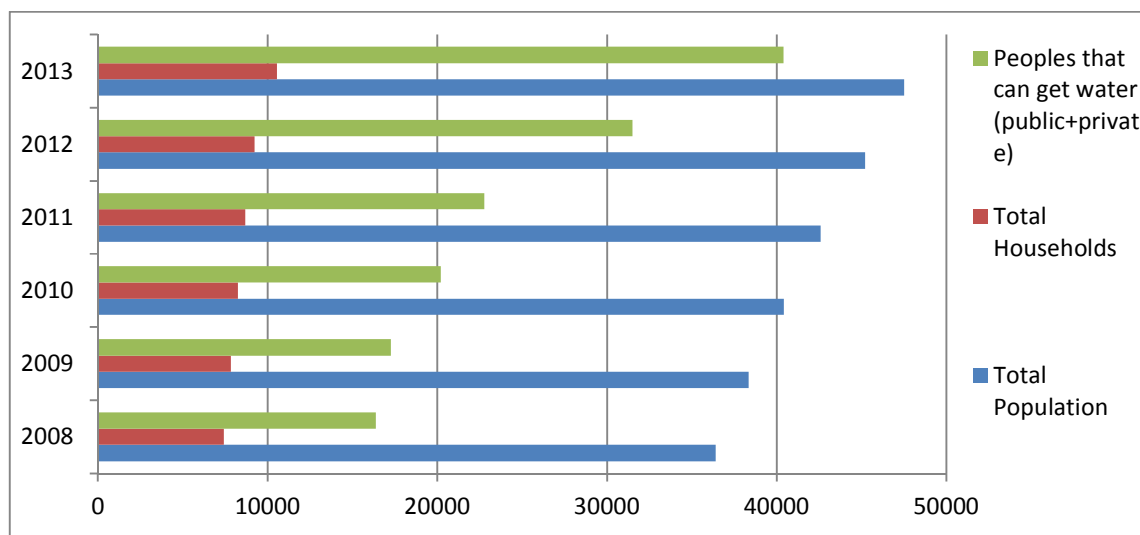


Table 2, Six years water supply and usage status of Butajira town, 2008 - 2013 G.C

Year (E.C)	Total popn.	Total H.H	Ppls that can get water (Public+private)	Amount of water produced in m ³ /yr (public+private)	Per capita water consumption L/day	Water supply coverage Of the
2008	36405	7430	16382	272867	20.5	45
2009	38362	7829	17263	277866	19.8	45
2010	40423	8250	20211	283807	19.23	50
2011	42596	8693	22773	290662	18.7	54
2012	45210	9226	31514	317675	19.5	70
2013	51931	11540	40388	443980	25.6	85

Fig 2, Chart showing the increase in coverage of peoples that can get water in Butajira town, 2008 - 20013 G.C



ANNEX 2, QUESTIONNAIRE (ENGLISH VERSION)

Introduction and Consent

Hello. My name is _____ and I am working as urban health extension worker in ----- kebele, in Butajira town. We are conducting a survey about impact of water supply and sanitation services on under-5 children diarrheal morbidity. We would very much appreciate your participation in this survey. This information will help the community in many aspects. The survey usually takes between 10 and 15 minutes to complete. As part of the survey we would first like to ask some questions about your household. Whatever information you provide will be kept strictly confidential, and will not be shared with anyone other than members of our survey team. Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer: ----- Date: -----

RESPONDENT AGREES TO BE INTERVIEWED DOES NOT AGREE TO BE INTERVIEWED → END



Informed consent Certified by

Interviewer:

House number _____ Name _____ signature _____

Date of interview _____ Time started _____ Time completed _____

Result of interview: 1. Completed, 2. Respondent not available, 3. Refused, 4. Partially Completed.

Checked Supervisor Name _____ Signature _____ Date _____

Thank you!!!

N.B Strictly follow the skipping part

House number_____ Name of kebele_____ Name of sub city -----

Part I: Socioeconomic and Demographic characteristics of respondent households of Butajira town.

Q.No	Questionnaire & filters	Coding and Categories	Skipping
1.1	Relation of the respondent to the child	1.Mother 2 Caretaker	
1.2	Total number of persons in the household	_____	
1.3	Marital status of the mother/caregiver	1. Married 2.Divorced 3.Single 4.Widowed	
1.4	Religion of the mother/caregiver	1.Orthodox 2.Protestant 3.Muslim 4.Other (specify)	
1.5	Ethnic group of parents/caretakers	1.Gurage 2. Selti 3.Amahara 4. Others.	
1.6	Age of the mother /caregiver		

		_____ Years	
1.7	Educational level of the mother/caregiver	Cannot read and write Read and write 1. Primary (1-8) 2.Secondary (9-10) 3.11 and above	
1.8	Occupation of the mother/caretaker	1.Housewife 2.Government employee 3.Privatework 4.Other(specify)	
1.9	Age of the child's father	_____ Years	
1.10	Educational level of the father	1.Cannot read and write 2.Read and write 3.Primary (1-8) 4.Secondary (9-10) 5. 11 and above	
1.11	Occupation of the father	1.Father 2.Government employee 3.Merchant	

		4.Other(specify)	
1.12	Does the family own radio?	1.Yes 2. No	
1.13	Do you have domestic animals?	1.Yes 2.No	
1.14	Which one of the following animals do you have? And how much?	Cattle___ Donkey___ Goat ___ Hen ___ Sheep___ Other /specify__	
1.15	Do you have other sources of income?	Specify in Birr/ year_____	

Part II: Information on water supply aspects in relation to child diarrheal morbidity:

Q.No	Questionnaire & filters	Coding and Categories	Skip
2.1	What is the main source of drinking water for members of your HH?	1.Piped water to yard/plot 2.Protected spring/well 3.well 4.River/stream 5.Other (specify	
2.2	Distance of the water source from the latrine	1. 5 m 2. 10 m 3. 15 m	

		4. > 20m	
2.3	How long does it take to get water at the source?	1.<30 minutes 2.1-2 Hrs 3. > 2Hrs	
2.4	Reason for long time	1. Hard to fetch 2. Interruption 3. Other	
2.5	Distance from the house to the water source	_____Meter	
2.6	Capacity of the container, which you used to collect drinking water yesterday?	_____Liters	
2.7	How many times did you collect water for drinking yesterday?	_____	
2.8	Type of collection container (observation)	1.Pot 2.Jerry can 3.Bucket 4.Other specify	
2.9	How do you transport the collected drinking water to your house? (Observation)	1.Covered 2.Uncovered	
2.10	How do you take water from the drinking water storage container?	1.Pouring 2.Dipping	
2.11	If it is by dipping ,do you have separate cup for this Purpose?(observation)	1.Yes 2.No	If No skip to Q 2.16
2.12	Where do you place the cup regularly (Observation)	No specific place Over container cover	

		At a place ready specifically it	
2.13	What do you usually do to treat the water to make it safer to drink?	<ol style="list-style-type: none"> 1. boil 2. Add bleach/chlorine? 3. strain through a cloth 4. without any treatment 5. Others (specify) 	
2.14	At what time do your families wash their hands?	<ol style="list-style-type: none"> 1. Before eating 2. Before preparing any food 3. Before feeding a child 4. After visiting a latrine 5. After cleaning child's bottom 6. At all critical moment 	
2.15	When do you wash your hands?	<ol style="list-style-type: none"> 1. Before eating 2. Before preparing food 3. Before feeding a child 4. After visiting a latrine 5. After cleaning child's bottom 6. At all critical moments 	
2.16	What do you usually use during hand washing especially after defecation, after cleaning child's bottom, before feeding children and before handling food?	<ol style="list-style-type: none"> 1. Only water 2. With soap/ash & water 3. Others/specify 	

2.17	If the answer to 2.13 is No, possible explanation.	1.Lack of local materials 2.Shortage of money 3.Not knowing its importance 4.Negligence	
------	--	--	--

Part III. Information on Sanitation Facility aspects in relation to child diarrheal morbidity:

3.1.	Do you have latrine? (Observation)	1.yes 2.No	If no, skip to Q 3.3 and 3.17
3.2.	Is the latrine functional? (observation)	1. Yes 2. No	
3.3.	If the latrine is not functional, where do you dispose human waste?	1. Open field 2. Other (specify)	
3.4.	What is the status of latrine? (observation)	1. Maintained 2.Need maintenance	
3.5.	Which parts of the latrine need Maintenance? (Observation)	1. Superstructure 2.Slab 3.Roof 4.Latrine pit 5.others/specify	
3.6.	What type of latrine do you have? (Observation)	1. pit latrine 2.VIP latrine 3. others/specify	
3.7.	Does the squatting have covered? (observation)	1.Yes 2.No	
3.8.	Is there some means of washing hands around the latrine?	1.Yes 2.No	

	(Observation).		
3.9.	How close are hand-washing facilities to the latrine?(Observation)	<ol style="list-style-type: none"> 1.Next to the latrine 2.Within walking distance 3.Inside the house 4.No facilities 	
3.10.	How far is the distance between the latrine and the house?(measure)	<ol style="list-style-type: none"> 1.<6 2.6-10 3.>10 	
3.11.	How many years since your latrine have been constructed?	Specify in months/year___/___	
3.12.	What are your reasons to construct latrines?	<ol style="list-style-type: none"> 1. Advice from health workers 2. Self-initiation 3. Seeing others 4.Imposition from others 5.Others/specify 	
3.13.	What is the condition of your latrine? (observation)	<ol style="list-style-type: none"> 1.Very clean and free of smell 2.Clean and with some smell 3.smelly and some feces shown on floor and squatting hole 4.Extremely smelly and disgusting with insects, flies, , feces on floor and squatting hole 5.Other specify 	
3.14.	Do the under 5 children use latrine?	<ol style="list-style-type: none"> 1.Yes 2.No 	If no , skip to

			Q3.16&3.17
3.15.	At what age do children start using latrine?	_____years	
3.16.	What are the reasons for not using the latrine by under 5 children?	1.Floor not safe to stand on 2.Large squat hole 3.Latrine not clean 4. bad smell 5.Others/specify	
3.17.	Where do you dispose feces of children who do not start using latrines?	1.Left in the house 2.Disposal in the compound 3. Disposal outside the compound... 4.Disposal into Pit latrine 5.Others/specify	

Part IV Information on Index Child

4.1.	Age of the Index child	_____months	
4.2.	Sex of the Index child	1. Male 2. Female	
4.3.	Birth order of the child	1. First 3. Third 2. Second 4. Fourth &above	
4.4.	Have you ever breast-fed your child?	1. Yes 2. No	
4.5.	For how long did you breastfed your child?	_____Months	

4.6.	What is his/her current breastfeeding status?	1. Exclusive breastfeeding 2. Partial breastfeeding 3. Not breastfeeding		
4.7.	At what age the child started supplementary /weaning food?	_____ Months		
4.8.	Do you (the mother/caretaker) have a history of diarrhea in the past two weeks?	1. Yes 2. No		
4.9.	Do your children affected with diarrhea in the past two-weeks?	1. Yes 2. No		
4.10	Which age group affected?	Age group M F 1. 0-5 months — — 2.6-11 months — — 3.12-23 months — — 4.24-35 months — — 5.36-47 month — — 6.48-59 months — —		
4.11	What actions do you take to treat/stop the diarrhea?	1. Take him/her to health institution 2. Take him/her to traditional healer 3. Increase feeding		

		<ol style="list-style-type: none">4. Give him/her ORS5. Give him/her cereal based fluids6. Stop/decrease feeding7. Homemade treatment8. Other (specify)		
--	--	---	--	--

ANNEX 3, QUESTIONNAIRE (AMHARIC VERSION)

የውሀ አቅርቦትና የአካባቢ ንጽህና አገልግቶች እድሜያቸው ከ 5 አመት በታች በሆኑ ህጻናት የተቅማጥ በሽታ ላይ ያለውን ተጽእኖ ለማጥናት የተዘጋጀ መጠይቅ

መጠይቅ ከመጀመሩ በፊት የይሁንታ መጠየቂያ ፎርም

ሰላምታ

ጤና ይስጥልኝ ፣ እኔ _____ እባላለሁ ። እኔ የ..... ቀበሌ ጤና ኤክስቴንሽን ሰራተኛ ነኝ። እዚህ የተገኘሁት የተወሰኑ ጥያቄዎችን ለመጠየቅ ሲሆን ጥያቄዎችም መጻፋት ቤት አጠቃቀም፣ የወጋ አቅርቦትና ንጽህና አገልግሎቶች ከ 5-ዓመት በታች ህጻናት ተቅማጥ ላይ ያለውን ተጽኖ ለማወቅ ነው።

የናንተ መልስ/ትብብር የህብረተሰባችንን ጤና ለማሻሻል ይረዳናል ። ስምዎ እዚህ ፎርም ላይ እይጻፍም እንዲሁም ከማንኛውም እርስዎ ከሰጡን መረጃ ጋር ተገናኝቶ ጥቅም ላይ አይውልም ። ማንኛውም እርስዎ የሚሰጡን መረጃ በሚስጠር ይበቃል የርስዎ ተሳትፎ በፈቃደኝነት ላይ የተመሠረተ ሲሆን ማንኛውንም ሊመልሱት የማያፈልጉትን ጥያቄ እንዲመልሱ አይገደዱም ። በመጠይቁ ቅር ከተሰኙ / ምሾት ካልተሰማዎት/ በማንኛውም ሰዓት መቋረጥ ይችላሉ ። መጠይቁ የሚፈጀው ከሰላሳ ደቂቃ አይበልጥም ።

መጠይቁን እንድቀጥል ፈቃደኛ ነዎት?

- 1. አዎ መጠይቁን ቀጥል
- 2. አይ አምቢ ያሉበትን ምክንያት በመጻፍ ወደ ሚቀጥለው ተሳታፊ ተሸጋገር ፡

ጠያቂው ፡ ስም----- ፊርማ.....
ቀን.....የተጀመረበት ሰዓት..... የተጠናቀቀበት ሰዓት.....

የመጠይቁ ውጤት 1. ተሟልቷል 2. ተጠያቂው አልነበረም 3. አምቢ አለ

1. በከፊል ተሟልቷል

የአረጋገጠው ሱፐርቫይዘር ስም-----ፊርማ-----
ቀን-----

ማሳሰቢያ: የሚታለፉ ቁጥሮችን ሳይዘነጉ ይለፉ

አመሰግናለሁ!!!

የቤት ቁጥር----- የቀበሌ ስም----- የክ/ከተማ ስም -----

ክፍል 1: ማህበራዊና ኢኮኖሚያዊ ሁኔታዎች

ተ.ቁ	ጥያቄ	ስማራጭ መሰሪቶች	ደስፋ
101	መላሻ/መላሹ ከህጻኑ ጋር ያላቸዉ ግኑኙነት	1.እናት 2.ሌላ አሳዳጊ	
102	የቤተሰብ ስብስብ ብዛት	-----	
103	የተጠያቂ እናት/አሳዳጊ ሰድሞ	-----	
104	የተጠያቂ እናት/አሳዳጊ የጋብቻ ሁኔታ	1.ያገቡ 2.የሴቱ 3.ያሳገቡ 4.ባስ የሞተባት	
105	ሃይማኖትዎ የእናት/አሳዳጊ ምንድነው ?	1.ክርስቲያን 2.ፕሮቴስታንት 3.ሙስሊም 4.ሱሳ/ደብዳቤ	
106	የህጻኑ ወላጆች/ አሳዳጊዎች ብሄረሰብ ?	1.ጉራጌ 2.ሰልጠ 3.አማራ 4.ሌሎች	
107	የተጠያቂ እናት/አሳዳጊ የትምህርት ደረጃ	1.ያስተማሩ 2.ማንበብና መጻፍ የሚችል 3.መጀመሪያ ደረጃ (1-8) 4.ሁለተኛ ደረጃ(9-10) 5.ከዚያ በላይ	
108	የስብሰባ የትምህርት ደረጃ	1.ያስተማሩ 2.ማንበብና መጻፍ የሚችሉ 3.መጀመሪያ ደረጃ (1-8) 4.ሁለተኛ ደረጃ(9-10) 5.ከዚያ በላይ	
109	ሥራዎት ምንድን ነው?	1.የቤት እመቤት	

		2.የመንግስት ሰራተኛ 3.የግሰ ሰራ 4.ሴባ/ ደጠቀስ	
110	የህጻኑ አባት ዕድሜ	-----ዓመት	
111	የባሰቤትዎ ስራ ምንድነው?	1.ገበሬ 2.የመንግስት ሰራተኛ 3.ነጋዴ 4.ሴባ/ደጠቀስ	
112	ለ ቤተሰቡ ሬድዮ/ ቴሌቪዥን አለው?	1.አለው 2.የለውም	
113	የቤት እንስሳት ስሳቸው?	1.ስዎ 2.የሰሞ	
114	የትኞች የቤት እንስሳት ስሳቸው? (በቁጥር ደግሰዱ)	ከብት ---- ስህያ ---- ፍየሰ----- ደሮ----- በግ-----ሴባ/ደጠቀስ-----	
115	ሌላ የገቢ ምንጭ ካለ ምን ያህል ነው?	-----ብር/ዓመት	

ክፍል 2: የውሀ አቅርቦት ሁኔታ እና አያያዝ ዕድሜያቸው ከ5 ዓመት በታች በሆኑ ህጻናት የተቅማጥ በሽታ ላይ ያለውን ፋይዳ ለማጥናት የተዘጋጀ መጠይቅ ::

ተ.ቁ	ጥያቄች	ስማራጭ መሰሪያ	ደስፍ
201	የመኖሪያ ቤቱ ወለል ሁኔታ(እይታ)	1.አፈር 2.እንጨት(ጣዉላ) 3.ሲሚንቶ 4.ሌላ (ይገለጽ)-----	
202	የመኖሪያ ቤቱ ጣሪያ የተሰራበት(እይታ)	1.የሳር ክዳን 2.የቆርቆሮ ክዳን 3.ሌላ (ይገለጽ)	
203	እንስሳት በቤት ውስጥ ከሰዎች ጋር አብረው ይኖራሉ?(እይታ)	1.ይኖራሉ 2.አይኖሩም	
204	በቤት ውስጥ ያሉት ክፍሎች ብዛት	-----	

205	በአብዛኛው ስቤት አገልግሎት የሚሆን ሁሃ ክዋት ደገኛል?	1. ቧንቧ 2. ከተጠበቀ ምንጭ/ ጉድጓድ 3. ካስተጠበቀ 4. ከሠንዘ 5. ስለ/ ደጠቀስ	
206	የሚጠቀሙት የውሀ ቦታ በአካባቢው ካለው የመጸዳጃ ቤት ምን ያህል ይርቃል?	5. 5ሜ 6. 10 ሜ 7. 15 ሜ 8. ከ20 ሜ በላይ	
207	ዉኃ ያለበት ከደረሱ በኋላ ለመቅዳት ምን ያህል ሰዓት ይወስዳል?	1. ከ30 ደቂቃ በታች 2. 1-2 ሰዓት 3. ከ 2 ሰዓት በላይ	
208	ውሀ ለመቅዳት ረጅም ጊዜ የሚወስድበት ምክንያት	1. ወረፋ ስላለ 2. ውሀ ስለሚጠፋ/ስለሚቆራረጥ 3. ሌላ/ ይጠቀስ	
209	ከቤት ወኃ ያለበት ምን ያህል ይርቃል?	-----ሜ/ኪ.ሜ	
210	ትናንትና ዉኃ ያመጡበት ዕቃ ምን ያህል ይይዛል	-----ሊትር	
211	ትናንትና የመጠጥ ዉኃ ስንት ጊዜ አመጡ	-----	
212	የቤት ሁሰጥ ሁሃ ማጠራቀሚያ ዕቃ ምንድነው? (እይታ)	1. እንስራ 2. ጂረካን 3. ባሳዲ 4. ስለ/ደጠቀስ	
213	ሁሃ ከሚቀደበት ቦታ ሲያመጡት ምንድን ያደርጋሉ?	1. ደክደናስ 2. አደክደንም	
214	ሁሃ ከማጠራቀሚያ ዕቃ የሚቀደበት ዘዴ ምንድን ነው?	1. በማዘንበስ 2. በመሞሰቅ	
215	በመሞሰቅ ከሆነ ሰዚሁ አገልግሎት የሚሆን ዕቃ አስዎት? (እይታ)	1. አዎ 2. የሰም	ከሴስ ወደ ቁጥር 216

216	የመሆንቅዳ ሰቃሡን የት ያስቀምጡታል? (እይታ)	1.በተገኘ ቦታ 2.ከክዳኑ በሳይ 3.ለዚህ በተዘጋጀ ቦታ	
217	ሰዎቹ ቁጥር 213እና214 መሰሰ የሰም ከሆነ ምክንያት ምንድን ነው?	1.ሞቀሙን ባሰማው 2.ዋጋው ከፍተኛ ስለሆነ 3.ሴሳ (ደጠቀስ)	
218	በቤት ውስጥ ወሃውን እንዴት በማከም/በማጣራት ይጠቀሙታል?	1.አፍልቶ በማቀጠቀጠ 2.ኪሎሪን በመጨመር 3.በንጽህ ጨርቅ በማጣራት 4.ያለምንም ህክምና 5.ሌላ (ይገለጽ).....	
219	የቤተሰብ ስባሳት እጃቸውን የሚታጠቡት መቼ መቼ ነው?	1.ከመሀን በፊት 2.ምግብ ከማዘጋጀት በፊት 3.ህዳር ከመሀን በፊት 4.ከመደዳጃ ቤት መጠቀም በኋላ 5.የህዳርን መቀመጫ ካጠቀሙ በኋላ 6.በቤትም ስለፈሳሪ ጊዜ	
220	እጃቸውን የሚታጠቡት መቼ መቼ ነው?	1.ከመሀን በፊት 2.ምግብ ከማዘጋጀት በፊት 3.ህዳር ከመሀን በፊት 4.ከመደዳጃ ቤት መጠቀም በኋላ 5.የህዳርን መቀመጫ ካጠቀሙ በኋላ 6.በቤትም ስለፈሳሪ ጊዜ	
221	ከመደዳጃ ቤት በኋላ ሰዎችን ካጠቀሙ በኋላ ምግብ ከማዘጋጀት በፊት ሰዎች ከመሀን በፊት እጃቸውን በምን ይታጠባሉ?	1.በውሃ ብቻ 2.በሰው/አጠቃላይ በውሃ 3.ሴሳ /ደጠቀስ	
222	ሰዎቹ ቁጥር 217 መሰሰ የሰም ከሆነ ምክንያት ምንድን ነው?	1.የሰቃቸውን እየረገጡ 2.ገንዘብ እየረገጡ 3.ሞቀሙን ባሰማው 4.ቸገሩን	

ክፍል ሶስት፡ በመጻፍጃ ቤትና አጠቃቀም ዙሪያ እድሜያቸው ከ5 አመት በታች በሆኑ ህጻናት ተቅማጥ በሽታ ዙሪያ ያለውን ተጽኖ ለመዳሰስ የተዘጋጀ መጠይቅ

301	መጻፍጃ ቤት አለዎት? (አይታ)	1.አዎ 2.የለም	ከለሌ ወደ ጥያቄ ቁጥር 303 & 317 እለፍ
302	መዳፍጃ ቤቱ ስገልግሎት በመስጠት ሳይ ነው ? (አይታ)	1.አዎ 2.የለም	
303	መጻፍጃ ቤቱ አገልግሎት የማይሰጥ ከሆነ ቤተሰቡ የት ይጠቀማል?	1.በየሜዳው 2.ሌላ(ይገለጽ)	
304	የመዳፍጃ ቤቱ ሁኔታ ምን ይመስላል? (አይታ)	1.የተጠገነ 2.ጥገና የሚያስፈልገው	
305	ጥገና የሚያስፈልገው የመዳፍጃ ክፍል የትኛው ነው? (አይታ)	1.ከሰላው 2.ወሰሎ 3.ጣፎ 4.ጉድጓድ 5.ሴሳ(ደጠቀስ)	
306	የመዳፍጃ ቤቱ ስደነት ምንድን ነው? (አይታ)	1.የተሰምዶ 2.ሽታ ስልባ 3.ሴሳ/ ደጠቀስ	
307	መጻፍጃ ቤቱ መቀመጫ ቀዳዳ ክዳን አለው? (አይታ)	1.አዎ 2.የለም	
308	ስለጅ መታጠቢያ የሚሆን ሰቃ ስለ-ዎት? (አይታ)	1.አዎ 2.የለም	ከሲላ ወደ ቁጥር 314
309	የእጅ መታጠቢያ ስመዳፍጃ ቤቱ ምን ያህል ይቀርባል?(አይታ)	1.ከመዳፍጃ ቤቱ ቀጥሎ 2.ትንሽ ፈቅ ብሎ 3.ቤት ውስጥ 4.መታጠቢያ የለም	
310	መጻፍጃ ቤት ከመኖሪያ ቤት ያለው ርቀት ምን ያህል ነው?(በመለካት)	1.<6 ሜትር 2.6-10 ሜትር 3.>10 ሜትር	

311	መዳዳሽ ቤቱ ከተሰራ ስንት ዓመት ሆኗል?	በወር ወይም በዓመት ይጠቀስ ----- -----	
312	መዳዳሽ ቤቱን ለመስራት ያነሳሳችሁ ምክንያት ምንድነው ?	1.ጤና ባለሙያዎች ባደረጉት ምክር 2.ሴቶችን በማየት 3.በራስ ተነሳሽነት 4.በቀበሌበመገደድ 5.ሴሳ(ይጠቀስ)	
313	የመዳዳሽ ቤቱ ስያሜዎ ሆኗል ምን ይመስላል? (አይታ)	1.በጣም ንደህና ሽታ ይሰጠው 2.ንደህ ሆኖ መጠንኛ ሽታ ያሰጠው 3.ሽታ ያሰጠው የተወሰነ ስደት ምክንያት በወሰዱ ሳይሆን 5.በጣም ስህተት ስህተት ምክንያት ምክንያት የተሰጠው 6.ሴሳ/የጠቀስ	
314	ከ 5 ዓመት በታች ያሉ ህፃናት መዳዳሽ ቤት ይጠቀማሉ?	1.አዎ 2.የለም	ከሴሳ ወይም ቁጥር 316እና317
315	ህፃናት መዳዳሽ ቤት መጠቀም የሚጀምሩበት ዕድሜ ቢጠቅሱ	----- ዓመት	
316	ከ5 ዓመት በታች ያሉ ህፃናት መዳዳሽ ቤት የማይጠቀሙበት ምክንያት ምንድነው?	1.ወሰዱ ስህተት ጥሩ ስህተት 2.ቀዳሚ ትልቅ ስህተት 3.ንደህ ስህተት 4.መካከል ሽታ 5.ሴሳ/ይጠቀስ	
317	መዳዳሽ ቤት መጠቀም ያልጀመሩ ህፃናት ስደት ምክንያት እንዴት ያስወግዳሉ?	1.ቤት ሁኔታ ይቀራል 2.በግቢ ሁኔታ ይጣሳል 3.ከግቢ ሁኔታ ይጣሳል 4.መዳዳሽ ቤት ሁኔታ ይጣሳል 5.ሴሳ /ይጠቀስ	

ክፍል - 4. ስለ ህጻኑ አጠቃላይ መረጃ

401	የህጻኑ ዕድሜ	-----ወር	
402	የህጻኑ ጾታ	1.ወንድ 2.ሴት	

403	ህጻኑ ለእናትዋ ስንተኛ ነዉ.	1.አንደኛ 2. ሁለተኛ 3.ሦስተኛ 4. አራተኛና ከዚያ በላይ	
404	ህጻኑ ከተወለደ ጡት ጠብቶ ያዉቃል?	1.አዎ 2.አያዉቅም	
405	ህጻኑ ለስንት ጊዜ ያህል ጡት ጠባ	-----ወር	
406	በአሁኑ ጊዜ ያለዉ የጡት አመጋገብ ሁኔታ	1.የጡት ወተት ብቻ ነዉ የሚመገበዉ 2.በከፍል የጡት ወተት ይመገባል 3.የጡት ወተት አይመገብም	
407	ህጻኑ ዕድሜዉ ስንት ወር ስሆን ነዉ ተጨማሪ ምግብ የጀመረዉ	-----ወር	
408	ህጻኑ የኩፍኝ መከላከያ ክትባት ተከትበዋል?(ዘጠኝ ወርና ከዚያ በላይ ጠይቅ)	1.አዎ(ከመላሷ/ሹ የተገኘ) 2.አዎ (ከ ካርድ የተገኘ) 3.አልተከተበም	
409	የቫታሚን ሴ እንክብሰ የወሰዱ ህጻናት አስዎት? (፩ ወርና ከዚያ በላይ ህጻናትን)	1.አዎ 2.የለም	
410	የቫታሚን ሴ እንክብሰ የወሰዱ ህጻናት በዕድሜ አሰጣጥ ቢጠቅሱ	የዕድሜ አሰጣጥ ወ ሴ 1.0-5 ወራት ---- ---- 2.6-11 ወራት ---- ---- 3.12-23ወራት ---- ---- 4.24-35 ወራት ---- ---- 5.36-47 ወራት ---- ---- 6.48-59 ወራት ---- ----	
411	የህጻኑ አያቶች መካከል በሚቆዩ በሽታዎች የታመመ ሰዉ ነበር/አለ?(አማራጮችን አንብብላቸዉ).	1.አስም 2.የስኳር በሽታ 3.የሳንባ ነቀርሳ እና ስጋ ዴዌ በሽታ 4.የጉቦት በሽታ	

		5.ሌላ(ይገለጽ):	
412	እናትየዋ/አሳዳጊዋ ባለፉት ሁለት ሳምንት ጊዜ ውስጥ ተቅማጥ ይሟላል ነበር?	1.አዎ 2.አልያዘኝም	
413	ባስፍት ዙሪያ ሳምንታት ውስጥ በተቅማጥ የተጠቁ ከ5 ዓመት በታች ህፃናት ነበሩ?	1.አዎ 2.የለም	
414	በተቅማጥ የተጠቁ ህፃናት በዕድሜ ክልል ቢጠቅሱ?	የዕድሜ ክልል ወ ሴ 1.0-5 ወራት ----- 2.6-11 ወራት ----- 3.12-23ወራት ----- 4.24-35 ወራት ----- 5.36-47 ወራት ----- 6.48-59 ወራት -----	
415	ተቅማጡን ለማቆም ለ ህጻኑ ምን አድርገዋል? (አማራጮቹን አታንብብላቸው) ከ አንድ በላይ መልስ ሊኖረው ይችላል	1.ወደ ጤና ድርጅት ወስጄዋለሁ 2.ወደ ባህል ህክምና ወስጄዋለሁ 3.ወትሮ ከምባላዉ ምግብ ተጨማሪ አሰጠዋለሁ 4.ኢ.አ.ኤስ አሰጠዋለሁ 5.ከተፈጠረ ጥራጥሬ የተዘጋጀ ፈሳሽ አሰጠዋለሁ 6.ወትሮ ከምሰጠዉ ምግብ ያነሰ አሰጠዋለሁ 7.በግል መድሀኒት ገዢ ሰጥቼዋለሁ 8.ሌላ (ይገለጽ).	

ANNEX 4, FOCUSED GROUP DISCUSSION QUESTIONS (ENGLISH VERSION)

Focused group discussion questions

1. What does the current water supply status looks like in your area?
2. What does the current sanitation status looks like in your area?
3. What do you think is the main problem regarding water supply in the town?
4. What is the main sanitation problem in your community?
5. How do you compare the current water supply and sanitation services access with previous times?
6. Do you think water supply and sanitation services have an association with childhood diarrhea?

ANNEX 5, FOCUSED GROUP DISCUSSION QUESTIONS

(AMHARIC VERSION)

1. በአካባቢያችሁ ህብረተሰቡ በበቂ ሁኔታ ሊጠቀምበት የሚችል የውሀ አቅርቦት በምን መልኩ ይገኛል?
2. በአካባቢያችሁ የመጸዳጃ ቤት አቅርቦት/አገልግሎት በምን መልኩ ይገኛል?
3. በአካባቢያችሁ/ በከተማው ውስጥ ከመጸዳጃ ቤት አገልግሎት አኳያ ምን አይነት ችግሮች ይታያሉ?
4. በአካባቢያችሁ/ በከተማው ውስጥ ከውሀ አቅርቦት አገልግሎት አኳያ ምን አይነት ችግሮች ይታያሉ?
5. በአሁኑ ሰአት ያለውን የውሀ እና የመጸዳጃ ቤት አገልግሎት ከበፊቱ ጋር በማነጻጸር እንዴት ትገልጹታላችሁ?
6. የውሀ እና መጸዳጃ ቤት አገልግሎቶች እድሜያቸው ከ5 አመት በታች በሆኑ ህጻናት ላይ ከሚከሰተው የተቅማጥ በሽታ ጋር ምን ግንኙነት ይኖረዋል ብላችሁ ታስባላችሁ?