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ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES
CENTRE FOR FOOD SECURITY STUDIES

FOOD SAFETY AND WASH KAP AND HOUSEHOLD FOOD SECURITY AMONG MOTHERS OF UNDER-FIVE CHILDREN IN URBAN INJIBARA AND RURAL KESSA, AWI ZONE, AMHARA REGIONAL STATE, ETHIOPIA

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THESIS ADVISER
PROFESSOR MOGESSIE ASHENAFI

ADDIS ABABA, ETHIOPIA
NOVEMBER, 2020

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MSC THESIS SUBMITTED TO COLLEGE OF DEVELOPMENT STUDIES, CENTER FOR FOOD SECURITY STUDIES, ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN FOOD SECURITY

NOVEMBER, 2020
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ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
CENTER FOR FOOD SECURITY STUDIES

Declaration of originality

I confirm that this thesis entitled *Food Safety and Water Sanitation KAP and household food security among Mothers of Under-Five Children in urban Injibara, and rural Kessa, Awi Zone, Amhara Regional State, Ethiopia*' is my own work carried out by me under the supervision of Professor Mogessie Ashenafi, Center for food Security studies, Addis Ababa University.

I further declare that this thesis is my original work and has not been submitted to any other university or examination institution for the award of any degree. I confirm that appropriate credit has been given within this thesis where reference has been made to the work of others and have been duly acknowledged.

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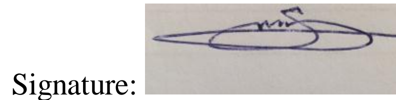
Signature: 

Date: November 12, 2020

Supervisor's approval:

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge as an advisor.

Approved by:

Mogessie Ashenafi (Prof)	____________________	November 13, 2020
Thesis Advisor	Signature	Date

Examiners' approval

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Final approval and acceptance of this thesis is contingent upon the candidate's submission of the final copy of the thesis, incorporating all the comments by

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ABBREVIATIONS

CSA	Central Statistical Agency
FAO	Food and Agriculture Organization
IBFAN	International Baby Food Action Network
KAP	Knowledge, Attitude and Practices
KIs	Key Informants
LIC	Low Income Countries
MDG	Millennium Development Goal
MNCH	Maternal, Newborn, and Child Health
PAHO	Pan American Health Organization
PEM	Protein Energy Malnutrition
SAM	Severe Acute Malnutrition
SDG	Sustainable Development Goals
STATA	Statistical Analysis
UN	United Nation
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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ABSTRACT

*Food safety problems, globally, resulted in illness of 600 million people death of 420,000 every years. Safe drinking water and basic sanitation are crucial to the preservation of human health, especially of children. This study assessed Knowledge, Attitude and Practice (KAP) of mothers of under-five children in Urban Injibara and Rural Kessa on Food Safety and Water, Sanitation and Hygiene (WASH) and evaluated household food access. **A** cross sectional study was performed during March to April 2020 across an urban Injibara and rural Kessa. A total of 235 mothers of under-five children were considered in this study. A modified version of previously validated questionnaire was used to gather information on socio-demographics, food handling, water sanitation, personal hygiene, existing water and sanitation facilities, water storage and treatment practices, waste disposal and hand washing practices. Household food access was also additionally evaluated using (HFIAS). Data was analyzed by using SPSS version 22 through descriptive and inferential statistics. Among the mothers, those aged 20 -40 years made up around 70% in rural and urban kebeles. There was high proportion of food secure (36% and 11%), mildly food insecure (38% and 46%) in urban than rural kebeles. Regarding HFIAS difference between urban and rural households was not significant (p>0.1). Average knowledge regarding food handling was low both in urban (30%) and rural (22%) settings. Knowledge of personal hygiene was also very low for urban (25%) and rural households (21%). Average water sanitation knowledge was also low (15% and 23% for urban and rural households, respectively. Average positive attitude was also low both in the urban (36%) and rural (32%) settings. Similarly attitude towards personal hygiene was also low (44% and 39% of urban and rural respondents, respectively). Rural households (81%) practiced mainly open defecation. Generally present study showed poor knowledge negative attitude and poor practice on food handling, personal hygiene water sanitation and WASH both in urban and rural settings. Regarding household food access difference between urban and rural households was not significant. Safe practice of water, sanitation and hygiene among mothers were affected by their education level and income.*

Keywords: *knowledge, attitude, practice, food safety, water, sanitation, hygiene, food access.*

CHAPTER 1

INTRODUCTION

1.1. Background

According to WHO (2002), the term food safety indicates the assurance that when food is consumed in the usual manner, it does not affect human health and wellbeing. However, WHO (2015) indicates that 600 million people globally fall ill and 420,000 die after consuming unsafe food each years. Because of this, currently food safety is a critical concern (Pattron 2004). Food safety is one of the least considered interventions in developing countries that affects food security due to loss of nutritional value (WHO, 2015). According to various studies, poor knowledge, attitude and practice (KAP) of hygiene, lack of basic sanitary facilities and negligence in safe food handling are major causes of poor sanitary conditions of food and drinking water at the household level (WHO, 2003). Food safety is the basic governmental issue to prevent or control food-borne illnesses. In response to the increasing number of food-borne illnesses, governments all over the world are intensifying their efforts to improve food safety (Rao et al., 2007). According to WHO, contaminated food contributes to 1.5 billion cases of diarrhea in children every year, resulting in over three million premature deaths (Henson and Reardon, 2005).

The transmission of food-borne diseases is aggravated by unsafe food handling practices of food handlers. Mudey *et al.,* (2010) reported that between 10% to 20% of outbreaks of food-borne diseases were caused by contamination from food handlers. Data about food-borne diseases in African region are still scarce (Wagacha and Muthomi, 2008). Although, mothers are usually the food handlers in homes, and ensure food safety at the household level, the status of their food handling knowledge and practices needs to be well understood (Medeiros, et al. 2004).

Improving the access to safe drinking water and adequate sanitation, as well as promoting good hygiene, are key components in the prevention of diarrhea. It was also indicated that access to adequate sanitation reduced the incidence of disease and brings relative comfort and ease to the daily routine of toilet use, thereby enhancing the quality of life (Sibiya and Gumbo 2013). A recent report by the World Health Organization in collaboration with UNICEF indicated that in 2006, an estimated 2.5 billion people were lacking improved sanitation facilities and

nearly one in four people in developing countries were practicing open defecation (WHO/UNICEF 2009). In addition to the provision of safe community water supply and sanitation services, there is a need for education on hygiene (Skhosana 2003).

The purpose of this study was, therefore, to evaluate household food insecurity, to determine food safety and water sanitation and hygiene among mothers of under-five children in urban Injibara and rural Kessa based on their KAP.

1.2 Statement of the Problem

Knowledge of food safety is associated with food safety practice (Rahman et al. 2016). However, knowledge of food safety and hygiene may not be translated into appropriate food safety practice (Wilcocket al., 2004). Attitude plays a significant role in food safety practice (Rahman et al. 2016). Safety knowledge, attitude, and practice are factors playing a fundamental role in food poisoning outbreaks prevention and control (Sharif et al., 2010). Food safety, knowledge and practices of food handlers interact in reducing food-borne outbreaks (Abdullahi, 2016.).

Availability of water, sanitation and hygiene (WASH) services by itself does not improve health problems related to unsafe water; households require adequate knowledge, positive attitudes and appropriate practices to maintain safety of drinking water. Safe drinking water and basic sanitation are crucial to the preservation of human health, especially among children. However Water, sanitation and hygiene related issues are still a burning issue in the context of developing countries

Absence of proper food safety KAP affect food security status at the household level. In developing countries, such as Ethiopia, the problem attains great proportions mainly due to lack of KAP. Relevant literature on KAP regarding household food safety, which influences nutritional and food security status of household members, is scanty in Addis Ababa (Nitsuhsew Taye 2019).

Among the major causes of morbidity and mortality in Ethiopia, water-borne diseases associated with unsafe water are important (Bayeh Abera 2018). Access to safe drinking water is an important public health and development issue worldwide. Household food safety and water sanitation practice are not well understood in many parts of Ethiopia as is the case in urban Injibara and rural Kessa.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study was to assess food security status of household and evaluate food safety and water, sanitation and hygiene (WASH) with respect to knowledge, attitude and practices among mothers of under- five children in Urban Injibara and rural Kessa in 2019/2020.

1.3.2. Specific Objective

The study addressed the following specific objectives to:

- ✓ Determine the socioeconomic and socio-demographic condition of sampled households in rural and urban settings.
- ✓ Evaluate access to food (food security status) using Household Food Insecurty Access Scale (HFIAS).
- ✓ Assess the food safety KAP of mothers of under five children.
- ✓ Assess the water, sanitation and hygiene KAP of mothers of under five children.

1.4. Research Questions

Based on the above specific objectives, the research attempts to answer the following question:

1. What is the knowledge, attitude and practice (KAP) of mothers of under five children regarding food safety and water sanitation and hygiene in urban Injibara and rural Kessa.
2. What are the different socio-economic and demographic factors affecting the KAP of food safety, water sanitation and hygiene of mothers of under five children and household food security status?
3. What is the food security status of households with under-five children?

1.5 Scope and Limitation of the Study

The study has limited spatial scope i.e. a kebele in urban Injibara and rural Kessa. Thus, this research as a preliminary work has limitation in generalizing findings to broader scope. This study has limitation with regard to data acquisition (in amount and time horizon) as a result of limited available financial and time resources.

1.6. Ethical Consideration

In case of data collection, ethical considerations were seriously taken into account to ensure the protection, integrity, anonymity, consents and other human elements of the informants. The respondents were not identified by names and their consent was acquired during interview and discussions.

1.7. Significance of the Study

This study shows the KAP status of mothers and caregivers of under-five children on food safety and water sanitation in an urban and rural setting in Awi Zone. KAP results in these locations are, therefore, useful in designing appropriate interventions to improve health of a child in the urban and rural communities of study area. This study also gives basis for further studying the status of food safety and water, sanitation and hygiene among mothers and caregivers of under-five children in other kebeles in Awi zone or in Amhara regional state as well in Ethiopia

CHAPTER 2

REVIEW OF LITERATURE

2.1. Food safety

Unsafe food is linked to the deaths of an estimated two million people annually, including many children in the world (Havelaar et al.; WHO, 2013).Safe food refers to food free of environmental and microbial contaminants that can cause food and water borne infections, risk of chronic diseases or death (Unnevehr, 2003). As a developing global problem, food safety significantly affects public health worldwide (Lamet. al., 2013). According to the World Health Organization, an estimated 600 million almost 1 in 10 people in the world-fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million healthy life years (WHO, 2017).

The food safety knowledge, attitudes, and practices (KAP) of mothers and caregivers is of great concern. Adequate knowledge and appropriate practice of mothers and caregivers about food safety was reported to be low thus putting the health of infants and children at risk from food borne diseases (Ferk, et. al., 2016; Green and Knechtges, 2015; Hassan and Dimassi, 2014; Stratev et al., 2017).

Unsafe food containing harmful bacteria, viruses, parasites or chemical substances is responsible for more than 200 diseases ranging from diarrhea to cancer (WHO, 2020); in addition to this, various epidemiological data indicate that a substantial proportion of food-borne disease is attributable to improper food preparation practices at consumers' homes (Redmond & Griffith, 2002). Solid waste disposal, sanitary condition and hand washing facilities, lack of knowledge of food safety, traditional beliefs, inadequate food safety laws, weak health extension service and a lack of health education about food safety and hygiene affect the four food security dimensions. (FAO, 1997)

Most of the food-borne diseases are preventable with proper food handling following the WHO's five keys to safer food: i) keep clean; ii) separate raw and cooked; iii) cook thoroughly; iv) keep food at safe temperatures; and v) use safe water and raw materials (WHO, 2006). Safe food refers to food free of environmental and microbial contaminants that can cause food and water borne infections, risk of chronic diseases or death (Unnevehr, 2003). Conversely, unsafe food

would be food unfit for human consumption due to environmental contaminants and pathogens. The food safety health risk ranges from short-term food-borne infections to long-term ill-health conditions (cancer, hypertension or coronary heart disease) (Dodd and Bayerl, 2012). Household food safety, therefore, will refer to protective measures such as food handling practices from acquisition until consumption by the households, which guard against contaminants and pathogens.

WHO estimates that in 2005, 1.8 million people died from diarrheal diseases caused by various pathogens (WHO, 2007). In Addis Ababa Administrative Region, for example, in 1995, recorded food borne illnesses consisted of 12,568 cases of ascariases, 3,167 of typhoid fever and 3,106 of tapeworm, among others (MOH, 2003/4). In addition to the above problems, chemical risks to food, such as pesticide residues and other chemicals are also concerns of food safety to consumers (WHO, 2018).

2.2 Water, Sanitation and Hygiene (WASH)

WASH is the acronym for Water, Sanitation and Hygiene. These three core issues are interdependent and are grouped together to represent a comprehensive approach. Each is a separate field but dependent on the presence of the other (Gomathi et al. 2017). For example, toilets help to prevent contamination of water sources and uncontaminated water sources are the basis for hygiene practices (UNICEF.2016).

One of the Sustainable Development Goals (SDG 6) envisions to "ensure access to water and sanitation for all by 2030". This calls for sustainable, and equitable access to safe drinking water, sanitation and hygiene, as well as the elimination of open defecation by 2030 (UNICEF 2016).

The United Nations General Assembly through 'Resolution 64/292', explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realization of all human rights (UN 2010). According to the resolution, states, in particular developing countries, have to provide safe, clean, accessible and affordable drinking water and sanitation for all.

WASH is important to child growth and development both in urban and rural communities around the world. It is necessary for health, nutrition, education and other outcomes for children (UNICEF 2016). Unhygienic practices such as open defecation eventually become sources of contamination to surface water and, thus, hamper availability of safe drinking water for communities.

Fecal transmitted disease causing organisms of microbial or parasitic nature result in poor WASH which is the main cause of gastrointestinal diseases, including cholera and diarrhea (Walker et al. 2013). These diseases are the second leading causes of morbidity and mortality among children under the age of five (Lim et al. 2013) and the leading causes of death in sub-Saharan Africa (Prüss-Ustün et al. 2014). Diarrhea and other water-borne diseases, linked to poor WASH and open defecation, result in child undernutrition (Checkley et al. 2008; Ziegelbauer et al. 2012). Thus, WASH is now considered as an essential nutrition-sensitive intervention to address undernutrition (UNICEF 2016).

Good public health requires not just access to an ample quantity of drinking water, but also that this water be safe to drink. Safe drinking water is water with no significant risk to health after consumption (WHO, 2008). For communities without reliable access to safe drinking water, household water treatment (HWT) provides a means of improving water quality and preventing waterborne diseases (Dejunget al. 2007. Clasen and Boisson, 2006.Sobsey2002) .The problem of access to safe water handling practice is not only hampered by the gap between knowledge and action, but also by wrong knowledge and attitude (Wasongaet, al. 2014), , In rural areas of many developing countries, particularly, the knowledge level regarding the direct link between unsafe water consumption and diarrheal diseases is very low (Bharti, 2013). Although many researchers identified the fact that hand hygiene is most important method in preventing the spread of infection, mothers do not view themselves as contaminator of their children. Young children, on the other hand, cannot wash their hands. Thus, mothers and care givers are the usual targets of behavior change campaigns.

In Ethiopia, ensuring safe drinking water remains a big challenge where waterborne diseases, including diarrhea, cause a great harm in many rural communities. Limited knowledge, misinformation, negative attitude, and lack of experience toward best practices of alternative water treatment technologies were among the leading challenges.

Globally 2.3 billion people do not have access to safe water at home, 844 million people are not supplied with drinking water (UNICEF 2017) and 2.5 million people lack access to improved sanitation (Rheinlander *et al,* 2015).

In peri-urban areas in Sub-Saharan Africa, there is inadequate access to safe drinking water. Moreover, movement of people from rural to urban areas, poverty, and poor sanitation and

housing conditions make achievement of healthy life difficult (Sheuya 2008). High incidences of diarrhea observed in peri-urban areas are generally due to poor water supplies. (Karn, 2002. Murage *et al,* 2007. Njoh and Akiwumi, 2011).

The most effective ways of reducing diarrheal disease are safe disposal of feces, hand washing with soap at critical times, and the treatment and storage of drinking water (Lubyet al, 2006). KAP on these issues are of great importance to prevent diseases carried by water.

Sanitation covers the whole field of controlling the environment with a view to prevent disease and promote health. Hygiene is commonly known as cleanliness or conditions and practices that serve to promote or preserve health. Improved housing, improved nutrition and improved hygiene with improved access to safe water, sanitation and good hygiene are the essential components for the war against infectious diseases and bases for clean environment, socio-economic development and sound public health (Greene, 2001).

Improving the access to safe drinking water and adequate sanitation, as well as promoting good hygiene, are key components in the prevention of diarrhea. It also indicated that access to adequate sanitation reduced the incidence of disease and brought relative comfort and ease to the daily routine of toilet use, thereby enhancing the quality of life (Sibiya and Gumbo, 2013).

2.3 Conceptual frame work of KAP regarding Food safety and Water sanitation

Multiple factors may have effect on the KAP of mothers regarding food safety, water sanitation and hygiene and it affects the household food access. The common factors are socio-demographic and economic factors. The mothers' knowledge and attitude in-turn will affect their practice when it comes to food safety, water, sanitation and hygiene.

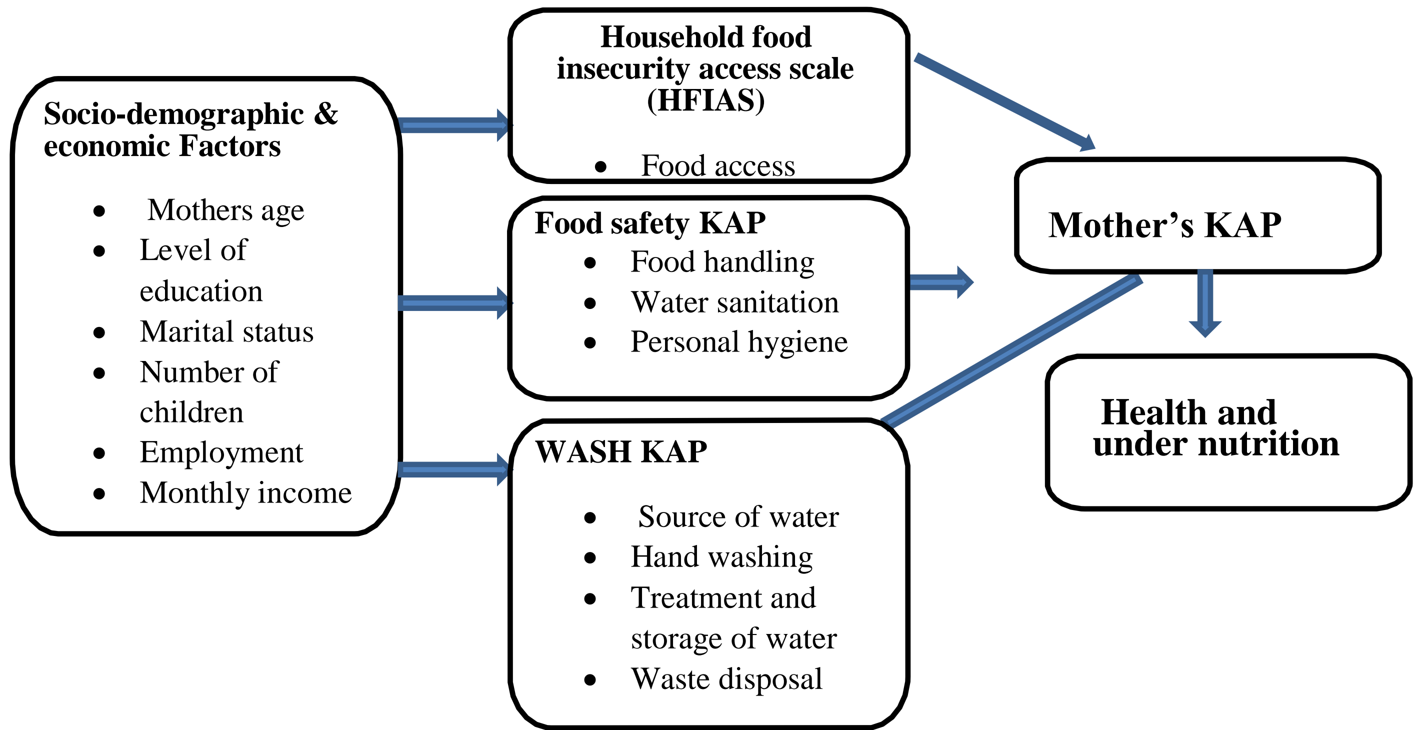

Figure 1: Conceptual frame work (own constructed)

CHAPTER 3

METHODS AND MATERIALS

3.1 Description of the Study Area

The study was carried out in Injibara, Awi Zone, Amhara, Ethiopia, which is located at 342 km away from Addis Ababa, the capital city of Ethiopia. It is the administrative center of the Awi Zone in the Amhara Region. Injibara is located at 10°57′N 36°56′E, in an elevation of 2560 meters above sea level (CSA, 2007). Based on figures from the 2007 census, Injibara has an estimated total population of 21,065, of whom 10,596 are males and 10,469 are females (CSA, 2007). Urban Injibara is the capital city of Awi zone, Amhara National Regional State (ANRS). According to the data obtained from the City Administration Office, there are ten rural-urban *kebeles* and one Urban center (Injibara town).

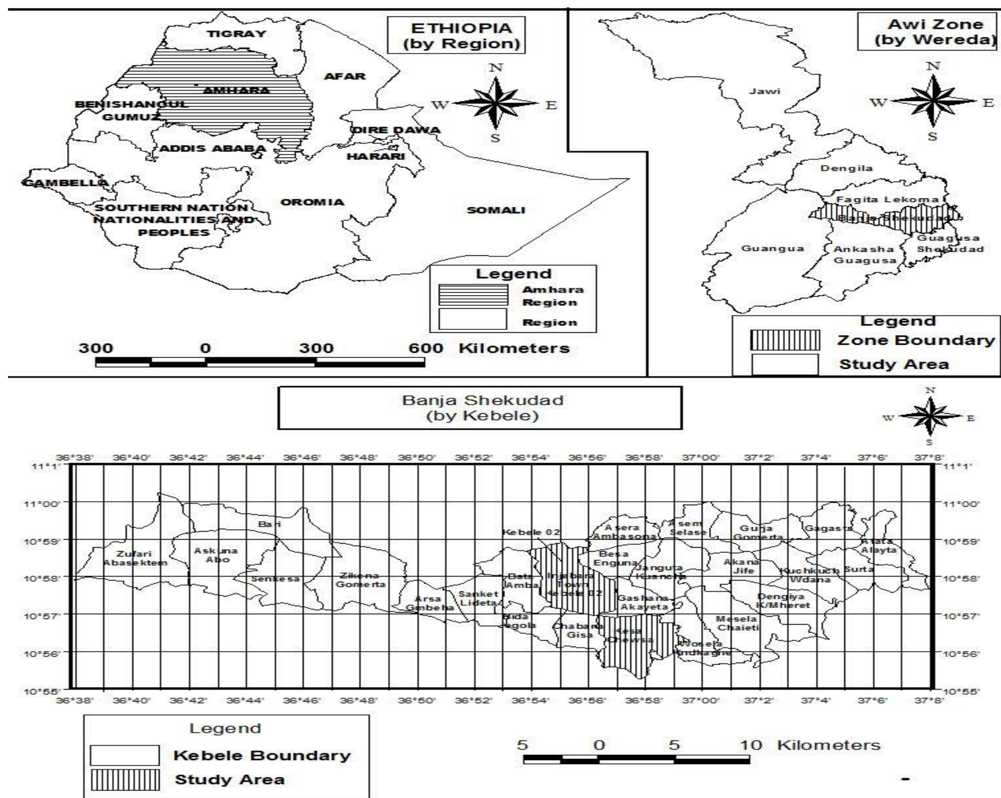

Figure 2 Injibara **sub-city kebele 02 and Rural** Kessa **chewsa kebele geographical map**

(Source CSA, 2012).

3.2. Research Design

This research employed a comparative cross-sectional study since it is a research tool used to capture information based on data gathered for a specific point in time. Quantitative data was collected. Quantitative data was collected by using semi-structured questionnaires. The study was conducted from March to April 2020

3.3. Sampling technique

In order to select the sample, this study applied a purposive sampling technique. Injibara was purposively selected as a study site because no research was conducted regarding knowledge, attitude and practice of mothers of under five children regarding food safety and water sanitation and hygiene. Therefore, two stages sampling procedure was used to draw samples for the study. Firstly, from the ten rural urban kebeles of the City administration of Injibara, one urban and one rural kebeles was purposively selected. Next, based on the total number of mothers of under five children who registered at City administration health office was selected using proportional allocation to sample size from each kebele. Households with under-five children were selected because health problems related to WASH and food safety result in high mortality in under-five children. Finally, the sample size required for our study was randomly selected from the selected two kebeles.

3.4. Source Population

The source population was all households with under-five children from two kebeles, one from urban and one rural setting.

3.5. Study Population

Randomly selected households with under-five children from households of selected kebeles were the study population.

3.5.1. Inclusion Criteria:

Selected households, who had under-five children.

3.5.2. Exclusion criteria:

Households who had children's but were not having under-five children.

3.6. Sources of Data

The study used both primary and secondary data sources. The primary data was collected from the selected households. Secondary data was gathered from recorded documents from Health administration office of Injibara sub city. The data was collected directly by the researcher.

3.7. Sample size determination

There were a total of 630 households with under-five children in the selected two kebele, namely Kebele 02 (Urban) and Kessa chewesa kebele (Rural).

The sample population consisted of randomly chosen households and the sample size was calculated based on Yamane (1967) at 95% confidence level. A population proportion formula was used to estimate the sample size needed for this study. Since working with a finite population and if the population size is known Cochran, (1963) and when the original sample collected is more than 5% of the population size, the corrected sample size is determined by using the Yamane formula for determining the sample size. So a population proportion formula was used to estimate the sample size needed for this study.

The sample size was determined by using this formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where n is sample size, N is the population size and e is margin of error equal to (0.05).

$$\text{Sample size} = \frac{630}{1 + 700\,(0.05)^2} = \underline{245}$$

Study area population (estimated number of mothers having under 5 children in the study area (N) = 630 (city admin data). The calculation given us a sample size (n) = 245

3.8. Tools and techniques of data collection

Data was collected using pretested structured questionnaire adapted from FAO guideline (Macias and Glasauer 2014) and HFIAS (Coates et al. 2007) semi-structured questionnaires with the study participants, it was translated into and administered in Amharic for easy communication with respondents, the primary data was collected through questionnaires from each household and secondary data gathering from the recorded documents. The data was collected directly by researcher. HFIAS was measured to assess food access using questionnaires.

3.9. Study Variables

3.9.1. Dependent variables

Household Food access in the households

KAP of Food Safety

KAP of Water, sanitation and hygiene

3.9.2. Independent variables

Independent variables are age of mothers, gender, marital status, Educational level, income, residency, occupation, religion.

3.10. Techniques of data analysis

Data was analyzed using SPSS for windows version 22. Descriptive and inferential statistical tools were used to analyze the data and multiple regression analysis was applied to determine the influence of certain socio-economic variables on household food security status, food safety and water sanitation and hygiene KAPs.

CHAPTER 4

RESULT AND DISCUSSIONS

The survey was conducted in February, 2020 for 25 days. Of a total 245 questionnaires filled in the study, seven were not correctly filled and rejected. The data is based on information obtained from 238 households of which 130 were from urban and 108 from rural households.

4.1. Socio-Economic & Socio-Demographic Characteristics

The respondents consisted of 235 females (128 from urban households) and three males (Table 1). Among the mothers, those aged 20 -40 years made up 69% and 70% in rural and urban households in this study, respectively.

Table 1. Socio economic and demographic status of the study households

Characteristics	Resident	
	Urban %	**Rural %**
Sex Mothers/ caregivers		
Male	5	0.9
Female	98.5	99.1
Mothers/caregivers Age Group		
20-30	28.5	52.8
30-40	40.8	18.5
40-50	19.2	19.4
Above 51	11.5	9.3
Marital status		
Married	82.3	94.4
Divorced	17.7	.6
Family size		
2-5	93.8	71.3
>5	6.2	28.7

Education	Resident	
	Urban %	**Rural %**
Illiterate	2.3	27.8
Read and write	43.1	67.6
Diploma and above	54.6	4.6
Religion		
Christian	94.6	100
Muslim	4.6	0
Others	0.8	0
Occupation		
Governmental	53.1	4
Private	15.4	9
Daily Labor	23.8	27.8
Farming	7.7	63.9
Monthly household income ETB		
500 -1000	9.2	38
1001-1500	6.9	17.6
1501- 2000	7.7	18.5
2001 & above	76.2	25.9

The majority were married, followers of Christianity and the families consisted of two to five members, although about 29% of rural families had greater than five members. About 98% of urban respondents could either read and write or had diploma level education or higher, whereas

20% of rural households were illiterate. About 49% of urban households worked in government offices or private businesses whereas 91% of rural households were mainly farmers or, to a lesser extent, daily laborers. About 76% of urban households had a monthly income of ETB 2000 or above. The monthly income for 74% of rural households was less than ETB 2000.

4.2 Household Food Insecurity Access (HFIAS)

Around 45% of urban and 55% of rural study households experienced food insecurity to varying extents during the four weeks prior to the study period (Table 2). A much higher proportion of rural households (89%) compromised the quality of food they ate either by not being able to eat preferred food, or eating limited variety of food or foods they did not like to eat than did urban households (35%). Similarly, 78% of rural households compromised the quantity of food they ate in the last four weeks either by eating smaller meals than they needed or eating fewer meals in a day because there was not enough food. This proportion for urban households was only 19%. Hunger was experienced by 26% or rural and 5% of urban households during the previous four weeks prior to this study. Similar to the observations observed in Nigeria (Abu and Soom, 2016) and Yemen (WFP 2012), this study also showed that rural households experienced the different levels of food insecurity more than rural households.

Table 2. Mean values of household food insecurity experience among urban and rural respondents in the past four weeks.

Household food insecurity experience	Locality	Occurrence	Frequency*		
			Rarely	Sometimes	Often
Anxiety and uncertainty	Urban	44.6	38.5	6.2	0
	Rural	55.6	63.9	31.5	0
Reduced quality of food	Urban	34.6	29.7	4.6	0
	Rural	88.9	72.2	17	0
Reduced quantity of food	Urban	19.2	15.4	3.1	0
	Rural	77.8	71.3	7.4	0
Hunger	Urban	5.4	5.4	0	0
	Rural	25.9	24.1	0	0

*Rarely (1 or 2 times), sometimes (3 to 10 times), Often (more than 10 times)

Based on the HFIAS data and following the methods of Coates et al (2007) respondents the in urban and rural households were classified into four food security categories (Table 3). Food secure

households were 36% and 11% of urban and rural respondents, respectively. Mildly food insecure households made the highest proportion of the categories (about 38% and 46% of households in urban and rural setting, respectively). Higher proportion of moderately and severely food insecure households were also found in rural than urban households. Difference between urban and rural households was not significant (p>0.1).

Table 3. HFIA prevalence in *urban and rural households*.

Category	Urban	Rural	Both
Food secure	36.3	11.4	20.7
Mildly food insecure	37.8	45.8	43.1
Moderately food insecure	18.8	28.9	25.4
Severely food insecure	6.3	13.9	11.3

4.3. Food Safety KAP of respondents

Food safety KAP among respondents was assessed in terms of food handling personal hygiene and water sanitation (Table 4).

Food safety knowledge

Assessment of knowledge of basic food safety principles of food handling dealt with knowing the reasons for separating raw foods from cooked foods, identifying signs of thorough cooking, storing perishable and left over foods at cool places and washing raw vegetables and fruits before eating. Raw foods, particularly those of animal origin, and the juices that drip from them may contain disease causing microbes, which can be transferred to other foods during preparation and storage (WHO 2006). For this reason, it is important to separate raw foods from cooked foods during preparation or storage. Similarly, thorough cooking of foods ensures safety. The importance of proper cooking in food safety lies in its effectiveness to kill almost all disease causing microbes. Therefore, cooking sauces should go to the point of boiling (Mogessie Ashenafi. 2012), which is the only direct sign of thorough cooking. Other concerns of food handling are perishable foods that spoil fast by allowing spoilage microbes grow in them. Storing perishable and left over foods by holding them at cooler temperatures slows down the multiplication of microbes in them (WHO 2006). Average knowledge among respondents regarding food handling was low both in urban (30%) and rural (22%) settings.

Knowledge of personal hygiene principles among the respondents was assessed based on appropriate hand washing and ways to avoid germs from feces. Disease causing microbes are widely found in soil, water, animals, and people. Hands, wiping cloths, and utensils may carry these microbes and any contact can transfer them to food and cause diseases (Woldt and May 2015). Knowledge of personal hygiene was also very low for urban (25%) and rural households (21%). Similarly, knowledge of treating unsafe water for drinking was also considered under food safety. To prevent illness from drinking contaminated water or fluids, water should be disinfected before use by boiling or adding disinfectants in the right concentration (CDC, 2020). Treating drinking water and maintaining sanitation have been efforts in developing countries to reduce diarrheal disease (Zwane and Kremer 2007).

Respondents' knowledge of water sanitation and hygiene was assessed in terms of treating unsafe water. Average water sanitation knowledge among the respondents was low (15% and 23% for urban and rural households, respectively) (Table 4). In general, total average knowledge of all food safety measures considered in this study was poor (around 24% and 22% for urban and rural households, respectively). Difference between urban and rural households in food safety knowledge was not significant ($p>0.1$). Knowledge of respondents in this study was much lower than that observed in Malaysia (Dora-Liyanam 2018; Nee and Sani 2011) but comparable to a similar observation from Dangla, Ethiopia (Ayehu Gashe et al. 2014).

Table 4. Average household food safety knowledge of respondents in the study area

KNOWLEDGE	Urban (130)	Rural (108)
FOOD HANDLING		
Reason for Separation of raw and cooked foods	43.1	25
Signs of thorough cooking	33.1	27.8
Perishable foods to be stored in a cool place	7.7	1.9
Reasons to avoid leftovers not kept in a cool place	30.8	18.5
Washing raw fruits and vegetables before eating	5.4	36.1
Average knowledge of food handling	***30***	***21.9***
PERSONAL HYGIENE		
Appropriate hand washing	30	20.4
Ways to avoid sickness from germs from feces	20	22.2
Average knowledge of personal hygiene	***25***	***21.3***
WATER SANITATION		
Treating unsafe water	15.4	23.1

Food safety attitude

Attitudes are emotional, motivational, perceptive and cognitive beliefs that positively or negatively influence the behavior or practice of an individual (Macías and Glasauer, 2014). Thus, the practice of food safety by respondents is influenced by their attitude towards food safety.

Table 5. Average positive attitude of respondents towards food safety in the study area

ATTITUDE	Urban	Rural
FOOD HANDLING		
Likely to get sick from eating contaminated food	3	32.4
Serious to get sick from eating contaminated food.	40	38.9
Good to cold store perishable foods, re-heat left-overs, clean wash fruits and vegetables	30	31.5
Not difficult to re-heating left-overs or clean wash fruits and vegetables	33.1	23.1
Average positive attitude to food handling	***36.4***	***31.5***
PERSONAL HYGIENE		
Likely to get stomach ache or diarrhea, from not washing hands.	43.1	35.2
Serious to get diarrhea from not washing hands.	42.3	38
Good to wash hands before preparing food or before feeding a child/eating.	43.8	39.8
Not difficulty to wash hands before preparing food or before feeding a child/eating	45.4	41.7
Have confidence in washing hands properly	43.1	38
Average positive attitude to personal hygiene	***43.5***	***38.5***
WATER SANITATION		
Likely to get sick from using unsafe water	49 37.7	39.8
Serious to get sick from using unsafe water	54 41.5	18.5
Good to boil water before drinking or using it	36 27.7	4.6
Not difficult to boil water before drinking or using it	28 21.5	8.3
Have confidence in boiling water before drinking or using it	51 39.2	28.7
Average positive attitude to water sanitation	***33.5***	***20***
TOTAL POSITIVE ATTITUDE **Significantly different P<0.1**	**37.8**	**30**

Attitude, in this study, was assessed in terms of respondents' perceived susceptibility to food borne diseases, perceived severity of such diseases, perceived benefits of implementing food safety measures, and perceived difficulty of implementing such measures. Assessment of attitudes was applied to food handling. Personal hygiene and water sanitation. Rate of average positive attitude was low both in the urban (36%) and rural (32%) settings. Similarly average

positive attitude towards implementing personal hygiene measures was also low (44% and 39% of urban and rural respondents, respectively). The positive attitude rate for water sanitation was even lower (Table 5). Positive attitude towards implementing food safety measures among respondents was comparable to an observation from Egypt (Allah et al. 2017), but lower than that from Debarq, Ethiopia (Henok Dagne et al. 2019) and Saudi Arabia (Ahmed et al., 2018)

Food safety practice

Practice of food handling was measured with respect to cleaning utensils and kitchen surfaces to avoid contamination of foods and storing perishable foods at cooler temperatures to prevent or reduce growth of contaminating microbes. Practice of personal hygiene was evaluated with regards to ways of washing hands. To assess practice of water sanitation, source of water, cleaning water collection items, describing how water was stored and treating unsafe water were considered. Appropriate practices of food handling among the respondents was less than 20%.

Table 6. Average appropriate practice of respondents in food safety in the study area

PRACTICE	Peri-urban	Rural
FOOD HANDLING		
Cleaning of kitchen surfaces and utensils after preparing dinner	16.2	15.7
Storing perishable fresh foods	15.4	13.9
PERSONAL HYGIENE		
Ways of washing hands	26.2	26.9
WATER SANITATION		
Main source of water for drinking, cooking and hand washing		
Piped water	20.8	0
Tube well	3.8	6.5
spring	2.3	23.1
Cleaning collection item	23.1	21.3
Description of how water is stored	8.5	5.6
Treatment of water to make it safe to drink	24.6	9.3
TOTAL APPROPRIATE PRACTICE	**19.6**	**13.2**

Only about a quarter of respondents practiced appropriate ways of washing hands (Table 6). This value is comparable to the findings of Takanashi et al (2009) from Viet Nam but lower than the observation by Henok Dagne et al (2018) from Debark town, Ethiopia and Hothur et al. (2019) from Andra Pradesh, India. Microbes are mainly transmitted by hands and hand washing is

therefore the most important step to prevent food poisoning during food preparation (CDC 2020). Washing hands frequently with soap and water prevents microbes from spreading around the kitchen and to other foods (CDC 2020; Paulson 2000). Average appropriate practice of treating of water to make it safe was higher than that observed in India (Hothur et al. 2019). Boiling and treatment with water disinfecting tablets is the only way of making water safe to drink (CDC 2020).

4.4 Water Sanitation and Hygiene – WASH

For the majority (63%) of urban households in this study, the main source of drinking water was piped municipal water, whereas rural households (87%) depended on well or spring as source of drinking water (Table 7).

Table 7. Water source for respondents in the study

Water source	Urban	Rural
Main source of drinking-water for household?		
Piped water	63.7	0
Tube well	7.6	13.5
Well or spring	10.6	28.8
Unprotected spring	18.1	57.7
Time to fetch water		
5 minutes	72.7	0
6-30 minutes	27.3	28.8
>30 minutes		71.2
Household member who fetches water for household		
Adult woman	45.5	59.6
Adult man	10.6	7.7
Female child under 15 years)	31.8	25
Male child under 15 years)	12.1	7.7
Time to collect water		
Adequacy of collected water to fulfill daily requirement		
Adequate	60.6	96.2
Inadequate	24.2	3.8
Note Sure	15.2	0
Year of maximum water shortage		
January – March	62.1	40.4
April - June	28.8	59.6
July – September	6.1	0
None	3	0
Problems usually faced in water supply		
Irregular	75.6	21.2
Unclean	13.6	42.3
Too far	6.1	32.7
Dirty water	4.5	3.8

While municipal water is centrally disinfected, springs and wells are usually exposed to contamination by microbes in the environment. There is risk of microbiological contamination of drinking water during collection and storage in the home (Clasen et al 2006). As source of

drinking water was either in the home or piped into yard or plot, it would take five minutes or less to 73% of urban households to collect water from the source.

Table 8. Water treatment and storage practices of respondents

Water treatment and storage		
	Urban	**Rural**
Drinking water storage container		
Clean container or jar	18.2	17.3
Covered container or jar	54.6	59.6
Clean and covered container or jar	10.6	5.8
Other	13.6	11.5
Don't know/no answer	3	5.8
Frequency of cleaning storage container?		
Before fetching water	77.3	88.5
When it is dirty	15.2	7.6
Every day	7.6	1.9
Safety of drinking water		
Safe	89.4	67.3
Unsafe	6.1	7 6.5
Don't know	4.6	19.2
Quality of water affects health?		
Yes	74.2	73.1
No	4.6	17.3
Don't know	21.2	9.6
Most common effects of using unsafe drinking water		
Diarrhea	47.7	45.7
Vomiting	32.6	54.3
Cholera	19.7	0

	Urban	**Rural**
Person suffered due to use of unsafe drinking water		
Family member	86.4	96.2
Friends	13.6	3.9
Treating water in any way to make it safer to drink		
Yes	93.9	67.3
No	6	32.7
Ways to make water safer to drink		
Boil it	48.5	11.
Strain it through a cloth	6.1	0
Use a water filter ceramic, sand, composite, etc.	19.	1.9
Let it stand and settle	21.2	51.9
Don't know/no answer	4.5	34.6
Reasons for not treating water		
Water is already clean/safe	43.9	30.8
Do not know how to do it	6.1	25
Expensive	7.6	3.8
Treated water does not taste good	37.9	5.8
Don't know	4.5	34.6
Challenge faced in procuring drinking water		
Timing?	63.6	7.7
Distance of source	36.4	92.3

However, 71% of rural households would spend over 30 minutes to fetch drinking water. In about 76% of urban and 85% of rural households, women and female children (under 15 years old) fetched water from collection point to household. Water shortage was at the maximum during the months of January to June for both urban (91%) and rural (100%) households. Major problem in water supply was irregularity of supply for urban households (76%) whereas for 75%

of rural households, unclean water and long distance of water source were the major problems (Table 8).

The proportion of households who stored collected water in clean and covered container was generally low (11% for urban and 6% for rural households). Urban (77%) and rural (89%) households cleaned storage containers before fetching water (Table 8). About 89% of urban households and 67% of rural households thought that drinking water was safe and 74% and 73% of urban and rural households, respectively, believed that quality of water affects life. It should, however, be noted that water, not collected from municipal sources or from protected walls, should not be considered safe and of good quality because it can easily be contaminated with fecal material of human or animal origin. Fecal material is the major source of intestinal microbes and parasites. Where households store water is as important as the primary source of water with respect to water safety. Reports showed that even if poor rural communities obtained drinking water from a 'safe' source, it could become contaminated during storage in the house (Jensen et al. 2002). For this purpose, cleaning of storage containers matters most. A study has identified significant contamination after water collection from source (Wright et al 2004). Even when water from the improved sources was free from fecal contamination, it was found, in a district of Sierra Leone, that, even the collected safe water, in household was subjected to frequent and extensive fecal contamination (Clasen and Bastable 2003).

In most rural households in this study, diarrhea (48%) followed by vomiting (33%) was the most common disease symptom from using unsafe water, whereas, in rural households, vomiting (54%) followed by diarrhea (46%) were the most common symptoms (Table 8). The majority of urban (86%) and rural (96%) households had a family number who suffered from diarrhea due to unsafe drinking water. About 94% of urban and 67% or rural households believed that they treated water to make it safe to drink. About 49% of urban households treated unsafe water by boiling whereas the majority of rural households (52%) only let the water in container to stand and settle. According to CDC (2020), the two dependable ways of treating water are boiling and treating with the right concentration of chlorine. Water from municipal sources is believed to be treated with chlorine. For urban households, the two major reasons for not treating drinking water were the belief that water was already clean/safe (44%) and that treated water did not taste good (38.5%). For rural households, on the other hand, not knowing whether water should be

treated (35%) and not knowing how to treat water (25%) were the major reasons for not treating water for safety. Point-of-use (household) water treatment is one of the major effective measures to make water safe (Clasen et al 2006).

The majority of urban households used pit latrine with slab (77%) or without (12%) slab. Family members of urban households (74%) used private toilet shared with other households (70%), whereas 90% of rural households used private toilets and 83% did not share toilets with other households (Table 9).

Table 9. Sanitation facilities for respondents in the study

Sanitation facility	Urban	Rural
Type of toilet/latrine used		
Flush/pour flush to piped sewer system or septic tank	10.6	0
Pit latrine with slab	77.3	0
Pit latrine without slab/open pit	12.1	34.6
Composting toilet	0	65.4
Kind of toilet facility usually used household members		
Public	6.1	0
Private	74.2	90.4
Both	19.7	9.6
Facility shared with other households		
Yes	69.7	17.3
No	30.3	82.7

Urban households (86%) disposed feces within premises. Rural households (81%) practiced mainly open defecation (Table 10). Waste water was also discharged into an open drainage (79%) or on the roads by urban households. On the other hand, rural households discharged waste water in an open drainage (40%) followed by on the roads (39%) and on the field (15%).

Table 10. Waste disposal practices of respondents

	Urban	Rural
Waste disposal	No %)	No %)
Where feces is usually dispose		
➢ Within premises	86.4	19.2
➢ Open defecation	13.6	80.8

	Urban	Rural
Where waste water is discharged?	No %)	No %)
➢ Open drainage	78.8	40.4
➢ On the roads	16.7	38.5
➢ No fixed pattern	0	5.8
➢ To the field	4.5	15.4

In Ethiopia, an estimated 35 million people defecated in the open because they did not have access to any form of toilet (Jones 2015). Of these, about 43% of people lived in rural areas. Practice of open defecation would result in a heavy disease burden by food and water-borne disease causing organisms (Jones 2015).

Poor management of waste leads to contamination of water and impacts on public health (Singh and Priya 2018). Inappropriate handling, treatment and disposal of waste contaminate water soil and food thus affecting the health of individuals (MOH 1995). Groundwater sources can be contaminated by household wastewater which may contain pathogens. This increases the risk of water borne diseases of microbial or parasitic origin. Moreover, poor drainage can lead to flooding that may damage water supply infrastructure and contaminate domestic water sources (Kolsky 1998).

All respondents in urban and rural households washed their hands before eating food. But only 92% and 71% of urban and rural households, respectively, washed their hands after defecation. The majority (79%) of urban households used water and soap for hand washing, whereas 50% of rural households used water and soap or water and ash to wash hands (Table 11). Urban and rural households practiced hand washing for the purpose of preventing infections (65% and 46%, respectively) followed by for maintaining hygiene (32% and 44%, respectively).

Table 11. Hand washing practices of households respondents in the study

	Urban	Rural
Hand washing	No %	No %
Critical times of hand washing?		
Before eating food	100	100
After defecation	92.4	71.2
After food	100	94.2
After weaning child	81.8	59.6
Material used for hand wash?		
Water and soap	78.8	30.8
Water only	18.2	50
Water and ash	3	19.2
Reasons for washing hands?		
To prevent infection	65.2	46.2
To maintain hygiene	31.8	44.2
Appears good	3	9.6

Hand washing with soap is one of the most effective steps taken to prevent diarrhea (Curtis and Cairncross 2003). Coverage of basic hand washing facilities in sub-Saharan Africa, in 2015, was less than 50%. Of these, about 60% were located in urban areas (Nguyen and Campbell 2017).

4.5 Regression analysis

The regression beta coefficient result indicates the effect of each independent variable on dependent variables. The standardized beta coefficient explains the average amount of change in the dependent variable that is caused by a unit change in the independent variable. (Cohen et al. 2007)

4.5.1 Multivariable regression analysis of factors associated with HFIAS

As shown the table hereunder, the regression result indicated that, all the independent variables; i.e. education level, income, family size, and resident, had positive beta coefficient.

The regression coefficient result shows that, there was a significant positive relationship between income and household food insecurity access scale with Beta value of b=0. .369, $p<0.05$). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 36.9 percent change on household food insecurity access scale. Therefore from this we can inferred that income has a strong and a significant impact on the household food insecurity access scale.

Table 12 also show that education level also has a significant positive relationship with household food insecurity access scale with Beta b=0.138, $p<0.05$ there will be 13.8% change in household food insecurity access scale as a unit change on education level.

Finlay as shown the below table the regression coefficient result of resident was beta b=0.097,$p<0.05$,i.e for a change on resident causes 9.7% change on household food insecurity access scale, also the regression coefficient result of family size also was Beta b=0.076, $p<0.05$,i.e for a change on family size causes 7.6% change on household food insecurity access scale.

Therefore the regression coefficient result indicates that the socioeconomic sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship with household food insecurity access scale.

Table 12. Multivariable regression analysis of factors associated with HFIAS among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.837	.217		8.462	.000
	Educlev	.120	.062	.138	1.938	.040
	Income	.185	.037	.369	5.055	.000
	Famsize	.126	.099	.076	1.273	.001
	Resident	.122	.076	.097	1.608	.003

a. Dependent Variable: HFSS

4.5.2 Multivariable regression analysis of factors associated with FSK

Table 13 shows the regression result indicated that, all the independent variables; i.e. Education level, income, family size, and resident, has positive beta coefficient.

The regression coefficient result shows that, there was a significant positive relationship between Income and food safety knowledge with Beta value of b=0. .182, p<0.05). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 18.2 percent change on food safety knowledge of households. Therefore from this we can inferred that income has a strong and a significant impact on the household food safety knowledge.

Table 13 shows that family size also has a significant positive relationship with household food safety knowledge with Beta b=0.176, p<0.05 there will be 17.6% change in household food safety knowledge as a unit change on family size.

The regression coefficient result of education level and resident also has a significant positive relationship with household food safety knowledge with Beta b=0.074 and 0.070 respectively, p<0.05, i.e for a change on education level and resident causes 7.4% and 7% change on household also household food safety knowledge respectively.

Therefore the regression coefficient result indicates that the sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship with household food safety knowledge.

Table 13. Multivariable regression analysis of factors associated with FSK among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.438	.348		7.013	.000
	Educlev	.059	.101	.074	.583	.041
	Income	.079	.051	.182	1.541	.026
	Famsize	.222	.119	.176	1.871	.044
	Resident	.079	.119	.070	.667	.006

a. Dependent Variable: FSK

4.5.3 Multivariable regression analysis of factors associated with FSA

Table 14 shows the regression result indicated that, all the independent variables; i.e. Education level, income, family size, and resident, has positive beta coefficient.

The regression coefficient result shows that, there was a significant positive relationship between Income and food safety attitude with Beta value of b=0.193, $p<0.05$). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 19.3 percent change on food safety attitude of households. Therefore from this we can inferred that income has a strong and a significant impact on the household food safety attitude

Table 14 shows that education level also has a significant positive relationship with household food safety attitude with Beta b=0.188, $p<0.05$ there will be 18.8% change in household food safety attitude as a unit change on education level.

The regression coefficient result of family size and resident also has a significant positive relationship with household food safety attitude with Beta b=0.107 and 0.86 respectively, $p<0.05$, i.e for a change on family size and resident causes 10.7% and 8.6% change on household also household food safety attitude respectively.

Therefore the regression coefficient result indicates that the sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship with household food safety attitude.

Table 14. Multivariable regression analysis of factors associated with FSA among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.123	.176		12.033	.000
	Educlev	.076	.052	.188	1.471	.044
	Income	.042	.026	.193	1.628	.006
	Famsize	.132	.060	.107	2.190	.031
	Resident	.049	.060	.086	.811	.049

a. Dependent Variable: FSA

4.5.4 Multivariable regression analysis of factors associated with FSP

Table 15 shows the regression result indicated that, all the independent variables; i.e. Education level, income, family size, and resident, has positive beta coefficient. The regression coefficient result shows that, there was a significant positive relationship between Income and food safety practice with Beta value of b=0.188, p<0.05). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 18.8 percent change on food safety practice of households. Therefore from this we can inferred that income has a strong and a significant impact on the household food safety practice.

Table 15 shows also family size has a significant positive relationship with household food safety practice with Beta b=0.180, p<0.05 there will be 18% change in household food safety practice as a unit change on family size. The regression coefficient result of education level and resident also has a significant positive relationship with household food safety practice with Beta b=0.042 and 0.067 respectively, p<0.05, i.e for a change on education level and resident causes 4.2% and 6.7% change on household food safety practice respectively.

Therefore the regression coefficient result indicates that the socioeconomic and sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship with household food safety practice.

Table 15. Multivariable regression analysis of factors associated with FSP among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.366	.446		5.301	.000
	Educlev	.044	.130	.042	.336	.048
	Income	.101	.066	.188	1.534	.028
	Famsize	.307	.152	.180	2.019	.046
	Resident	.097	.153	.067	-.637	.025

a. Dependent Variable: FSP

4.5.5 Multivariable regression analysis of factors associated with WSK

Table 16 shows the regression result indicated that, all the independent variables; i.e. Education level, income, family size, and resident, has positive beta coefficient. The regression coefficient result shows that, there was a significant positive relationship between income and water sanitation knowledge with beta value of b=0.100, $p<0.05$). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 10.0 percent change on water sanitation knowledge of households. Therefore from this we can inferred that income has a strong and a significant impact on the household water sanitation knowledge.

Table 16 shows that education level also has a significant positive relationship with household food safety attitude with Beta b=0.031, $p<0.05$ there will be 3.1% change in household water sanitation knowledge as a unit change on education level. The regression coefficient result of family size has no a significant positive relationship with household water sanitation knowledge since beta b=0.073, $p>0.05$, i.e. for a change on family size no impact on household water sanitation knowledge and whereas regression coefficient result of resident has a significant positive relationship with household water sanitation knowledge with Beta b=0.005, $p<0.05$, i.e for a change on family size and resident causes 0.5% change on household water sanitation knowledge.

Therefore the regression coefficient result indicates that the sociodemographic characteristic (Education level, income and residency) has positive and significant relationship, whereas family size has no positive and significant relationship with household water sanitation knowledge.

Table 16. Multivariable regression analysis of factors associated with WSK among mothers of Under five children in Injibara and rural kessa. (2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.386	1.453		2.330	.022
	Educlev	.109	.399	.031	.273	.045
	Income	.225	.257	.100	.877	.042
	Famsize	.673	.871	.073	.773	.051
	Resident	.025	.503	.005	.049	.044

a. Dependent Variable: WSK

4.5.6 Multivariable Regression Analysis of Factors Associated with WSA

Table 17 shows the regression result indicated that, all the independent variables; i.e. education level, income, family size, and resident, has positive beta coefficient. The regression coefficient result shows that, there was a significant positive relationship between income and water sanitation attitude with beta value of $b=0.202$, $p<0.05$). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 20.2 percent change on water sanitation attitude of households. Therefore from this we can inferred that income has a strong and a significant impact on the household water sanitation attitude.

Table 17 shows that education level also has a significant positive relationship with household water sanitation attitude with Beta $b=0.150$, $p<0.05$ there will be 15.0% change in household water sanitation attitude as a unit change on education level. The regression coefficient result of resident has a significant positive relationship with household water sanitation attitude with beta $b=0.182$, $p<0.05$, i.e for a change on resident causes 18.2% change on household water sanitation attitude.

The regression coefficient result of family size has a significant positive relationship with household water sanitation attitude with Beta b=0.023, p>0.05, i.e. for a change on family size by 2.3% there will be change on household water sanitation attitude. Therefore the regression coefficient result indicates that the sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship household water sanitation attitude.

Table 17. Multivariable regression analysis of factors associated with WSA among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.499	.262		9.554	.000
	Educlev	.096	.072	.150	1.341	.043
	Income	.083	.046	.202	1.787	.037
	Famsize	.038	.157	.023	.245	.047
	Resident	.172	.091	.182	1.903	.040

a. Dependent Variable: WSA

4.5.7 Multivariable regression analysis of factors associated with WSP

Table 18 shows the regression result indicated that, all the independent variables; i.e. Education level, income, family size, and resident, has positive beta coefficient. The regression coefficient result shows that, there was a significant positive relationship between Income and water sanitation practice with Beta value of b=0.119, p<0.05). This beta coefficient of income was the highest among the four independent variables. This can be interpreted as, for a unit change in income there will be a 11.9 percent change on water sanitation practice of households. Therefore from this we can inferred that income has a strong and a significant impact on the household water sanitation practice.

Table 18 shows also show that education level also has a significant positive relationship with household water sanitation practice with Beta b=0.041, p<0.05 there will be 4.1% change in household water sanitation practice as a unit change on education level. The regression coefficient result of resident has a significant positive relationship with household water

sanitation practice with Beta b=0.156, $p<0.05$, i.e for a change on resident causes 15.6% change on household water sanitation practice.

The regression coefficient result of family size has a significant positive relationship with household water sanitation practice with Beta b=0.038, $p>0.05$, i.e. for a change on family size by 3.8% there will be change on household water sanitation practice.

Therefore the regression coefficient result indicates that the sociodemographic characteristic (Education level, income, family size and residency) has positive and significant relationship household water sanitation attitude.

Table 18. Multivariable regression analysis of factors associated with WSP among mothers of Under five children in Injibara and rural kessa.(2020)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.223	.606		3.670	.000
	Educlev	.060	.166	.041	.363	.017
	Income	.112	.107	.119	1.047	.047
	Famsize	.147	.363	.038	.405	.036
	Resident	.339	.210	.156	1.613	.010

a. Dependent Variable: WSP

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Poor knowledge, negative attitude, and poor practice on Food safety and WASH were common amongst the residents in urban Injibara and rural Kessa, Amhara regional state, Ethiopia. These negative attributes predispose urban and rural residents to food and water-borne diseases results into huge number of deaths, particularly to under-five children who are fed with home-prepared complementary foods. Most of the problems are related to issues of hygiene and sanitation, which can be mitigated by appropriate knowledge of basic hygiene and sanitation pinciples.

5.2 Recommendations

Based on the results of the study the following recommendations are forwarded:

1. House to house health extension programs should be revitalized in a way that can enhance the interventional measures to improve their knowledge, attitude, and practice on food safety and WASH.
2. A need for a multifaceted intervention that will facilitate adequate water and sanitation hygiene practices among the study area
3. There must be availability of proper sanitation infrastructure, and family-centered education
4. Further research is needed to identify the factors affecting food safety KAP and WASH among mothers of under-five children.

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ANNEXES

Annex 1.

HFIAS	Occurrence						Frequency*								
	Yes			No			Rarely			Sometimes			Often		
	Total	**U**	**R**	**Total**	**U**	**R**	**Total**	**U**	**R**	**Total**	**U**	**R**	**Total**	**U**	**R**
1. In the past four weeks, did you worry that your household would not have enough food?	118 49.6%)	58 49.2)	60 50.8)	120 50.4%)	72 60)	48 40)	76 64.4%)	50 65.8)	26 34.2)	42 35.6%)	8 19%)	34 81%)	0	0	0
2. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	142 50.6%)	44 31)	98 69)	96 40.4%)	8689.6)	1010.4)	110 77.5%)	41 37.3)	69 62.7)	32 22.5%)	3 9.4%)	29 90.6%)	0	0	0
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	160 67.2%)	59 36.9)	10163.1)	78 32.8%)	7191)	79)	130 81.25%)	48 36.9)	82 63.1)	30 18.75%)	11 36.7%)	19 63.3%)	0	0	0
4. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	121 50.8%)	31 25.6)	90 74.4)	117 49.2%)	9984.6)	1815.4)	110 91%)	27 24.5)	83 75.5)	11 9%)	4 36.4%)	7 63.6%)	0.	0	0
5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	114 47.9%)	31 27.2)	83 72.8)	124 52.1%)	9979.8)	2520.2)	101 88.6%)	25 24.8)	76 75.2)	8 7.0%)	5 62.5%)	3 37.5)	5 62.5)	0	5 100%)
6. In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	103 43.3%)	18 17.5)	85 82.5)	135 56.7%)	1128 3)	2317)	93 90.3%)	15 16.1)	78 83.9)	7 6.8%)	3 42.9)	4 57.1)	3 2.9%)	310 0%)	0
7. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	18 7.6%)	3 16.7)	15 83.3)	220 92.4%)	1275 7.7)	9342.3)	18 100%)	2 11)	16 89)	0	0	0	0	0	0
8. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	88 37.0%)	19 21.6)	69 78.4)	150 63.0%)	1117 4)	3926)	80 90.9%)	19 23.8)	61 76.2)	8 9.1%)	0	8 100)	0	0	0
9. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0	0	0	238 100%)	130 54.6)	10845.4)	0	0	0	0	0	0	0	0	0

*Rarely 1 or 2 times), sometimes 3 to 10 times), Often more than 10 times)

Annex 2

Annex 2a. Food Handling Knowledge of the study population Mothers of under five children) in Injibara**,**

Food Handling Knowledge			**Resident**			
			Urban		**Rural**	
Treating unsafe water	No	%	No	%	No	%
1: Reason for separation of raw and cooked foods						
Raw animal foods often contain germs	83	69.2	56	87.5)	27	48.2)
Other	21	17.5	8	12.5)	13	23.2)
Don‘t know	16	13.3	0	0)	16	28.6)
2: Signs of thorough cooking of soups and stews for safety and readiness to be served						
They are boiling/ well cooked	71	59.2	41	64)	30	53.6)
Other	30	25	15	23.5)	15	26.8)
Don‘t know	19	15.8	8	12.5)	11	19.6)
3: Kinds of perishable foods to be stored in refrigerator or in a cool place						
Meat, offal	15		12		3	
Poultry	11		11		0	
Fish	14		14		0	
Milk/dairy products	16		13		3	
Cooked foods	6		2		4	
Don‘t know	97		47		50	
4: Reasons for avoiding eating leftovers that were not kept in a cool place						
Because food is not safe anymore	73		43		30	
Germs multiply very quickly and can cause illness or spoilage	57		41		16	
Higher temperatures make germs grow faster	49		35		14	
Don‘t know	4		0		4	
Choice No. 1, 2 &3 are correct answers	103		71		32	
5: Washing raw fruits and vegetables before eating						
Wash them with clean water	85	70.8	46	71.8)	39	69.7)
Other	17	14.2	12	18.8)	5	8.9)
Don‘t know	18	15	6	9.4)	12	21.4)

Annex 2b. **Water Sanitation Knowledge of the study population Mothers of under five children) in** Injibara**,**

Water Sanitation Knowledge						
	Total		**Resident**			
			Urban		**Rural**	
1. Treating unsafe water	No	%	No	%	No	%
Boil it	71	59.2%	37	57.8	34	60.7
Use a water filter ceramic, sand, composite, etc.)	7	5.8%	7	10.9	0	0
Let it stand and settle	24	20%	18	28.1	6	10.7
Discard it and get water from a safe source	18	15%	2	3.2	16	28.6

Annex 2c. Personal hygiene Knowledge

Personal hygiene Knowledge						
	Total		**Resident**			
			Urban		**Rural**	
1. Food poisoning often results from contact with germs from faeces. What can you do to avoid sickness from germs from human or animal faeces?	No	%	No	%	No	%
Wash hands after going to the toilet and cleaning the baby's bottom)	49		31		18	
Remove feces from the home and surroundings use a laterine, teach small children to use a potty and put children's faeces in the laterine and clean up faeces from animals)	50		21		29	
Other	13		9		4	
No answer	8		3		5	
2. There are key moments when you need to wash your hands to prevent germs from reaching food. What are these key moments?						
After going to the toilet/latrine	73		53		20	

After cleaning the baby's bottom/changing a baby's nappy	101		60		41	
Before preparing/handling food	105		61		44	
Before feeding a child/eating	27		19		8	
After handling raw food	6		4		2	
After handling garbage	53		37		16	
Other	8		6		2	
Don't know	2		0		2	

Annex 3a. Food Handling Attitude of the study population Mothers of under five children) in Injibara**,**

Food Handling Attitude									
	Total	Resident		Total	Resident		Total	Resident	
		Urban	Rural		Urban	Rural		Urban	Rural
	It is not			Not sure			It is		
Perceived susceptibility Likelihood of getting sick from eating contaminated	11 9.2%)	2 18.2.2 %)	9 81.8%)	19 15.8%)	736.8 %)	1263.2 %)	90 75%)	5561.1 %)	3538.9 %)
Perceived severity: Seriousness of getting sick from eating contaminated food	13 10.8%)	969.2 %)	430.8 %)	13 10.8%)	323.1 %)	1076.9 %)	94 78.4%)	5255.3 %)	4244.7 %)
Perceived benefits: Goodness of keeping meat, poultry, fish, or cooked food in a cool place.	19 15.8%)	1789.5 %)	210.5 %)	33 27.5%)	2369.7 %)	1030.3 %)	68 56.7%)	2435.3 %)	4464.7 %)

Goodness of re-heating left-over before eating or serving them	5 4.2%)	120%)	480%)	30 25%)	1240%)	1860%)	85 70.8%)	5160%)	3440%)
Goodness of washing fruits and vegetables with clean water	16 13.3%)	956.3 %)	743.75 %)	39 32.5%)	1435.9 %)	2564.1 %)	65 54.2%)	4163.1 %)	2436.9 %)
Perceived barriers: Difficulty of keeping these foods in a cool box or in the	56 46.7%)	4173.2 %)	1526.8 %)	33 27.5%)	1442.4 %)	1957.6 %)	31 25.8%)	929%)	2271%)
Difficulty of re-heating leftovers before eating or serving them	63 52.5%)	41	22	44 36.7%)	18	26	13 10.8%)	538.5%)	861.5%)
Difficulty of washing fruits and vegetables with clean water	87 72.5%)	48	39	22 18.3%)	13	9	11 9.2%)	327.3%)	872.7%)

Annex 3b. Water Sanitation Attitude of the study population Mothers of under five children) in Injibara**,**

Water Sanitation Attitude									
	It's not			Not sure			It is		
	Total	Resident		Total	Resident		Total	Resident	
		Urban	Rural		Urban	Rural		Urban	Rural
Perceived susceptibility Likelihood of oneself or one's child to get diarrhea from using unsafe water	18 15%)	1372. 2%)	527. 8%)	10 8.3%)	220%)	880%)	92 76.7%)	4953.3 %)	4346.7 %)
Perceived severity: Seriousness of getting sick from using unsafe water	29 24.2%)	724.1 %)	2275 .9%)	17 14.2%)	317.6 %)	1482. 4%)	74 61.6%)	5473%)	2027%)

Perceived benefits: Goodness of boiling water before drinking or using it	25 20.8%)	416%)	2184%)	54 45%)	2444.4%)	3055.6%)	41 34.2%)	3687.8%)	512.2%)
Perceived barriers: Difficulty of boiling water before drinking or using it	37 30.8%)	2875.7%)	924.3%)	58 48.3%)	3153.4%)	2746.6%)	25 20.8%)	520%)	2080%)
Perceived self-efficacy Confidence in boiling water before drinking or using it	14 11.7%)	1178.6%)	321.4%)	55 45.8%)	2240%)	3360%)	51 42.5%)	3160.8%)	2039.2%)

Annex 3c. Personal hygiene Attitude

Personal Hygiene Attitude									
	Total	Resident		Total	Resident		Total	Resident	
		Urban	Rural		Urban	Rural		Urban	Rural
Perceived susceptibility Likelihood of oneself or child having stomach ache or diarrhea, from not washing your hands?	It is not			Not sure			It is		
	18 15%)	5 7.8%)	13 23.2%)	8 6.7%)	3 4.7%)	5 8.9%)	94 78.3%)	56 87.5%)	38 67.9%)
Perceived severity: Seriousness of oneself or child getting diarrhea from oneself not washing one‘s hands.	13 10.8%)	57.8%)	8 14.3%)	11 9.2%)	46.3%)	712.5%)	96 80%)	55 85.9%)	4173.2%)
Perceived benefits: Goodness of washing ones hands before preparing food or before feeding a child/eating	6 5%)	23.1%)	47.1%)	14 11.7%)	57.8%)	916.1%)	100 83.3%)	5789.1%)	4376.8%)

Perceived barriers: Difficulty to wash ones hands before preparing food or before feeding a child/eating	104 86.7 %)	59 92.2%)	4580.4 %)	11 9.2%)	46.2%)	712.5 %)	5 4.1%)	1 1.6%)	4 7.1%)
Perceived self-efficacy: Confidence in washing ones hands properly?	10 8.4%)	3 4.7%)	7 12.5%)	13 10.8%)	5 7.8%)	8 14.3%)	97 80.8%)	56 87.5%)	4173.2 %)

Annex 4a. Food Handling Practice of the study population Mothers of under five children) in Injibara**,**

Food Handling Practice						
	Total		Resident			
			Urban		Rural	
Treating unsafe water	No	%	No	%	No	%
1. Usual cleaning of kitchen surfaces and utensils after preparing dinner						
Scrape excess food into rubbish bin	20	16.7	16	25	4	7.1
Wash with hot water	43	35.8	17	26.6	26	46.5
Wash with detergent	51	42.5	29	45.3	22	39.3
No answer	6	5	2	3.1	4	7.1
2. Storing perishable fresh foods such as raw meat, poultry and seafood						
In the refrigerator below 5 °C)/cool box	9	7.5	9	14.1	0	0
Covered protected from insects, rodents, pests and dust)	65	54.2	34	53.1	31	55.3
Separated from cooked or ready-to-eat foods	30	25	16	25	14	25
No answer	2	1.6	0	0	2	3.6
Other	14	11.7	5	7.8	9	16.1

Annex 4b. Water Sanitation Practice of the study population Mothers of under five children) in Injibara**,**

Water Sanitation Practice						
	Total		Resident			
			Urban		Rural	
	No	%	No	%	No	%
Main source of water for household for drinking, cooking and hand washing						
Piped water	43	35.8 %	43	67.2	0	0
Piped into yard or plot	11	9.2%	11	17.2	0	0
Tube well	12	10%	5	7.8	7	12.5
Water from spring	22	18.3%	3	4.7	19	34
Unprotected spring	32	26.7%	2	3.1	30	53.5
Collection of water for domestic use						
Yes item used) JERY CAN, POT	120	100%	64	100%	56	100%
No	0	0%	0	0	0	0
Treating collection item to make it clean						
Yes how?) CLEAN CONTANER BY SOAP	42	35%	26	40.6	16	28.6
No	14	11.7%	4	6.2	10	17.8
Use of water and soap clean container)	64	53.3%	34	53.2	30	53.6
Description of how water is stored						
Clean container or jar	21	17.5%	10	15.6	11	19.6
Covered container or jar	67	55.8%	34	53.1	33	59
Clean and covered container or jar	17	14.2%	11	17.2	6	10.7
Other	15	12.5%	9	14.1	6	10.7
Treatment of water to make it safe to drink						
Yes	26	21.7%	24	37.5	2	3.5
No	80	66.7%	35	54.7	45	80.4
Don‘t know/no answer	14	11.6%	5	7.8	9	16.1
Actions usually done to the water to make it safer to drink						

Boil it	42	35%	32	50	10	17.8
Strain it through a cloth	4	3.3%	4	6.3	0	0
Use a water filter ceramic, sand, composite, etc.)	14	11.7%	13	20.3	1	1.8
Let it stand and settle	41	34.2%	14	21.9	27	48.2
Don‘t know/no answer	19	15.8%	1	1.5	18	32.2

Annex 4c. Personal hygiene Practice

Personal hygiene Practice						
	Total		**Resident**			
			Urban		**Rural**	
1. Could you please describe step by step how you wash your hands?	No	%	No	%	No	%
Washes hands in a bowl of water sharing with other people) – Poor practice	18		4		14	
With someone pouring a little clean water from a jug onto one‘s hands - appropriate practice	81		52		29	
Under running water — appropriate practice	63		23		40	
Washes hands with soap or ashes — appropriate practice	90		56		34	

Annex 5a

1.1. Water						
1.1.1. Water source	Total		Resident			
			Urban 66)		Rural 52)	
	No	%	No	%	No	%
Q1. What is the main source of drinking-water for your household?						
Piped water	31	26.3 %	31	47	0	0
Piped into yard or plot	11	9.3%	11	16.7	0	0
Tube well	12	10.2%	5	7.6	7	13.5
Water from spring	22	18.6%	7	10.6	15	28.8

Unprotected spring	32	27%	2	3	30	57.7
Other	10	8.6%	10	15.1	0	0
Q2. Supplier of water						
Government/Public	59	50%	7	10.6%	52	100%
Private	39	33%	39	59.1%	0	0
Both	20	17%	20	30.3%	0	0
Q3. How long does it take to go there, get water, and come back?						
5 minutes	48	40.7%	48	72.7%	0	0
<30 minutes	33	28%	18	15.2%	15	28.8%
>30 minutes	37	31.3%	0		37	71.2%
Q3. Distance of source						
Within premises	48	40.7%	48	72.7%	0	0
Outside household	70	59.3%	18	27.3%	52	100%
Q4. Who usually goes to this source to fetch the water for your household?						
Adult woman	61	51.7%	30	45.5%	31	59.6
Adult man	11	9.3%	7	10.6%	4	7.7
Female child under 15 years)	34	28.8%	21	31.8%	13	25
Male child under 15 years)	12	10.2%	8	12.1%	4	7.7
Q5. Time to collect water						
Morning	57	48.3%	27	40.9	30	57.7
Evening	28	23.7%	22	33.3	6	11.6
Morning and evening	20	16.9%	9	13.6	11	21.1
Irregular	13	11%	8	12.2	5	9.6
Q6. Do you feel the quantity of water you collect fulfills your daily requirement?						
Yes	90	76.3%	40	60.6	50	96.2
No	18	15.3%	16	24.2	2	3.8
Note Shure	10	8.5%	10	15.2	0	0

Q7. How many times in a day you face drinking water scarcity?						
Once	23	19.5%	18	27.3	5	9.6
No shortage	95	80.5%	48	72.7	47	90.4
Q8. Average time period of water shortage						
<1 day	72	61%	57	86.4	15	28.8
1 day	10	8.5%	9	13.6	1	1.9
Not applicable	36	30.5%	0	0	36	69.3
Q9. Which period of year do you face maximum water shortage?						
January – March	62	52.5%	41	62.2	21	40.4
April - June	50	42.4%	19	28.8	31	59.6
July – September	4	3.4%	4	6	0	0
None	2	1.7%	2	3	0	0
Q 10. What are the problems you usually face in the water supply?						
Irregular	61	51.7%	50	75.8	11	21.2
Unclean	31	26.3%	9	13.6	22	42.3
Too far	21	17.8%	4	6	17	32.7
Dirty water	5	4.2%	3	4.6	2	3.8

Annex 5b

1.1.2. Water treatment and storage						
Q 11. Where do you store drinking water?						
Clean container or jar	21	17.8%	12	18.2	9	17.3
Covered container or jar	67	56.8%	36	54.3	31	59.6
Clean and covered container or jar	10	8.5%	7	10.6	3	5.8
Other	15	12.7%	9	13.6	6	11.5
Don‘t know/no answer	5	4.2%	2	3.3	3	5.8
Q 12. How often do you clean storage container?						

Before fetching water	97	82.2%	51	77.3%	46	88.4%
When it is dirty	15	12.7%	10	15.1%	5	9.6%
Every day	6	5.1	5	7.6%	1	2%
Q 13. Do you think the quality of water you receive is safe?						
Safe	94	79.7%	59	89.4%	35	67.3%
Unsafe	11	9.3%	4	6%	7	13.5%
Don't know	13	11%	3	4.6%	10	19.2%
Q 14. Do you think quality of water affect health?						
Yes	87	73.7%	49	74.3%	38	73.1%
No	12	10.2%	3	4.5	9	17.3%
Don't know	19	16.1%	14	21.2%	5	9.6%
Q 15. Most common effects of using unsafe drinking water						
Diarrhea	73		41		32	
Vomiting	66		28		38	
Cholera	17		17		0	
Q 16. Do you know any person who has suffered do to use of unsafe drinking water?						
Family member	107	90.7%	57	86.4%	50	96.2%
Friends	11	9.3%	9	13.6%	2	3.8%
Q 17. Do you treat your water in any way to make it safer to drink?						
Yes	97	82.2%	62	93.9%	35	67.3%
No	15	12.7%	3	4.6%	12	23.1%
DK	6	5.1%	1	1.5%	5	9.6%
Q 19. What do you usually do to the water to make it safer to drink?						
Boil it	38	32.2%	32	48.5%	6	11.5%
Strain it through a cloth	4	3.4%	4	6.1%	0	
Use a water filter ceramic, sand, composite, etc.)	14	11.9%	13	19.7%	1	1.9%
Let it stand and settle	41	34.7%	14	21.2%	27	52%
Don't know/no answer	21	17.8%	3	4.5%	18	34.6

Q 19. What are the reasons for not treating water?						
Water is already clean/safe	45	38.1%	29	43.9%	16	30.8%
Do not know how to do it	17	14.5%	4	6.1%	13	25%
Expensive	7	5.9%	5	7.6%	2	3.8%
Treated water does not taste good	28	23.7%	25	37.9%	3	5.8%
DK	21	17.8%	3	4.5%	18	34.6%
Q 20. What are the biggest challenge do you face in procuring drinking water?						
Timings	46	39%	42	63.6%	4	7.7%
Distance source	72	61%	24	36.4%	48	92.3%

Annex 5c

1.2. Sanitation and hygiene							
1.2.1. Sanitation facility		Total		Resident			
				Urban		Rural	
		No	%	No	%	No	%
Q 21. Kind of toilet/latrine used							
Flush/pour flush to:	Piped sewer system	5	4.3 %	5	7.6%	0	0%
	Septic tank	2	1.7%	2	3%	0	0%
Pit latrine with slab		51	43.2%	51	77.3%	0	0%
Pit latrine without slab/open pit		26	22%	8	12.1%	18	34.6%
Composting toilet		34	28.8%	0	0%	34	65.4%
Q 22. What kind of toilet facility do members of your household usually use?							
Government/Public		4	3.4%	4	6.1%	0	0%
Private		96	81.4%	49	74.2%	47	90.4%
Both		18	15.2%	13	19.7%	5	9.6%
Q 23. Do you share this facility with other households?							
Yes		55	46.6	46	69.7	9	17.3
No		63	53.4	20	30.3	43	82.7

Annex 5d

1.2.2. Waste disposal						
Q 24. Solid waste disposal where do you usually dispose the feces??						
Within premises	67	56.8%	57	86.4%	10	19.2%
Outside household	51	43.2%	9	13.6%	42	80.8%
Q 25. Where is the waste water discharged?						
Open drainage	73	61.9%	52	78.8%	21	40.4%
On the roads	31	26.3%	11	16.7%	20	38.5%
No fixed pattern	3	2.5%	0		3	5.8%
To the field	11	9.3%	3	4.5%	8	15.3%

Annex 5e

1.2.3. Hand washing						
Q 25. What in your opinion are the critical times of hand washing?						
Before food	118		66		52	
After defecation	98		61		37	
After food	115		66		49	
After weaning child	85		54		31	
Q 27. Material used for hand wash?						
Water and soap	68	57.6%	52	78.8%	16	30.8%
Water only	38	32.2%	12	18.2%	26	50%
Water and ash	12	10.2%	2	3%	10	19.2%
Q 28. Reasons for washing hands?						
Health: Prevent infection	67	56.8%	43	65.2%	24	46.2%
Hygiene	44	37.3%	21	31.8%	23	44.2%
Appears good	7	5.9%	2	3%	5	9.6%

Appendix

English version

Questionnaire and Interviews

Addis Ababa University College of development studies center for food security studies

The aim of this study will be to investigate the knowledge, attitude and practices of food safety and water sanitation among mothers of under-five children's in Urban Injibara and Rural Kessa. The information you provide used only for academic purpose. So, please put a thick mark and short answer for the following questionnaires.

"I would like to thank you in advance for sharing your time with me!"

I. Socio-demographic data

1. Sex: A. Male B. Female

2. Age: A. 20-30 B. 30-40 C. 40-50 D. a above 51

3. Religion: A. Orthodox B. Muslim C.others

4. Marital status: A. single B. Married C. divorced

5. Occupation: A. Nongovernmental B. Private C.Daily labor

6. Educational status: A. Master B. Degree C. Diploma

D. Certificate E. not

7. Monthly income (Birr): A. 500-1000 B. 1001-1500

C. 1501- 2000 D . 2001-2500 E. above 2500

8. Family size A. 2-5 B. >5

II. Household Food Insecurity Access Scale (HFIAS) Measurement Tool

NO	QUESTION	RESPONSE OPTIONS	CODE
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	….| |
1a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	….| |
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	….| |
2a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the pastfour weeks) 3= Often (more than ten times in the past fourweeks)	….| |
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	….| |
3a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	….| |
4	In the past four weeks, did you or any household member have to eat somefoods that you really did not want to eat because of a lack of resources to obtain other types of food	0 = No (skip to Q5) 1 = Yes	….| |

4a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks)	....| |
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	....| |
5a	How often did this happen?	1= Rarely (once or twice in the past fourweeks) 2= Sometimes (three to ten times in the pastfour weeks)	....| |
6	In the past four weeks, did you or any other household member have to eat fewermeals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes	....| |
6a	How often did this happen?	1= Rarely (once or twice in the past fourweeks) 2= Sometimes (three to ten times in the pastfour weeks)	....| |
7	In the past four weeks, wasthere ever no food to eat ofany kind in your householdbecause of lack of resources to get food?	0 = No (skip to Q8) 1 = Yes	....| |

7a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks)	….| |
8	In the past four weeks, didyou or any household member go to sleep atnight hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	….| |
8a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks)	….| |
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes	….| |
9a	How often did this happen?	1= Rarely (once or twice in the past four weeks) 2= Sometimes (three to ten times in the past four weeks)	….| |

III. Food safety

I am going to ask you some questions about food safety. Please let me know if you need me to clarify any of my questions. Feel free to ask any question you may have.

Food safety attitude

No	Questions	Response option	Answer
1	How likely do you think you are to get sick from eating contaminated food?	1=. Not likely 2= You're not sure 3= Likely *If Not likely:* Can you tell me the reason why it is not likely?	
2	How serious do you think it is to be sick from eating contaminated food? ..	1=. Not serious 2=. You're not sure 3= Serious If Not Serious *Can* you tell me the reason why it is not serious?	
3	How good do you think it is to keep meat, poultry, fish, seafood or cooked food in a cool place, for example in a cool box or in the refrigerator?	1=. Not good 2=. You're not sure 3=. Good *If Not good:* Can you tell me the reasons why it is not good? __________________	
4	How difficult is it for you to keep this foods in a cool box or in the refrigerator?	1= Not difficult 2=. So-so 3= Difficult	
5	How good do you think it is to reheat leftovers before eating or serving them?	1=. Not good 2=. You're not sure 3=. Good *If Not good:* Can you tell me the reasons why it is not good? _______________	

6	How difficult is it for you to reheat leftovers before eating or serving them?	1= Not difficult 2=. So-so 3= Difficult *If Difficult:* Can you tell me the reasons why it is difficult? ___________________	
7	How good do you think it is to wash fruits and vegetables with clean water?	1=. Not good - 2=. You're not sure - 3= Good - *If Not good:* Can you tell me the reasons why it is not good? _______________	
8	• How difficult is it for you to wash fruits and vegetables with clean water? ..	• 1=. Not difficult 2=. So-so - 3=. Difficult -	

Food Safety Knowledge

No	Questions	Response option	Answer
1	Why should you prevent raw meat, offal, poultry and seafood from touching other foods such as those that are cooked or ready to eat?	1=Raw animal foods often contain germs (which may be transferred to cooked and ready-to-eat foods) 2=Other 3=Don't know	
2	When cooking soups and stews, what sign shows that these are ready and safe to be served?	1=They are boiling/ well-cooked 2=Other - 3=Don't know -	
3	What kinds of food should be placed in the refrigerator or in a cool place, such as an icebox or cool box?	Perishable foods 1=Meat, offal 2=Poultry 3=Fish 4=Milk/dairy products 5= Cooked foods 6=Other 7=Don't know	

4	Why should someone avoid eating leftovers that were not kept in a cool place?	1=Because food is not safe anymore 2=Foods get spoiled (germs multiply very quickly and can cause illness) - 3= Higher temperatures make germs grow faster 4=Other 5=Don't know 6=(Any of the three first response options is correct)	
5	What should you do before eating raw fruits and vegetables?	1=Wash them with clean water - 2= Other - 3= Don't know -	

Food Safety Practices

No	Questions	Response option	Answer
1	After you have prepared dinner, kitchen surfaces, pots, pans, plates and utensils are dirty. Can you describe how you clean them usually?	1=Scrape excess food into rubbish bin 2=Wash with hot water - 3=Wash with detergent - 4=Don't know/no answer -	
2	How do you store perishable fresh foods such as raw meat, poultry and seafood?	1= In the refrigerator (below 5 °C)/cool box 2=Covered (protected from insects, rodents, pests and dust) 3=Separated from cooked or ready-to-eat foods 4=Other 5=Don't know/no answer -	

IV. Water sanitation

Water sanitation Attitudes

No	Questions	Response option	Answer
1	How likely do you think you are to get diarrhoea from using unsafe water? *OR* How likely do you think your child is to get diarrhoea from using unsafe water?	1= Not likely - 2= You're not sure 3= Likely *If Not likely:* Can you tell me the reason why it is not likely? -	
2	How serious do you think it is to get sick from using unsafe water?	1= Not really serious 2= Neutral/serious 3= Serious If Not serious: Can you tell me the reason why it is not serious?	
3	How good do you think it is to boil water before drinking or using it?	1=. Not good 2=. You're not sure 3=. Good - If Not good: Can you tell me the reasons why it is not good?	
4	How difficult is it for you to boil water before drinking or using it?	1=. Not difficult - 2= So-so – 3= Difficult - If Difficult: - Why it is difficult? __________	
5	• How confident do you feel in boiling water before drinking or using it?	• 1= Not confident 2=. Ok/so-so 3= Confident	

Water Sanitation Knowledge

No	Questions	Response option	Answer
1	If you know that the water you are going to use for cooking or drinking is not safe or does not come from a safe source, what should you do?	1=Boil it 2=Add bleach/chlorine 3=Strain it through a cloth - 4=Use a water filter (ceramic, sand, composite, etc.) 5=Use solar disinfection 6=Let it stand and settle 7=Discard it and get water from a safe source 8=Other 9= Don't know	

Water Sanitation Practices

No/	Questions	Response option	Answer
1	What is the main source of water used by your household for drinking, cooking and hand washing?	1=Piped water 2=Piped into dwelling 3= Piped into yard or plot 4= Public tap/standpipe 5= Tube well/borehole 6=Dug well 7= Protected well 8= Unprotected well 9=Water from spring 10= Protected spring 11= Unprotected spring 13=Tanker-truck 14=Cart with small tank/drum	

		15=Surface water (river, stream, dam, lake, pond, canal, irrigation channel) 16=Bottled water 17= Other (specify)	
2 A	Do you collect water for domestic use?	1=Yes................Go to *question* P.2B. 2= No................ Go to *question* P.3.	
2.B	B. What item do you use to collect water?		
2.C	To know if the item is clean probe: Did you treat this item in any way to make it clean?	1=Yes 2= No 3= Don't know If Yes: How? 4=Use of water and soap (clean container) -	
3	Could you describe how you store water?	1=Clean container or jar 2= Covered container or jar 3=Clean and covered container or jar 4=Other	
4.A	Do you treat your water in any way to make it safe to drink?	1=Yes 2=No 3= Don't know/no answer go to 4.B	
4.B	What do you usually do to the water to make it safer to drink?	1=*Boil it* 2=*Add bleach/chlorine* 3=*Strain it through a cloth* 4=*Use a water filter (ceramic, sand, composite, etc.)* 5= *Use solar disinfection* 6=*Let it stand and settle* 7=*Other*	

APPNDIX (Amharic Version)

Amaharic version

የምግብ ደህንነት እና የምግብ ዋስትና መርጃ መጠይቅ ቅጽ ፡-

አዲስ አበባ ዩኒቨርሲቲ የሀገር ልማት ጥናት ኮሌጅ የምግብ ዋስትና ጥናት ማዕከል የዚህ ጥናት ዋና አላማ በእንጅባራ ከተማ በተመረጡ አንድ የገጠርና አንድ የከተማ ቀበሌዎች ከአምስት አመት በታች ልጆች ያላቸው እናቶች ስለምግብ ጤናማነትና የውሃ ሳኒቴሽን ያላቸውን እውቀት፣ አመለካከት እና ትግበራ ለማወቅ የሚያስችል የዳሰሳ ጥናት መጠይቅ፡-

ስለምታደርጉት መልካም ትብብርና ስለምትሰጡት እውነተኛ መረጃ ከልብ አመሰግናለሁ፡፡

1. Socio-demographic data

ክፍል አንድ፡ የማህበራዊና የግል ሁኔታ መረጃ ፡-

1. ፆታ :- ሀ. ወንድ ለ. ሴት
2. ዕድሜ ፡- ሀ. 20-30 ለ. 31-40 ሐ. 41-50 መ. ከ51በላይ
3. ሀይማኖት፡- ሀ. ክርስቲያን ለ. ሙስሊም ሐ. ሌላ
4. የጋብቻ ሁኔታ: ሀ. ያላገባ ለ. ያገባ ሐ. የፈታ
5. የስራ ሁኔት ፡- ሀ. የመንግስት ለ. የግል ሐ. የቀን ስራ
6. የትምህርት ደረጃ፡-ሀ. ያልተማረ ለ. መፃፍ ና ማንበብ ሐ. ከዲፕሎማ በላይ
7. የወር ገቢ በብር፡- ሀ. 500-1000 ለ. 1001-1500 ሐ. 1501- 2000 መ. 2001 እና በላይ
8. የቤተሰብ መጠን ሀ. 2-5 ለ. > 5

2. Household Food Insecurity Access Scale (HFIAS) Measurement Tools

ክፍል ሁለት፡ . የቤተሰብ ምግብ ዋስትና ማረጋገጫ መለኪያዎች

ተ.ቁ	ጥያቄ	የመልስ አማራጭ/	መልስ
1	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ አይኖረኝም ይሆናል ብለው ሰግተው ያውቃሉ?	0 = አልሰጋሁም 1= አዎ (ወደጥያቄ 2)	|___
1 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይሄ ስጋት ስንት ጊዜ ደርሶብዎታል?	1= አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ10 ጊዜ በላይ)	.|__|
2	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል የወደዱትን ምግብ ሳይበሉ ቀርተው ያውቀሉ?	0 = አይደለም 1=አዎ (ወደጥያቄ 3)	.|__|
2 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|__|
3.	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል የተወሰኑ የምግብ አይነቶች ብቻ በልታችኋል?	0 = አይደለም 1 = አዎ (ወደጥያቄ 4)	.|___|
3.ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1 አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = /አንዳንድ ጊዜ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|___|
4	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል	0 = አይደለም(ወደጥያቄ 5) 1 = አዎ	.|__|

	መብላት የማትፈልጉትን ምግብ በልታችኋል?		
4 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|___|
5	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል ሳትጠግቡ ለመነሳት ተገዳችኋል?	0 = አይደለም 1 =አዎ (ወደጥያቄ 6	.|___|
5 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|___|
6	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል ቁርስ፤ ምሳ ወይም ራት መብላት ሳትችሉ ቀርታችኋል?	0 = አይደለም 1 = /አዎ (ወደ ጥያቄ 7	.|__|
6 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|__|
7	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት በቤተሰቡ ውስጥ የሚላስ የሚቀመስ ያልነበረበት ጊዜ ነበር?	0 =አይደለም (ወደጥያቄ 8 1 = አዎ	.|__|
7 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|__|
8	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል	0 = አይደለም (ወደጥያቄ 9 1 = አዎ	.|__|

	እየራበው ወደ መኝታ የሄደበት ጊዜ ነበር?		
8 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድ ጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|__|
9	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል ቀኑን ሙሉ ሳይበላ ውሎ ሳይበላ ያደረበት ጊዜ አለ?	0 = የለም 1 = አዎ	.|___|
9 ሀ	ባለፉት አራት ሳምንታት ውስጥ ይህ ስንት ጊዜ አጋጥሞዎታል?	1, አልፎ አልፎ (አንድ ወይም ሁለት ጊዜ) 2 = አንዳንድጊዜ (3-10 ጊዜ) 3= ሁልጊዜ (ከ 10 ጊዜ በላይ)	.|___|

3፡ FOOD SAFETY

ክፍል 3፤ (የምግብ ጤናማነት)

3.1 Food safety attitude (የምግብ ጤናማነት አመለካከት ወይም አስተሳሰብ)

(ምንጭ፡-የአለም አቀፍ ግብርና ድርጅት/FAO/መመሪያ የምግብ ሁኔታንና ተዛማች ነገሮች ዙሪያ ያላቸውን እውቀት፤አመለካከትና ተግባር በተመለከተ)

የምግብ ጤናማነት ዙሪያ መረጃ ማግኛ ጥያቄዎች፡-

ስለ ምግብ ጤናማነት አንዳንድ ጥያቄዎችን ላቀርብልዎት ነው፡፡ ጥያቄዎቼ ግልፅ ካልሆኑ እንዳብራራልዎት ይጠይቁኝ፡፡ ሊጠይቁኝ የሚፈልጉት ሌላ ጥያቄ ካለ ሳይጨነቁ ይጠይቁኝ፡፡

ተ.ቁ	ጥያቄ	የመልስ አማራጭ/	መልስ
1	የተበከለ ምግብ መብላት ለበሽታ ሊያጋልጥ ይችላል ብለው ያስባሉ?	1=አላስብም 2=እርግጠኛ አይደለሁም 3=አዎ አስባለሁ (መልሱ አላስብም ከሆነ) አላስብም ያሉበትን ምክንያት ሊነግሩኝ ይችላሉ;	
2	የተበከለ ምግብ በመብላት የሚመጣ በሽታ ምን ያህል ከባድ ነው ብለው ያስባሉ?	1=.ከባድ አይደለም 2=.እርግጠኛ አይደለሁም 3=ከባድ ነው (መልሱ ከባድ አይደለም ከሆነ)ከባድ አይደለም ያሉበትን ምክንያት ሊነግሩኝ ይችላሉ?	
3	ስጋን፣ የዶሮ ስጋን፣ አሳን ወይም የበሰለ ምግብን ቀዝቃዛ ቦታ (ማቀዝቀዣ ሳጥን ወይም ፍሪጅ ውስጥ) ማስቀመጥ ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1=. ጥሩ አይደለም 2=. እርግጠኛ አይደለሁም 3= ጥሩ ነው (መልሱ ጥሩ አይደለም ከሆነ ጥሩ ያልሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?	
4	እነዚህን ምግቦች ማቀዝቀዣ	1. ከባድ አይደለም	

	ሳጥን ወይም ፍሪጅ ውስጥ ማስቀመጥ ለርስዎ ምን ያህል ከባድ ነው?	2. እንደ ነገሩ 3. ከባድ ነው	
		4.መልሱ ከባድ ነው ከሆነ ከባድ የሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?...............	
5	ሳይበሉ የተረፉ ምግቦችን (እንደ ወጥ ያሉ) ከመብላት ወይም ለምግብነት ከማቅረብ በፊት እንደገና ማንተክተኩ ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1=. ጥሩ አይደለም 2=. -እርግጠኛ አይደለሁም 3=. -ጥሩ ነው (መልሱ ጥሩ አይደለም ከሆነ ጥሩ ያልሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?______________________________	
6	ሳይበሉ የተረፉ ምግቦችን (እንደ ወጥ ያሉ) ከመብላት ወይም ለምግብነት ከማቅረብ በፊት እንደገና ማንተክተኩ ምን ያህል አስቸጋሪ ይሆንብዎታል?	1=ከባድ አይደለም 2=. እንደ ነገሩ 3=ከባድ ነው (መልሱ ከባድ ነው ከሆነ ከባድ የሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?----------	
7	ፍራፍሬዎችን እና አትክልቶችን በንጹህ ውሃ ማጠብ ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1=.ጥሩ አይደለም 2=. እርግጠኛ አይደለሁም 3=ጥሩ ነው (መልሱ ጥሩ አይደለም ከሆነ ጥሩ ያልሆነበትን ምክንያት ሊነግሩኝ ይችላሉ? ______________________	
8	ፍራፍሬዎችን እና አትክልቶችን በንጹህ ውሃ ማጠብ ምን ያህል ይከብድዎታል?¨	1=. ከባድ አይደለም 2=. - እንደ ነገሩ 3=.ከባድ ነው መልሱ ከባድ ነው ከሆነ ከባድ የሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?_________________________	

3.2 Food safety knowledge (የምግብ ጤናማነት እውቀት)

ተ.ቁ	ጥያቄ/	የመልስ አማራጭ/	መልስ
1	ጥሬ ስጋ፣ የሆድ እቃ ስጋዎች (እንደ ጨጓራ፣ ወተት አንጀት፣ ጉበት፣ ኩላሊት፣ ልብ አይነት) ከበሰሉ ወይም ለምግብነት ከተዘጋጁ ምግቦች ጋር እንዳይነካኩ ማድረግ ለምን ያስፈልጋል?	1=ከእንስሳት የሚገኙ ያልበሰሉ ምግቦች ብዙ ጊዜ ጀርሞች ይገኙባቸዋል እነዚህ ጀርሞች ወደ በሰሉ ወይም ለምግብነት ወደ ተዘጋጁ ምግቦች ሊተላለፉ ይችላሉ 2=ሌላ 3=መልስየለም	
2	ወጥ ወይም ሾርባ በሚሰሩበት ጊዜ መብሰሉን (ለምግብነት ለመቅረብ ዝግጁ መሆኑን) እና ጤናማ መሆኑን እንዴት ያውቃሉ?	1= ይንተከተካል / በደንብ ይበስላል 2=ሌላ 3=መልስ የለም	
3	ፍሪጅ ወስጥ፣ ማቀዝቀዣ ሳጥን ውስጥ ወይም ቀዝቀዝ ያለ ቦታ መቀመጥ ያለባቸው ምግቦች ምን ምን አይነቶቹ ናቸው?	1=ስጋ፣ የሆድ እቃስጋዎች 2=የዶሮ ስጋ 3=አሳ 4=ወተት / የወተት አስተዋጽኦዎች 5=የበሰሉ ምግቦች 6=ሌላ 7=ሁሉም 8=መልስየለም	
4	ተዘጋጅቶ ከቀረበ በኋላ ሳይበላ የተረፈ ምግብ ቀዝቃዛ ቦታ ውስጥ ካልቆየ በስተቀር እንደገና ለምግብነት መቅረብ የሌለበት ለምንድን ነው?	1=በሽታ ሊያስከትል ስለሚችል 2=በምግቡ ውስጥ ጀርሞች በፍጥነት ተባዝተው ምግቡለ በሽታ ስለሚያጋልጥ 3= ሞቅ ያለ መጠነ-ሙቀት ጀርሞች ፈጥነው እንዲራቡ ስለሚረዳ 4=ሌላ 5=መልስየለም 6=(ከመጀመሪያዎቹ ሶስት አማራጮች ማንኛውም ትክክል ነው)	
5	ፍራፍሬዎችን ወይም ጥሬ አትክልቶችን (እንደ ጎመን፣ ሰላጣ፣ ቆስጣ፣ ቃርያ፣ ቲማቲም ያሉትን) ከመመገባችሁ በፊት ምን ማድረግ አለባችሁ?	1=በንጹህ ውሃ ማጠብ 2= ሌላ 3= መልስ የለም	

3.3. Food safety practice (የምግብ ጤናማነት አተገባበር)

ተቁ	ጥያቄ	የመልስ አማራጭ/	መልስ
1	ምግብ ካዘጋጁ በኋላ የማብሰያ አካባቢው፣ ድስቶች፣ መጥበሻዎች፣ ሰሃኖች እና ሌሎች መገልገያዎች መጽዳት ይኖርባቸዋል። አብዛኛውን ጊዜ እንዴት እንደሚያጸዷቸው ሊነግሩኝ ይችላሉ?	1=ጥራጊውን ወደ ቆሻሻ ማጠራቀሚያው እደፊዋለሁ። 2=በሞቀ ውሃ አጥበዋለሁ። 3=በሳሙና (አጃክስ) ወይም በፈሳሽ ሳሙና አጥበዋለሁ 4= መልስ የለም	
2	ቶሎ ሊበላሹ የሚችሉ ምግቦችን (እንደ ስጋ፣ ያልተሰራ ዶሮ ወይም አሳ) እስኪሰሩ ድረስ እንዴት ያቆዩዋቸዋል?	1=ፍሪጅ ውስጥ 2=አቧራ ወይም አይጥ እንዳይደርስበት ተሸፍኖ 3=ለምግብነት ከተዘጋጁ ምግቦች ጋር እንዳይነካካ ተለይቶ 4=ሌላ 5= መልስ የለም	

Part 5: Water sanitation

5.1. Water sanitation Attitudes (የውሃ ሳኒቴሽን አመለካከት ወይም አስተሳሰብ)

ውሃን እና አካባቢን ከብክለት ስለመጠበቅ አንዳንድ ጥያቆዎች ልጠይቅዎት ነው:: ላብራራልዎት የሚፈልጉት ጥያቆዎች ካሉ ሳይጨነቁ ይጠይቁኝ:: ሊጠይቁት የሚፈልጉት ማንኛውም ጥያቄ ቢኖር በነጻነት ይጠይቁኝ::

ተ.ቁ	ጥያቄ/	የመልስአማራጭ	መልስ
1	ጤናማ ያልሆነ ውሃ መጠቀም ተቅማጥ ሊያመጣ እንደሚችል ምን ያህል ያስባሉ? ወይም ጤናማ ያልሆነ ውሃ በመጠጣት ልጆህ ለተቅማጥ ሊታመም እንደሚችል ምን ያህል ያስባሉ?	1= አላስቢም 2= እርግጠኛ አይደለሁም 3= አስባለሁ የማስቡ ከሆነ ተቅማጥ አያማጣም ብለው የሚያስቡበት ምክንያት ምን እንደሆነ ሊነግሩኝ ይችላሉ	
2	ጤናማ ያልሆነ ውሃ መጠጣት የሚያስከትለው በሽታ ምን ያህል ከባድ ነው ብለው ያስባሉ?	1= ከባድ አይሆንም 2= ቀለል ያለ ነው 3= ከባድ ነው ከባድ ካልሆነ ከባድ የማይሆንበት ምክንያት ምን እንደሆነ ሊነግሩኝ ይችላሉ?	
3	ውሃን ለመጠጥ ወይም ለሌላ ስራ ከመዋሉ በፊት ማፍላቱ ምን ይህል ጥሩ ነው ብለው ያስባሉ?	1= ጥሩ አይደለም 2=እርግጠኛ አይደለሁም 3= ጥሩ ነው ጥሩ አይደለም ከሆነ ጥሩ ያልሆነበትን ምክንያት ሊነግሩኝ ይችላሉ?	
4	ውሃን ለመጠጥነት ወይም ለሌላ ስራ ከመጠቀምዎ በፊት ማፍላቱ ምን ያህል ያስቸግርዎታል?	1= አያስቸግረኝም 2= እንደነገሩ 3= ያስቸግራል የሚያስቸግር ከሆነ ለምን አስቸጋሪ እንደሆነ ምክንያቱን ሊነግሩኝ ይችላሉ?	
5	ለመጠጥነት ወይም ለሌላ ስራ ከመዋሉ በፊት ውሃን ማፍላቱ ምን ያህል መተማመን ይፈጥርልዎታል?	1= አልተማመንም 2= እንደ ነገሩ 3= እተማመናለሁ ካልተማመኑ ለምን እንደማይተማመኑ ምክንያቱን ሊነግሩኝ ይችላሉ?	

5.2 Water sanitation Knowledge (የውሃ ሳኒቴሽን በተመለከተ እወቀት)

ተ.ቁ	ጥያቄ	የመልስ አማራጭ	መልስ
1	ምግብ ለመስራት ወይም ለመጠጣት የሚጠቀሙበት ውሃ ጤናማ አለመሆኑን ወይም የተቀዳበት ቦታ ጤናማ አለመሆኑን ቢያውቁ ምን ማድረግ አለብዎት?	1=, አፈላዋለሁ 2=በረኪና እጨምርበታልሁ 3=በጨርቅ አጠለዋለሁ 4=በውሃ ማጣርያ (ሴራሚክ፣ አሸዋ፣ የተቀላቀለ ጠጠር) እጠቀማለሁ 5=ለጸሃይ በማጋለጥ ጀርሞች እንዲሞቱ አደርጋለሁ 6=እስኪዘቅጥ አቆየዋለሁ 7=- እደፋውና ከጤናማ ቦታ ሌላ ውሃ አመጣለሁ 8=ሌላ 9= መልስ የለም	

5.3. Water sanitation Practices (የውሃ ሳኒቴሽን በተመለከተ አተገባበር)

ተ.ቁ	/ጥያቄ	የመልስአማራጭ	መልስ
1	በቤትዎ ውስጥ ለመጠጥ፣ ለማብሰያ እና እጅን ለመታጠቢያ የሚሆን ውሃ የሚያገኙት በዋነኛነት ከዬት ነው?	1=የቧንቧ ውሃ 2=ቤት ውስጥ ካለ የቧንቧ ውሃ 3= ግቢ ውስጥ ካለ የቧንቧ ውሃ 4= ከቦኖ ውሃ 5= ከጉድጓድ በቧንቧ ከሚወጣ ውሃ 6=ጉድጓድ ከሚጠለቅ ውሃ 7= - ከአካባቢው ቆሻሻ እንዳይገባበት መከላከያ ካለው ጉድጓድ 8= ከክፍት ጉድጓድ 9=የምንጭ ውሃ 10= መከላከያ ካለው ምንጭ 11= መከላከያ ከሌለው ምንጭ 12=የዝናብ ውሃ በማጠራቀም 13=ውሃ ከሚያድል የመኪና ቦቴ 14=የውሃ በርሜል ካለው ጋሪ 15=የገጸ-ምድርውሃ (ወንዝ፣ ምንጭ፣ ግድብ፣ ሃይቅ፣ ኩሬ፣ ቦይ፣ የመስኖ ቦይ) 16= (የታሸገ ውሃ) 17=ሌሎች (ዘርዝር)________________________ 18=መልስ የለም	
2. ሀ	ለቤት ውስጥ አገልግሎት ውሃ ይቀዳሉ?	1=. መልሱ አዎ ከሆነ ወደ ሚቀጥለው ምርጫ ይሂዱ 2=. መልሱ አልቀዳም ከሆነ ወደ ጥያቄ 3 ይሂዱ	
2.ለ	ውሃ ለመቅዳት ምን አይነት መቅጃ ይጠቀማሉ?	--------------	
2.	መቅጃው ንጹህ ካልሆነ መቅጃውን ንጹህ ለማድረግ የሚጠቀሙት ነገር አለ?	1=አዎ (መልሱ አዎ ከሆነ እንዴት? ------------- 2= ምንም አልጠቀምም 3= መልስ የለኝም:: 4=መቅጃውን በሳሙና እና በውሃ	

		አጥበዋለሁ 5=ሌላ 6= አላውቅም /መልስ የለም	
3	ውሃውን እንዴት እንደሚያጠራቅሙ ሊያብራሩልኝ ይችላሉ?	1=ንጹህ ውሃ ማጠራቀሚያ ውስጥ 2= የተከደነ ውሃ ማጠራቀሚያ ውስጥ 3=ንጹህ እና የተከደነ ውሃ ማጠራቀሚያ ውስጥ 4=ሌላ 5= አላውቅም መልስየለም	
4.ሀ	የቀዱት ውሃ ለመጠጣት ጤናማ እንዲሆን የሚያክሙበት መንገድ አለ?	1= - አዎ 2=የለም 3= አላውቅም/ መልስየለም መልሱ አዎ ከሆነ ወደ 4ለ ይሂዱ	
4.ለ	የቀዱት ውሃ ለመጠጥ ጤናማ እንዲሆን ብዙውን ጊዜ ምን ያደርጋሉ?	1=ማፍላት 2=በረኪና መጨመር 3=በጨርቅ ማጥለል 4=የውሃ ማጣርያ መጠቀም (ሴራሚክ፣ አሸዋ፣ ቅልቅል ጠጠር) 5= በጸሃይ 6=ቆሻሻው እስኪዘቅጥ ማስቀመጥ 7=ሌላ 8= አላውቅም/መልስ የለም	
5	ስለ ምግብ ደህንነትና ጥንቃቄ የጤና ኤክስቴነሽን በለሙያዎች ምክርና ትምህርት ሰጥተዎት ያውቃሉ?	0= በወር ውስጥ የለም 1=1-2 ጊዜ በወር ውስጥ 2= ከ 3 ጊዜ በላይ በወር ውስጥ	