

**MORBIDITY OF DIARRHEAL DISEASE AMONG CHILDREN AGED UNDER
FIVE YEARS LIVING IN INTERNALLY DISPLACED POPULATION CAMPS
OF HODAN DISTRICT, MOGADHISHU-SOMALIA**

HAWA ALI WARSAME

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

Signature Date

Name: Hawa Ali Warsame

Department of Community Health

Supervisors:

This thesis has been submitted with our approval as University Supervisors.

Dr. Eunice Chomi

Department of Community Health

Kenya University

Signature Date.....

Dr. Ngwatu Peter

Department of Pediatrics and Child Health,

Kenya University

Signature Date.....

DEDICATION

This work is dedicated to my beloved husband, Abdinur Sheikh Abukar and our children, Sarah and Ahmed.

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ABBREVIATIONS AND ACRONYMS

ACF	Action Form
AWD	Acute Watery Diarrhea
CDC	Communicable Disease Control
CHERG	Child health Epidemiology Reference Group
CSZ	Central South Zone
EPEC	Entero Pathogenic Escherichia Coli
EPHS	Essential Packages of Health Services
ETEC	Entero Toxigenic Escherichia Coli
FSAU	Food Security Assessment Unit
HH	Household
HIV	Human immune deficiency syndrome
IDMC	Internal Displacement Monitoring Center
IDPs	Internally Displaced Populations
IOM	International Organization for Migration
KII	Key Informant Interview
MICS	Multiple Indicator Cluster Survey
NGO	Non-Governmental Organization

NRC	Norwegian Refugee Council
OCHA	Office for Coordination and Humanitarian Affairs
SD	Standard Division
SPSS	Statistical Package for Social Sciences
UNDP	United Nation Development Program
UNHCR	United Nation Human Commissionaire Rights
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

DEFINITION OF TERMS

Antibodies: A blood protein produced in response to and counteracting a specific antigen.

Children: Children in this study referred to any person who was under- five years.

Cholera: An acute infectious disease of the small intestine, caused by the bacterium *Vibrio cholera* and characterized by profuse watery diarrhea, vomiting, muscle cramps, severe dehydration, and depletion of electrolytes

Conflict: Strong disagreement between people, groups, etc., that results in often angry argument.

Dehydration: Occurs when you use or lose more fluid than you take in, and your body doesn't have enough water and other fluids to carry out its normal functions

Developed countries: Industrialized country, or "more economically developed country" (MEDC), is a sovereign state that has a highly developed economy and advanced technological infrastructure relative to other less industrialized nations.

Developing countries: Also called a **less developed country** or **underdeveloped country**, is a nation with an underdeveloped industrial base, and a low Human Development Index (HDI) relative to other countries

Diarrhea: The passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual) (WHO, 2013).

Disposal: The action or process of throwing away or getting rid of something

Dysentery: Infection of the intestines resulting in severe diarrhea with the presence of blood and mucus in the feces

Household: The smallest and most common unit of production, consumption and organization in a society. It involves all people or one person living in a house.

Hygiene: The science and practice of maintaining good health through cleanliness.

Immunity: Is the balanced state of having adequate biological defenses to fight infection, disease, or other unwanted biological invasion, while having adequate tolerance to avoid allergy, and autoimmune diseases

Malnutrition: Is a serious condition that occurs when a person's diet doesn't contain the right amount of nutrients

Morbidity: A measure of sickness or disease within a geographic area

Mortality: A measure of deaths within a population or geographic area.

Mother/care givers: A person that is involved with provision of the child's care.

Pathogens: Infectious agent is a biological agent that causes disease or illness to its host.

Poverty: Condition where people's basic needs for food, clothing, and shelter are not being met.

Prevalence: The percentage number of children who had diarrhea two weeks before the time of the study.

Reliability: Is the degree to which an assessment tool produces stable and consistent results.

Sanitation: The process of maintaining cleanliness and dealing with sewage.

Seasons: Are periods in a year marked by specific weather conditions, temperatures and length of day

Slums: A squalid and overcrowded urban street or district inhabited by very poor people.

Validity: The quality of being logically or factually sound; soundness or cogency.

Weaning: Accustom (an infant or other young mammal) to food other than its mother's milk.

ABSTRACT

The last two decades of armed conflicts, lack of functioning government, economic collapse, and disintegration of the health system and other public services - together with recurrent droughts and famines, have turned Somalia into one of the world's most difficult environments for survival. The under-five mortality in Somalia is estimated at 200 deaths per 1,000 live births, which is one of the highest in the world. Diarrhea is the main killer; contributing to 20-25 per cent of all under-five mortality. The main objective of this study was to assess the morbidity of diarrhea among under-five children living in Internally Displaced Persons (IDPs) of Hodan district which has the highest IDP settlement in Mogadishu with conditions that are conducive to occurrence of diarrheal disease in the district. The study used descriptive cross-sectional survey design and multistage sampling technique to select 236 children. Researcher administered structured questionnaires were used to collect data using face-to-face interviews with mothers/care givers of the children during a one-time visit to the households. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 21 software. Descriptive and inferential statistical findings were presented in form of text, tables, graphs and charts. Chi-square was used to show the relationship between variables. Fourth eight percent of households reported having children who suffered from diarrhea in the past 2 weeks preceding the study. Diarrhea was also the most common disease reported by mothers/care givers among under-five children in the camps, affecting 107(45.3%) of the children. Diarrheal disease occurrence was highest (74.3%) among children of mothers who did not attend school ($p=0.001$), children living in households provided water by Non-Governmental Organizations (NGOs) ($p=0.025$) and among children whose main source of water was public tap diarrhea (71.3%; $p=0.001$). Most parents in the camp delayed taking their ill children to hospital opting to first use traditional medicines resulting in many cases of admissions at the health facilities. From the study findings it can be concluded that diarrhea was the most prevalent disease among under-fives and is more likely to occur among children whose mothers had no education, and who lived in household whose main source of drinking water was public tap, supplied by NGOs. In addition, the study concluded that other environmental factors had no association with diarrhea occurrence. The study recommends educating mothers to reduce overall illiteracy rate of Somali women, and regular treatment of drinking water and evaluation of water quality by the Ministry of Health and Human Services. Given the high diarrhea prevalence and the fact that camp environmental conditions are conducive to its occurrence, the study also recommends promotion of improved hygiene and sanitation practices, even though these were not found to be associated with diarrhea in this particular study.

CHAPTER ONE: INTRODUCTION

1.1 Background

Diarrheal disease is the second leading cause of death among children under five globally; accounting for 9 percent of all deaths in 2012. This translates into 1,600 children dying each day or more than 580,000 children each year. These deaths mainly occur in south Asia and sub-Saharan Africa (UNICEF, 2012) In the African 300 000 children among under- five age die from diarrhea (WHO, 2013). In Somalia the prevalence of diarrheal disease among children under-five reached 19% in 2012 (WHO, 2012). The under-five mortality in Somalia is estimated at 200 deaths per 1,000 live births, which is one of the highest in the world. Diarrhea is the main killer, contributing 20-25 per cent of all under-five mortality (WHO, 2012).

Diarrheal diseases are connected with unhygienic environments, lack of safe drinking water and poverty. Lack of access to safe water is a striking feature in all parts of Somalia. Only 30% of Somalis have access to safe water, with 20% in the worst affected areas of southern Somalia particularly in areas overcrowded by internally displaced populations (IDPs) increases the risk of outbreaks of diarrheal diseases (UNICEF, 2012). Among IDPs, diarrheal diseases are more common due to prevailing risk factors in the camps such as a lack of safe drinking water, poor hygiene and lack of sanitation, overcrowding, lack of proper water storage and insufficient health services (UNICEF, 2012). There are many outbreaks of diarrheal disease in Somalia but the last outbreak happened in January 2011, where more than 43,000 cases of diarrhea (acute watery diarrhea (AWD) and cholera) and over 710 deaths were reported. The worst affected

areas were Banadir, Lower Shabelle and Lower Juba, which accounted for 57 per cent of the reported cases and 76 per cent of the related deaths (UNICEF, 2011).

There is shortage of literature factors that influence on the burden of diarrheal disease in Somalia over the past decade and a half because of the collapse of the central government in 1991. The World Health Organization (WHO) established a network of health workers reporting to the early warning system of the diseases like diarrhea in Mogadishu in 2009. The objective of the network was early detection of epidemic prone diseases, to facilitate a rapid public health response. However, the network does not identify the causative factors because there is no system to track the causes and risk factors of each disease (WHO, 2009). This study aimed at filling this gap by providing recent data on the prevalence and risk factors of diarrheal disease among IDP camps in Hodan district of Somalia.

1.2 Problem Statement

Diarrheal diseases are still the major cause of morbidity and mortality among children worldwide and mainly in sub-Saharan Africa. In Somalia, more than two decades of war and ongoing civil unrest led to further deterioration of Somalia's health situation. Limited access to basic health services due to insecurity and instability has contributed to the spread of diseases. Somalia became number one in the world health ranking of diarrheal disease in 2011 with a death rate of 179 per 100,000 (WHO, 2011).

Hodan district has the highest IDP settlement in Mogadishu, with conditions that are conducive to occurrence of diarrheal disease in the district. In addition, the lack of

knowledge and awareness of diarrhea transmission and prevention within the community (UNICEF, 2011) may be contributing to the high transmission of diarrheal disease. Understandably, there has been a dearth of documented information on the morbidity burden due to diarrheal disease (WHO, 2009). It was therefore important to study the prevalence and risk factors of diarrheal disease among children living in IDP camps.

1.3 Justification

Somalia is drought prone and faces food insecurity, which is exacerbated by poor healthcare, lack of access to safe drinking water and safe sanitation facilities (UNICEF, 2012). Other determinants of child mortality are widespread poverty, a poorly functioning health system, low level of education, and the ongoing conflict with all the insecurity and hardships that it brings in Somalia. Given the shortage of current data on the prevalence and risk factors for diarrheal disease burden, this study sought to highlight how the current situation facilitated the occurrence and spread of diarrheal diseases among under-five children living in IDP camps.

1.4 Research questions

- 1) What is the prevalence of diarrheal disease among children under-five years living in Hodan IDP camps?
- 2) What are the demographic and socioeconomic factors associated with morbidity of diarrheal disease among children under-five years living in Hodan IDP camps?
- 3) What are the health system factors that influence morbidity of diarrhea disease among children under-five years living in Hodan IDP camps?
- 4) What are the environmental factors that influence morbidity of diarrhea disease among children under-five years living in Hodan IDP camps?

1.5 Hypotheses

- 1) There is no association between socio-economic and demographic factors and morbidity of diarrheal disease among children under-five living Hodan IDPs.
- 2) There is no relationship between health system factors and morbidity of diarrheal disease among children under-five living Hodan IDPs.
- 3) There is no association between environmental factors and morbidity of diarrheal disease among children under-five living Hodan IDPs.

1.6 Objectives of the research

1.6.1 Broad objective

To determine the morbidity from diarrheal disease among children under-five years living in Hodan IDP camps.

1.6.2 Specific objectives

- 1) To determine the prevalence of diarrheal disease among under-five children living in Hodan IDPs.
- 2) To identify demographic and socioeconomic factors associated with morbidity of diarrheal disease among children under-five living in Hodan IDP camps.
- 3) To identify the health system factors that influence morbidity of diarrhea disease among children under-five living in Hodan IDP camps.
- 4) To identify environmental factors that influence morbidity of diarrhea disease among children under-five living in Hodan IDP camps.

1.7 Significance

The results of this study highlighted the current diarrhea morbidity burden and risk factors among under-five children living in IDPs of Hodan district. The findings would assist policy makers, planners and implementers of child health programs in the development of strategies and interventions to address morbidity burden of diarrheal disease. In addition the study would contribute to the field of knowledge in diarrheal diseases and serve as a basis for future research in this area.

1.8 Limitation of the study

Being cross sectional design it was difficult to entertain the seasonal differences in the occurrence of diarrheal diseases. The information on the prevalence of diarrhea may not reflect the actual situation that may be observed in the various seasons of the year, as the information on diarrhea was collected in February, March and April, which is a dry

season. Furthermore, not all diarrheal incidences are as a result of infection. This study did not distinguish between non-infectious and infectious diarrhea.

1.9 Conceptual Framework

This conceptual framework was drawn from known determinants and contributing factors for under five diarrhea. Diarrheal diseases are major causes of morbidity and mortality in developing countries especially among displaced persons, where there are large concentrations of people living in poor hygienic conditions (WHO, 2010). The determinants and contributing factors can be explained as follows:

Younger mothers/care givers lack experience and are more likely to have little knowledge on risk factors, prevention and treatment of diarrhea, especially if they have low level of education (UNICEF, 2008). The age of the child is a risk factor since children under five have under-developed immune systems, making them prone to infection like diarrhea (Brooks et al., 2003). The occurrence of diarrhea increase after introduction of complementary food due to unhygienic preparation of weaning food, especially in children aged 6 to 24 months (Usfar, Iswarawanti, Davelyna, & Dillon, 2010).

Somalia is one of the poorest countries in the world. According to the World Bank (2002), over 40 per cent of the population was estimated to live in extreme poverty - that is, living on less than one US dollar per day – and about 75 per cent of the population lived on less than two US dollars per day. Low income and low paying occupations increase the risk of diarrhea due to the reduced ability to provide adequate nutrition, proper living conditions and prompt treatment seeking at health facilities (UNDP, 2014).

Educational level of the mother/care giver is a key determinant of the lifestyle and status of the family; those mothers had low level of education are at risk of occurrences of diarrheal disease among their children (Mukhtar, Izham, & Pathiyil, 2011).

The availability of public health facilities in Somalia is generally low, especially in IDP camp places, and the service output from existing health units is generally unsatisfactory (WHO, 2012). Lack of health facilities and infrastructure, inadequate qualified staff and supervision to provide preventive and curative services to address diarrhea contributes to the high prevalence of the disease (WHO, 2012). Poor access to clean water and lack of proper waste disposal and latrines perpetuates the high prevalence of diarrhea (WHO, 2011).

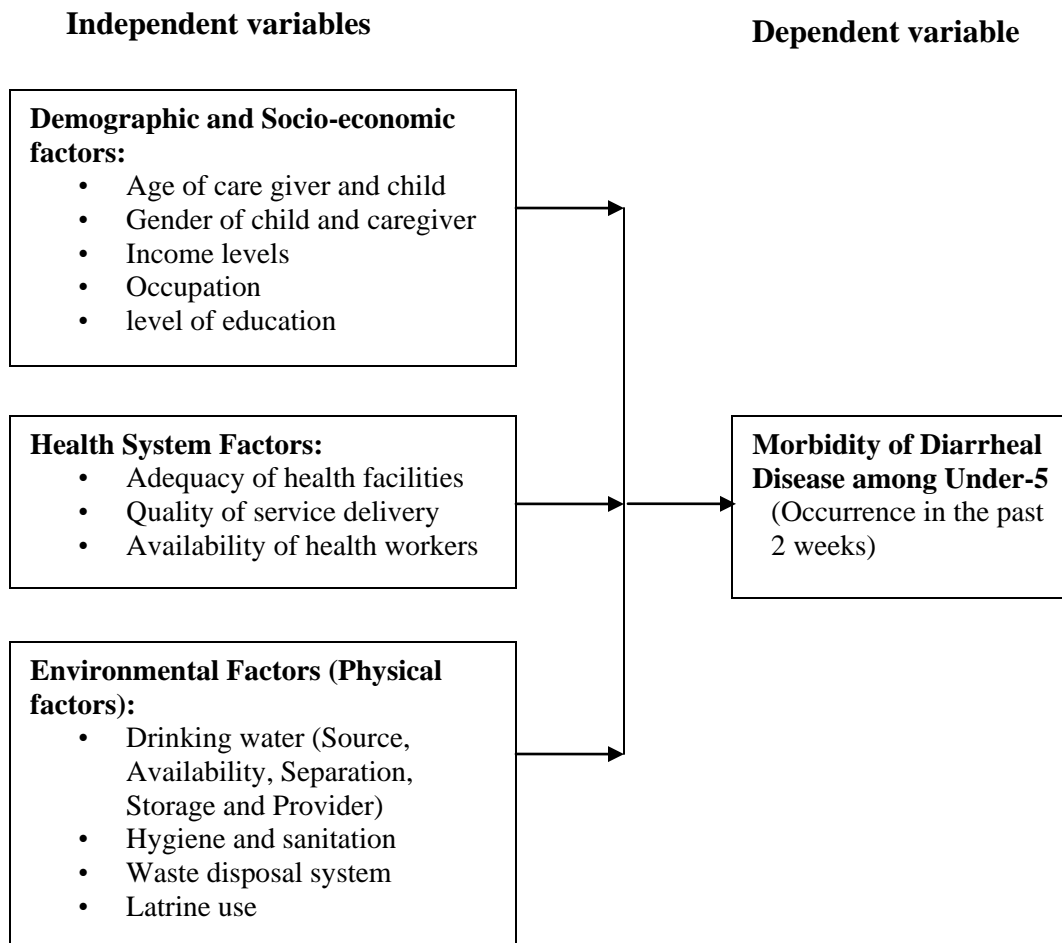


Figure 1.1: Conceptual Framework: Adopted and Modified from Mulugeta, 2003

CHAPTER TWO: LITERATURE REVIEW

2.1 Definition of diarrhea

As defined by WHO diarrhea is the passage of 3 or more loose or liquid stools per day, or more frequently than normal for the individual (WHO, 2013). It is usually a symptom of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking water, or from one person to another as a result of poor hygiene. Severe diarrhea leads to fluid loss, and may be life threatening, particularly in young children and people who are malnourished or have impaired immunity (WHO, 2013).

2.2 Types of diarrhea

2.2.1 Acute watery diarrhea

This term refers to diarrhea characterized by abrupt onset of frequent, watery, loose stools without visible blood, lasting less than two weeks. Usually, acute watery diarrhea episodes subside within 72 hours of onset. The enteric pathogens causing this diarrhea in developing countries are largely the same that are encountered in developed countries, but their proportions are different. In general, bacterial pathogens are more important in countries with poor hygienic conditions. The most important causes of this diarrhea in developing countries especially among children include *Rotavirus*, *Shigellae*, *Enterotoxigenic E. coli* (ETEC), *Vibrio cholerae*, *Campylobacter jejuni*, *Enteropathogenic E. coli* (EPEC), *Salmonella spp* and *Cryptosporidium* (Vesikari and Torun, 1994). The most dangerous complication is dehydration that occurs when there is excessive loss of fluids and minerals (electrolytes) from the body. With vomiting,

dehydration becomes more severe. Dehydration is especially dangerous in infant and young children due to rapid body water turnover, high body water content and relatively larger body surface (Molbak, 2000).

2.2.2 Dysentery

Also called acute bloody diarrhea and may simply be defined as diarrhea containing blood and mucus in feces. The illness also includes abdominal cramps, fever and rectal pain. The most important cause of bloody diarrhea is *Shigella*. *Shigella* is a genus of bacteria with four species: *S. dysenteriae*, *S. flexneri*, *S. boydii* and *S. sonnei*. In developing countries, the main causative agents of dysentery are *S. flexneri*, *S. boydii* and *S. dysenteriae*, whereas *S. sonnei* is the main cause in developed countries (WHO, 2013). Other pathogens causing endemic dysentery in children include; *Campylobacter jejuni*, non-typhoid *Salmonella* strains and *Entamoeba histolytica* (Waldman, 1994).

2.2.3 Chronic diarrhea

This term refers to diarrhea which is recurrent or long lasting due to mainly non-infectious causes. Chronic diarrhea may be caused by gastrointestinal disease, or secondary to systemic disease (Armon, 2001).

2.3 The global burden of diarrheal disease in children

Pneumonia, diarrhea and malaria remain leading causes of death among children under age five, accounting for about 1.3 million about 40 percent of under-five deaths in Sub-Saharan Africa and roughly half a million about 25 percent in Southern Asia. Diarrhea killed roughly 2 million children in 2013 and accounted for almost a third of global under-five deaths (UNICEF, 2014). For children with HIV, diarrhea is even more deadly;

the death rate for these children is 11 times higher than the rate for children without HIV (Hutton, Haller, & Bartram, 2007).

2.4 Burden of diarrheal disease in Somalia

Across Somalia, the ongoing conflict, lack of security and instability has resulted in only 29% of the population having access to clean water and only 39% of the population with access to adequate sanitation. The prevalence of diarrhea increased to 19% in 2012 (WHO, 2012) as the climate of Somalia is dry and hot, access to safe water is limited diarrhea and other epidemics are common (Gigon, 2011). IDPs are more vulnerable due to insufficient water storage, access to safe and clean water, thus conditions of hygiene, sanitation and housing among the IDPs are very poor. Lack of proper waste disposal system, poor latrine usage and open defecations are also contributing to the burden of diarrheal disease among children living in the camps (Nicole, 2015). On the other hand, the Central South Zone (CSZ) of Somalia has been more affected by conflicts including Mogadishu compared to other parts of Somalia, as a result the IDPs are more settled in Mogadishu, being the capital city and where humanitarian actors are more accessible. Despite the fact that there are number of humanitarian actors on the ground, there are still limited health centers where IDPs can access health services. This factor can also facilitate the occurrence of the diarrheal disease (NRC, 2013).

2.5 Transmission routes of diarrheal disease

Infectious diarrhea is acquired by fecal-oral transmission that includes consumption of contaminated food or water, person-to-person contact, or direct contact with fecal matter.

Transmission patterns occur when in-house water storage facilities or/and water sources are contaminated (Jensen et al., 2004). There are four transmission routes that the major infectious agents use to reach human hosts, that is, (1) human-to-human via the environment for example the man is the principal reservoir and whose transmission mostly originates from human feces; (2) human-to-human multiplying in the environment, for instance some bacteria can multiply in the environment, especially when nutrients and warmth are available then will affect another new host; (3) human-to-animal-to-human via the environment, where the infection begins from the man host then the pathogen spread to the animal, and in a conducive environment of warmth, shade and moisture the pathogen multiplies and infects the new human host; and (4) animal-to-human via the environment, where the animal is the original reservoir of the pathogen which will affect the new human host. All in all, poor hygiene environment is the main risk factor for diarrheal disease in children living within IDPs (Curtis, Cairncross, & Yonli, 2000; Jensen, et al., 2002).

2.6 Risk factors of diarrheal disease among under five years children

2.6.1 Lack of safe drinking water, sanitation and hygiene

Since human feces are the primary source of pathogens causing diarrhea, poor sanitation, lack of adequate water supply and hygiene are all contributing factors to high instances of diarrheal disease (Keusch, et al., 2006). Diarrheal diseases represent the most significant health impact of unimproved sanitation, and disproportionately impact upon children. Lack of access to safe, clean drinking water and basic sanitation, as well as poor hygiene cause nearly 90% of all deaths from diarrhea, mainly in children (WHO, 2008). While 87% of the world's populations now have access to improved water sources, 39% still

lack access to improved sanitation (UNICEF & WHO, 2010). In addition, in the developing countries 1.1 billion people still defecate in the open, and hand washing with soap is practiced, on average, only after 17% of toilet uses (Curtis, Cairncross, & Yonli, 2000). Diarrhea most often results from the ingestion of pathogens from feces that have not been disposed of properly, or from the lack of hygiene (WHO, 2011). Throughout the world, an estimated 2.5 billion people lack basic sanitation (more than 35% of the world's population) and lack access to facilities for the safe disposal of human waste (feces and urine), as well as having the ability to maintain hygienic conditions. Centre for Disease Control [CDC] (2014) estimates that 88% of cases of diarrhea can be attributed to unimproved water and sanitation where around 1.1 billion people globally do not have access to improved water supply sources. Access to clean and safe water in Somalia is one of the main challenges due to a combination of factors; arid climate, chemical concentration of water sources and human-induced conflict. Moreover, existing water sources are inadequate in terms of accessibility, quality and quantity. The high concentration of chemical components and salinity in the groundwater makes it unsafe for human consumption and even the available surface water is often contaminated, needing treatment (IOM, 2014).

2.6.2 Demographic and socio-economic factors

Low level of income of the household is associated with poor housing, crowding, dirt floors, and lack of access to sufficient clean water or to sanitary disposal of fecal waste. Poverty restricts the ability to provide age-appropriate, nutritionally balanced diets or to modify diets when diarrhea develops so as to mitigate and repair nutrient losses (Keusch, et al., 2006). Approximately, 43% of Somalia's populations live below the poverty line

(CDC, 2014). Poverty in Somalia can be attributed to a number of factors; the prominent among them is the absence of an active central government, civil disputes, natural calamities like floods and droughts (UNICEF, 2010). The most vulnerable social groups affected by poverty are IDPs, women and children. For the IDPs camps there is shortage access of services and caused limited day life and treatment of ill children those contribute massive died of children living in IDPs due to poverty.

Education of mothers/care givers enhances mother's knowledge of child's health, which is an important predictor of child health outcome (Mukhtar, Izham, & Pathiyil, 2011). Education can also facilitate the mother's ability to understand the causation and prevention methods of illness (Ambel, 2007). The impact of maternal education on child health has three primary causal pathways (Adato, 2011). Among the key pathways, maternal education impacts on child health through increased knowledge of health issues (Richards, 2012). Second, maternal education can increase awareness of disease prevention and control mechanisms and thirdly, maternal education can change traditional attitudes towards child health and nutrition (Bellessa, 2005). Maternal education can also reduce the likelihood of poverty and social exclusion, thus removing financial constraints, enabling families to achieve better living conditions, increasing their ability to pay for social services and improving their social relations; all of these factors can ultimate improve child developmental outcomes (Houweling and Kunst, 2010; Guliani, 2012).

2.6.3 Health system factors

In countries at analogous levels of income and educational attainment, there exists a variation in health outcomes (World Bank, 1993). A little of this variation is due to

differences in health system performance. Differences in the design, content and management of health systems translate into differences in a range of socially valued outcomes such as health, responsiveness or fairness. Decision-makers at all levels need to quantify the variation in health system performance, identify factors that influence it and ultimately articulate policies that will achieve better results in a variety of settings (Murray & Frenk, 2003). Several aspects of health care system have been postulated to impact patient care and outcome particularly among racial and ethnic minority groups (Smedley, Stith, & Nelson, 2003). These include but not limited to organization, constitution and financing of the system as well as ease of accessing the services (Chang & Christopher, 2008). The overwhelming majority of the world's refugees originate from countries where the most basic resources required for health, such as safe drinking-water, housing, adequate food supply and education are scarce, during the emergency phase, the four most frequent communicable diseases which together are responsible for the highest morbidity and mortality rates are: measles, diarrheal diseases, acute respiratory infections and malaria (UNDP, 2010). People affected by infectious diarrheal diseases often require health care and/or hospital support, which incur costs to both patients transport, medicine, time-loss and to the national governments medical consultation, treatment, medication (Hutton and Haller, 2004).

CHAPTER THREE - MATERIALS AND METHODS

3.1 Research Design

This was a descriptive cross-sectional study that utilized both quantitative and qualitative research methods of data collection and analysis. This design allowed for collection of extensive data within a short time on issues based on the relationship between the variables under study.

3.2 Variables

The study used the following variables to measure diarrhea morbidity among under-five children living in Hodan IDP camps.

3.2.1 Dependent variable

This was the occurrence of diarrhea in children under five in the past 2 weeks prior to the study. In this study, this variable was operationalized as '0' for those who reported no experience and '1' for those who reported having experienced diarrhea during the study recall period.

3.2.2 Independent variables

These were the risk factors that contributed to the occurrence of diarrheal disease in the under-five children, including environmental factors, demographic and socio-economic, and health system factors. Environmental factors included water sources, drinking water storage, water availability, and water provider), type of toilet, hygiene practices (hand washing and garbage disposal). Socio-demographic and economic factors included gender of household, mother/caregiver marital status, level of education, source of

income and age and gender of interviewed child. Health system factors included quality of service delivery, number of health workers and working health facilities.

3.3 Location of the study

The study was conducted in Hodan district, which is located in the south east of Banadir region of Somalia. It lays between latitude $2^{\circ}2'46''\text{N}$ and longitudinal $45^{\circ}18'10''\text{E}$ and shares boundaries with 5 other districts, including: Hawl-wadag to the east, Deynile to the north, Waberi to the south, and Wadajir and Dharkeynley to the west. The district has four sub divisions: October, Taleex, Kacaan, and Ahmed Gurey. The district stretches an area of about 10 square kilometers, and has an estimated population of 121, 000 people. Majority of the population (an estimated 78%) of the district live in IDP camps. Hodan was selected because it has the highest population of IDP camps in Mogadishu.

3.4 Study population

Study population included all mothers/ care givers to children under-five years of age living in Hodan IDP camps. These were selected from households within the camps. Six health workers (clinical officers and nurses) in the camps were also targeted to aid with information.

3.5 Sampling techniques

This study used multistage sampling as follows: October Sub-District was purposively selected because it had the majority of IDP camps. Within the sub district, Zone K camp was purposively selected because it had the largest concentration of IDP camps. Within

Zone K camp households with at least one child aged below 5 years were randomly sampled from a list obtained from the camp authorities. In every household one child was randomly selected. This is because the source of information was the mothers/care givers, and selection of more than one child in the same household would provide similar data. For the key informant interviews all health workers working in the camp, which included two clinical officers and four nurses were purposively sampled.

3.6 Sample Size

The sample size was calculated using the statistical formula of Fishers (Kothari, 2004).

$$\text{Sample size } n = \frac{z^2 pq}{d^2}$$

Where: n = desired minimal sample size (when population is greater than 10,000)

z = standard normal deviate which is 1.96 at 95% confidence level.

p = estimated prevalence of diarrheal disease among under five children in Somalia (19%) (WHO, 2012)

d = degree of accuracy (0.05)

q = $1-p$

Therefore using a confidence of 95% that corresponds to the standard normal deviate of 1.96, the proportion in the target population estimated at 19% and the degree of accuracy required set at 0.05 the sample size, the sample size is:

$$n = \frac{1.96^2 \times 0.19 \times 0.81}{0.05^2} \approx 236$$

The study used a sample of 236 mothers/ care givers and 6 health workers including Clinical officers and nurses.

3.7 Pretest

The research instruments were pre-tested in Waberi District among 24 (10% of minimal sample size), which is similar to Hodan district to ensure the appropriateness of the tools in the study and to evaluate the validity and reliability of the instrument. In addition, pre-testing the questionnaire ensured that the instrument generated the intended data and highlighted the errors to be corrected before actual data collection started.

3.8 Validity

Validity assesses the degree to which the instrument will be actually suitable, and to check how the respondents filled the questionnaires to avoid bias (Rässler & Riphahn, 2006). Validity of the study was assured by randomly sampling the households, use of questions adapted from standardized questionnaires (MICS), pre-testing of the research instruments and use of appropriate data analysis methods. At the end of each day the filled interview schedules were counterchecked by the researcher to ascertain that all questions had been answered correctly and consistently.

3.9 Reliability

Reliability is the proportion of variance attributable to the true measurement of a variable and estimates the consistency of such measurement over time (Mugenda, 2011). The test-retest method was used to test the consistency of the questionnaire in producing the same results. The same questionnaire was used for all mothers/ caregivers to maintain reliability of the result.

3.10 Research Instruments

Quantitative and qualitative data was collected using appropriate instruments as follows: Quantitative data was collected using a questionnaire and facility medical records. The questionnaire was translated from English into the local language (Somali) for the respondents to understand. The Somali questionnaires were back-translated to English to avoid distortion of the meaning of the questions. The questionnaire contained both closed and open-ended questions on household characteristics, socio-demographic characteristics of the child and caregiver, diarrheal experience and environmental risk factors.

The medical record form served to capture annual diarrhea morbidity and trends in the camp. This information included total children admitted with diarrheal disease in annual and trends of diarrhea among under-five children living in IDP camps. The secondary data obtained from the medical records was triangulated with the data from questionnaire and interview guide.

Qualitative data was collected using an interview guide, which was also translated into Somali then back translated into English. The guide contained open-ended questions related to the participants' experience of diarrheal disease and common health problems with regard of under children of Hodan IDP camps as well as probing questions to obtain a deeper understanding of the issues raised.

3.11 Data Collection Techniques

The researcher trained five post O-level research assistants within two days on the study and how to capture quality data using the research instruments. Well-known individuals or the camp authority were used to guide and identify the selected households as well as to introduce the research team to the study participants. Informed consent was sought prior to commencement of the interview. The researcher and assistants administered the questionnaire to the mother/ care giver in face-to-face interviews. If the caregiver of selected household was not present at the time of visit, the researcher visited the household a second time. Research assistants ensured completeness of tools by cross checking and verifying with the mothers/ care givers.

Key informant interviews were conducted face-to-face with two clinical officers and four nurses working in the health facilities inside the camps using the Interview Guide (Appendix III). Informed consent was obtained before commencing with the interview. During the interviews the researcher took notes as discreetly as possible and reviewed them immediately after interview to ensure that all information was captured.

3.12 Data Analysis

Data coding, entry and analysis was done using the SPSS version 21 software. Data was cleaned to ensure consistency. Chi square tests were used to test the association between environmental, demographic and socio-economic, and health system factors and the prevalence of diarrheal disease at 95% confidence interval and 0.05 level of significance. Qualitative data was analyzed using content analysis that identifies common and similar

information, which is then categorized under major themes. Statements from health workers were also recorded and presented as verbatim.

3.13 Logistical and Ethical Considerations

Approval to conduct the study was obtained from Kenyatta University Graduate School (Appendix 7, 8). In Somalia, permission to conduct the study was obtained from the Ministry of Culture and Higher Education (Appendix 10) and Ministry of Health and Human Services (Appendix 9). In addition, the Hodan District Commissionaire and Hodan camp leader was informed about the study.

Informed consent was sought from each respondent prior to interviewing by first explaining the purpose of the study, the voluntary nature of participation, the confidentiality of the information provided by the participant, the benefits of the study to the community and that no harm would result from participation or refusal to participate. Those who agree to participate were asked to sign or put a thumbprint on the informed consent form (Appendix I). Anonymity and confidentiality of participants were assured by using codes to identify the households and restricting the use of data collected to the research team.

CHAPTER FOUR: FINDINGS

4.1 Quantitative Results

The quantitative results presented are the socio-demographic characteristics of the study population, prevalence of diarrheal disease among under-five children, socio-demographic, economic and environmental factors associated with morbidity of diarrheal disease among under-five children in Hodan IDP camp. A total of 236 mothers/care givers of households in the camp were surveyed.

4.2 Demographic and socioeconomic characteristics

Sixty one percent of the households were male-headed while 39% were female headed. Fifty seven percent of children whose mothers/ care givers were interviewed were female and 42.8% children were male. Sixty nine percent of the care givers/mothers were married; 16.5% were divorced; 8.5% were widowed/widowers while 5.9% were single. Sixty one percent of the care givers had no education, 16.1% had primary school, 10.5% completed primary while 12.7% had secondary and above education. Thirty eight percent of households depend on their income from private sector employment, 24.2% from own business, 18.6% from civil service employment, 13.6% from agriculture and 5.9% had no source of income. The mean household size was 7.8 (SD 3.05). The mean number of under-five year children per households was 2.9 (SD 1.44). The mean age of children interviewed was 22.6 months (SD 15). Mean age of care givers interviewed was 30.6 years (SD 7.9, Table 4.1).

Table 4.1: Socio-demographic characteristics of respondents

Characteristic	Frequency	Percent (N = 236)
Gender of household head		
Male	144	61.0
Female	92	39.0
Child's gender		
Male	101	42.8
Female	135	57.2
Marital Status of Mother/care givers		
Married	163	69.1
Divorced	39	16.5
Widowed/Widower	20	8.5
Single	14	5.9
Mother's/Caregiver's highest level of education		
None	143	60.6
Primary	38	16.1
Completed Primary	25	10.5
Secondary and above	30	12.7
Main source of income in the family		
Wages from private sector employer	89	37.7
Own business	57	24.2
Wages from civil service employment	44	18.6
Agriculture	32	13.6
No income	14	5.9
Age of the child groups (mean = 22.61,SD =15.00)		
<6 months	26	11.0
6 - 24 months	142	60.2
>24 months	68	28.8
Age of caregiver (mean = 30.60, SD =7.91)		
< 18 years	174	74.7
18 - 35 years	56	24.0
> 35 years		
Household size (mean = 7.76, SD = 3.05)		
<= 5	59	25.0
> 5	177	75.0

4.3 Prevalence of diarrheal disease

Fourth eight percent of households reported having children who suffered from diarrhea in the past 2 weeks preceding the study (Fig 4.1).

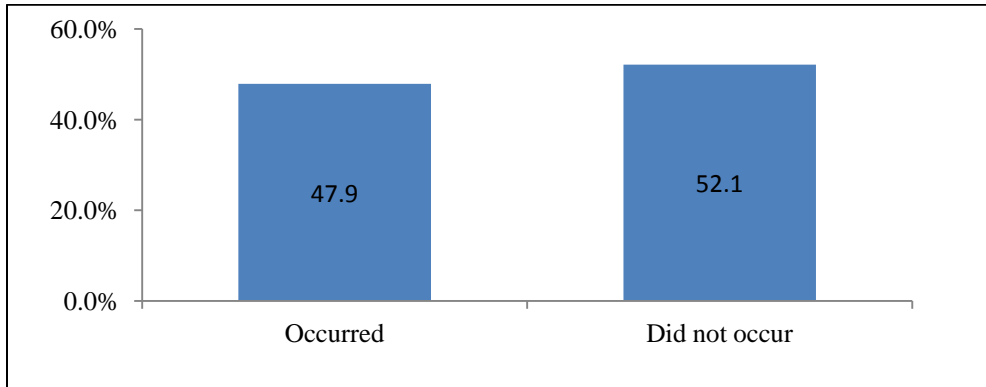


Figure 4.1: Occurrence of diarrhea among under-five children in Hodan IDP camp in the past 2 weeks

Diarrheal disease was reported among 46.5% of male children and 48.9% of female children.

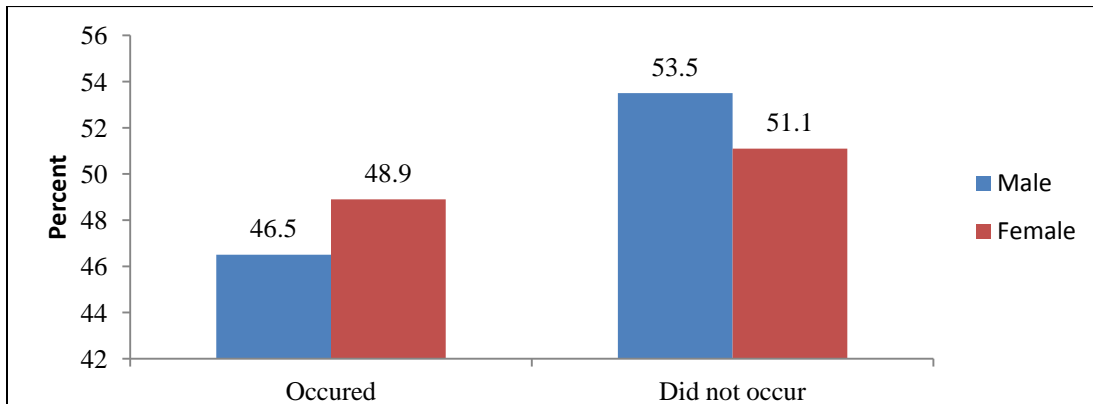


Figure 4.2: Occurrence of Diarrhea by Gender

In addition, among the childhood illnesses reported by mothers/care givers to affect under five children in the camp, diarrhea was the most commonly reported (45.3%), followed

by malaria (22.9%), acute respiratory infections (17.8%), malnutrition (11.4%) and injury/trauma (2.5%) as illustrated in (Fig. 4.2).

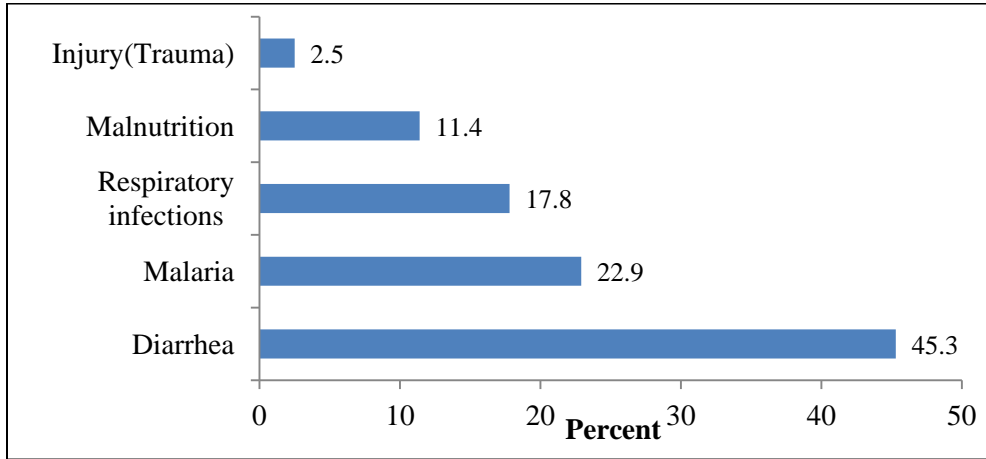


Figure 4.3: Top diseases among under-five children in Hodan IDP camps reported by mothers/care givers

4.3.1 Demographic and socioeconomic risk factors

Table 4.2 illustrates the association between socio-demographic and economic risk factors and the occurrence of diarrheal disease. Diarrhea was reported among 56.4% of children of divorced care givers, among 55% of children of widowed care givers, 45.4% of children of married care givers, and among 42.9% of children of single care givers.

Among children whose mothers did not attend school 74.3% reported diarrhea occurrence, compared to 9.7% of those whose mothers had primary education, 8.8% of those whose mothers had completed primary school and 7% of those whose mothers had secondary education and above. The occurrence of diarrhea among children of care givers aged less than 18 years was 66.7%, among those of care givers aged between 18 and 35 years was 48.3% and among those of care givers older than 35 years was 42.9%.

Table 4.2: Demographic and socioeconomic factors associated with morbidity of diarrheal disease among under-five children in Hodan IDP camps

Characteristic	Occurrence of Diarrhoea			p-value*
	Yes (%)	No (%)	Total (% N = 236)	
Gender (household head)				.291
Male	65(45.1)	79(54.9)	144(61.0)	
Female	48(52.2)	44(47.8)	92(39.0)	
Marital Status (Mother/caretaker)				.555
Married	74(45.4)	89(54.6)	163(69.1)	
Divorced	22(56.4)	17(43.6)	39(16.5)	
Widowed/Widower	11(55.0)	9(45.0)	20(8.5)	
Single	6(42.9)	8(57.1)	14(5.9)	
Mother's/Caretaker's highest education				.001
None	84(74.3)	59(48.0)	143(60.0)	
Primary	11(9.7)	27(22.0)	38(16.1)	
Completed primary	10(8.8)	15(12.2)	25(10.6)	
Secondary and above	8(7.0)	22(17.8)	30(12.7)	
Mother's/Caretaker's main source of income				.505
Wages from private sector employer	41(46.1)	48(53.9)	89(37.7)	
Own business	24(42.1)	33(57.9)	57(24.2)	
Wages from civil service employment	26(59.1)	18(40.9)	44(18.6)	
Agriculture	15(46.9)	17(53.1)	32(13.6)	
No income	7(50.0)	7(50.0)	14(5.9)	
Age of the child				.422
<6 months	13(50.0)	13(50.0)	26(11.0)	
6 - 24 months	72(50.7)	70(49.3)	142(60.2)	
>24 months	28(41.2)	40(58.8)	68(28.8)	
Age of caregiver				.619
< 18 years	2(66.7)	1(33.3)	3(1.3)	
18 - 35 years	84(48.3)	90(51.7)	174(74.7)	
> 35 years	24(42.9)	32(57.1)	56(24.0)	

* Chi-square test

About 46.1% of care givers whose main source of income was from private sector employment reported the occurrence of diarrhea among their children, compared to 42.1% of care givers whose main source of income was own business, 59.1% of care givers whose main source of income was wages from civil service employment, 46.9% of care givers whose main source of income was agriculture and 50% of care givers who did not have any source of income.

A higher proportion of children aged between 6 and 24 months reported diarrhea occurrence (50.7%), compared to the proportion of children aged less than 6 months old (50%) and children older than 24 months reported diarrhea occurrence (41.2%).

Chi-square test showed a non-significant association between head of household ($p=.291$), marital status of caretaker ($p=.555$), mother/ caretakers main source of income ($p=.505$), Age of the child ($p=.422$), age of caregiver ($p=.619$) and occurrence of diarrhea. However, there was a significant association between caretakers' education level and occurrence of diarrhea ($p=0.001$) implying that caretakers/mothers with higher education level were less likely to have children suffering from diarrhea compared to caretakers/mothers with lower education levels.

4.3.2 Environmental factors associated with morbidity of diarrheal disease

Environmental factors associated with diarrheal disease were measured using water dimensions (water sources, drinking water storage, water availability, and water provider), type of toilet, hygiene practices (hand washing and garbage disposal).

4.3.2.1 Water dimensions and occurrence of diarrhea

Among children of household whose main source of water was public tap diarrhea was reported in the past two weeks preceding the study (Table 4.3) by 71.3%, while 46.2% of those using water boozer, 34.0% using water from tube well, 30.8% protected dug well and 35.7% unprotected dug well.

Diarrhea was reported by 53.6% of households that stored water in pots, 51.4% of households that stored drinking water in jerry cans and 42.3% of households, which stored water in tanks.

Among households that sometimes separated drinking water from water for other domestic purposes diarrhea occurrence was 51.2%, while households that never separated drinking water from water for other domestic purposes was 48.4% and among households that always separated drinking water from water for other domestic purposes it was 43.1% (Table 4.3).

The occurrence of diarrheal disease among households that did not have a continuous supply of water was reported by 50.5%, while that among households that had water available throughout was 45.7%. Among households whose water was provided by NGOs diarrhea was reported by 57.1%, while among households whose water was provided by the government it was 41.7% and among those whose water was provided by private operators it was 39.3% (Table 4.3).

Table 4.3: Water dimension factors associated with the occurrence of diarrhea among children under five in Hodan IDP camp

Characteristic	Occurrence of Diarrhoea			p-value*
	Yes (%)	No (%)	Total (% , N = 236)	
Main source of drinking water				< .001
Public tap	57(71.3)	23(18.7)	80(28.8)	
Tube well	35(34.0)	68(66.0)	103(43.6)	
Protected dug well	4(30.8)	9(69.2)	13(5.5)	
Unprotected dug well	5(35.7)	9(64.3)	14(5.9)	
Water boozer	12(46.2)	14(53.8)	26(11.0)	
Drinking water storage				.346
Jerry cans	57(51.4)	54(48.6)	111(47.0)	
Tank	41(42.3)	56(57.7)	97(41.1)	
Pot	15(53.6)	13(46.4)	28(11.9)	
Drinking water separate from water for other domestic purposes				.615
Never	44(48.4)	47(51.6)	91(38.6)	
Sometimes	41(51.2)	39(48.8)	80(33.9)	
Always	28(43.1)	37(56.9)	65(27.5)	
Continuous water supply				.469
No	54(50.5)	53(49.5)	107(45.3)	
Yes	59(45.7)	70(54.3)	129(54.7)	
Water provider				.025
NGOs	64(57.1)	48(42.9)	112(47.5)	
Government	5(41.7)	7(58.3)	12(5.1)	
Private operator	44(39.3)	68(60.7)	112(47.5)	

* Chi-square test

Chi-square tests indicated that occurrence of diarrhea was significantly associated with the water provider ($p = .025$) and the main source of water ($p = 0.001$). This implies the occurrence of diarrhea is less likely to be reported from households whose water is provided by private operators and government than from households whose water is provided by NGOs. Similarly, the occurrence of diarrhea is more likely to be reported

from households whose main source of water is lake; river or stream compared with households whose main source of water is public tap (table 4.3).

4.3.2.2 Type of Toilet facility and occurrence of diarrhea

About forty nine percent (49.6%) of the respondents used pit latrines as their toilet facility while 43.6% used communal pit latrines and whereas the rest (6.8%) had no toilet facility in their households. Diarrheal disease occurrence was reported by 52.1% of those with no toilet facility, 42.5% of those using single pit latrine and 36.4% of those using communal pit latrine (Fig. 4.4). The association between type of toilet facility used in household and occurrence of diarrhea was not significant ($p = .243$).

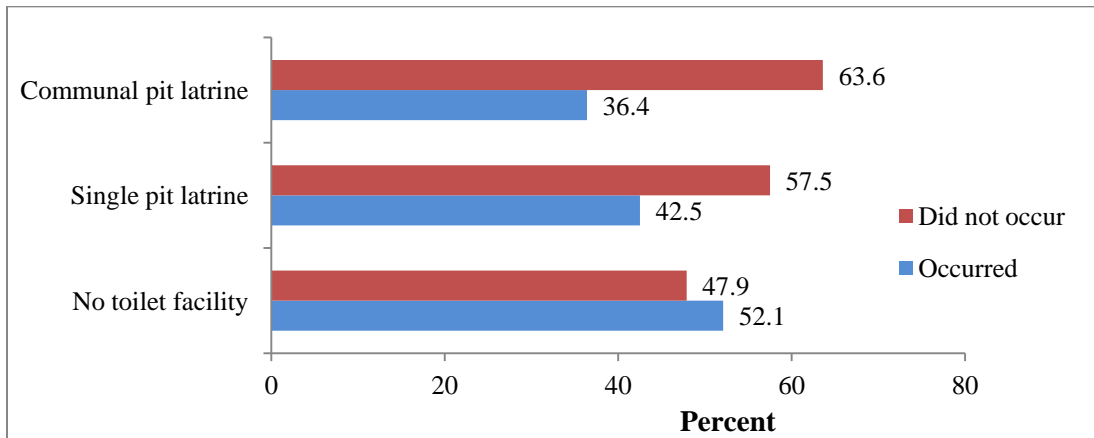


Figure 4.4: Occurrence of diarrheal disease by type of toilet facility

4.3.2.3 Hand washing Practice and occurrence of diarrhea

Hand washing was practiced after using the toilet by 61.9% of the respondents, before meals by 20.8% and before preparing meals by 18.6%. Occurrence of diarrheal disease was reported by 44.9% of respondents who washed their hands before meals, 43.2% of respondents who washed their hands before preparing meals and by 49.3% of

respondents who washed their hands after using the toilet (Fig. 4.5). The association between hand washing time and occurrence of diarrhea was not significant ($p = .798$).

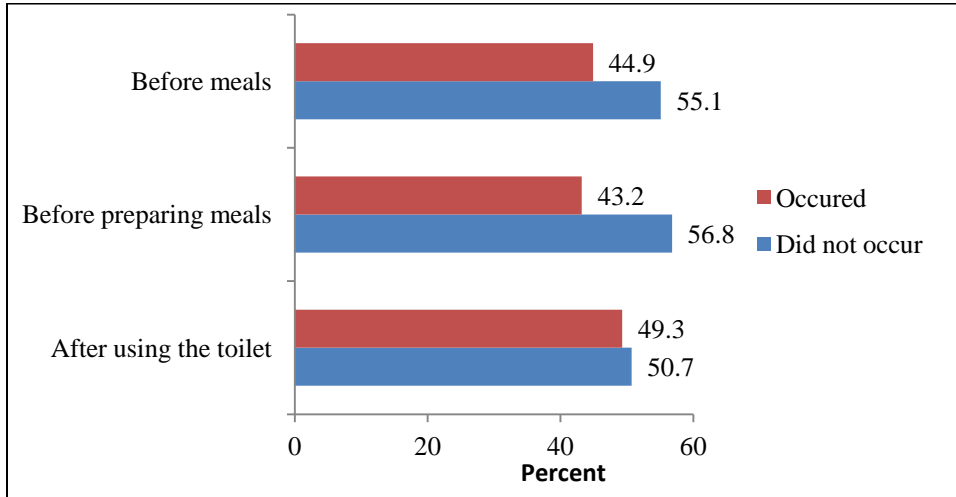


Figure 4.5: Occurrence of diarrheal disease by hand washing time

Most of the respondents (61.4%) wash their hands with water only after visiting toilet, while 38.6% wash their hands with soap and water. The occurrence of diarrheal disease among children of respondents that use soap and water was 47.3%, while that of children whose mothers/caregivers used water only was 48.3 % (Fig 4.6). The association between mode of hand washing and occurrence of diarrhea was insignificant ($p = .878$)

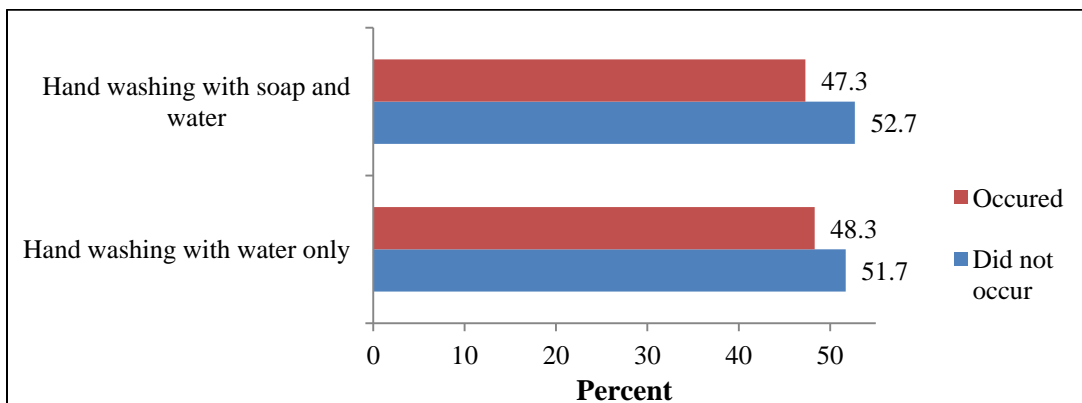


Figure 4.6: Occurrence of diarrhea by mode of hand washing after toilet use

4.3.2.4 Garbage disposal and occurrence of diarrhea

About 41% of the respondents reported burning their garbage in the household, while 30.5% reported using the community garbage collection utility and 28.8% reported throwing it in the open surrounding. The occurrence of diarrheal disease among children of households that burned garbage it was 51%, among children of households that disposed garbage in open surrounding was 50%, and among children of households that used the community garbage collection utility was 41.7% (Fig. 4.7). There was no significant association between method of garbage disposal and occurrence of diarrhea ($p = .562$).

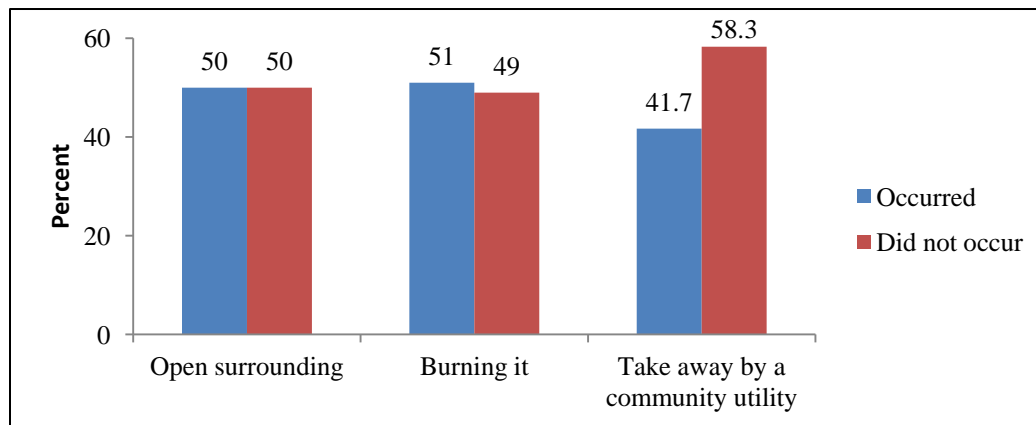


Figure 4.7: Occurrence of diarrhea by method of garbage disposal

4.4 Qualitative results

The qualitative results are findings from the key informant interviews, which focused on contribution of diarrhea morbidity among under- fives in Hodan IDP camps, contributory factors and measures to prevent and control the disease. The interviews were conducted among six health workers working at two health facilities in Hodan IDP camps. The

health workers that were interviewed comprised two clinical officers and four nurses. The interview took place at the health facilities. The views of the health workers concerning the morbidity of diarrheal disease have been categorized into the four themes: diarrhea as a major cause of morbidity and mortality, health seeking behavior of the mothers/care givers, health system factors associated with diarrhea morbidity and health education as a key factor in prevention.

4.4.1 Diarrhea as a major cause of morbidity and mortality

According to the health workers, the most common health problems among children under five years of age at Hodan IDP camp were diarrheal disease, malnutrition, malaria and respiratory diseases. The health workers all mentioned that the situation is similar to that in other IDP camps. The following statements illustrate the views of the health workers:

“Similar to other IDP camps in the region, most children under five here suffer from diarrhea, malaria and malnutrition”. (Clinical Officer 1)

“Children in this camp mostly suffer from diarrhea, respiratory diseases and malaria”. (Clinical Officer 2)

All of the health workers mentioned that diarrhea is causing morbidity and mortality among under-five children of the camps. Diarrheal disease was found to be most rampant with average monthly cases of between 40 and 60 recorded in the health facilities. This was attributed to the scarcity of water during the dry season and the use of contaminated water during the rainy season. Nurse 2, made the following comment:

“Diarrhea is causing morbidity and mortality among under-five children especially during the rainy and dry seasons, we experience as high as 60 cases of diarrhea in this facility, and this is the highest causes of morbidity here”.

Nurse 4 also said:

“Most children suffering from diarrhea registers up to 40 cases of diarrhea in this month. During this dry season, most families don’t get access to water thus worsening the situation”.

4.4.2 Health seeking behavior of the mothers/care givers

There was agreement among health workers that when children suffer from diarrheal disease most mothers first use traditional and herbal medicines and only seek care from health facilities as a second option, as illustrated by what one nurse said.

“In this camp most mothers prefer to first visit traditional healers whenever their children are sick” (Nurse 3).

The researcher asked health workers about why they think the mothers prefer to first seek care from traditional healers. The health workers were of the opinion that many reasons care givers have preference for traditional healers and they have quoted as followed.

“Because of misbeliefs that care givers believe and misconceptions of the running health services due to lack of good community mobilization. Also the caregiver believes some disease were not suitable to treat the drugs so they had gone to traditional healers first” (Clinical officer 1).

The health workers also noted that the parents delay to bring the sick children to health facility such that by that time most children are dehydrated and severely sick. Often this also results in the death of these children.

“Children are brought to the health facility when they are in very bad state... the parents take long to come to hospital”. (Nurse 4)

“This not only worsens the situation of the sick child but can lead to death due to delayed medication”. (Nurse 1)

It was also reported that the mothers did not return for follow-up visits after the first visit, causing discontinued treatment, negative health outcomes and re-lapse in some cases as illustrated by the following statements:

“Most mothers of these camps do not come back after first visit to complete medication and when under outpatient care some fail to complete giving their children all the drugs given at the health center”(Nurse 1).

The researcher asked why mothers don't return for follow-up visits. The reasons reported were mothers/care givers were busy searching a job so as to cover their daily life's and sometimes the mothers/care givers moving the camp that they are living so were not coming back as clinical officer said,

“Most care givers are mothers who are busy taking care of the family/children and who sometime shave to search for a job to cover daily expenses, such to wash clothes, clean houses and load materials from the market. And sometimes forces them to move

from the camp that they are living to another one that is far from the health facility. That is why they do not go back for the follow-up visits” (Clinical officer 1).

4.4.3 Health system factors associated with morbidity of diarrhea disease

The health system factors found were quality of services, availability of drugs, and number of staff, supportive supervision and maintenance of the health facility. The health facilities were inadequately staffed and overstretched by demand of health services in the camp since there are two facilities in the camp serving the entire population in the camps. Since the number of IDP population estimated 93,409 people (UNDP, 2014). However, these facilities had enough stockpile of drugs. The following statements illustrate this.

“The health facility is inadequate to the population living in Hodan IDP camps”
(Clinical Officer 1)

“The facilities have enough drugs stock that keeps the medicine but the number of staff are so small relative to the work to be done here” (Nurse 3).

The health facilities were run and maintained by local NGOs but the Somali government did staff training and supervision sometimes. The training mainly was included primary health care package and essential packages of health services (EPHS) as clinical officer reported.

“The local NGOs are running the health facility... the government sometimes trains the health workers and sends some supervisors to assess the situation in these facilities, and the content of the trainings were included packages of

primary health care which the diarrhea include, and essential of packages of health services ” (Clinical Officer 1).

“Mostly the training was related to primary health care packages so diarrhea is one of local endemic disease which is turn one of the primary health care package” (Clinical officer 1).

The health workers also mentioned that international agencies give support to the local NGOs to running the facilities and are project based and when the projects end the health facilities collapsed and stopped operating. For example in 2014, there were four health facilities operating in Hodan IDP camps but in 2015, two of them collapsed, as mentioned by one of the clinical officers:

“All health facilities run by local NGOs are project based. Last year two health facilities stopped operating because of the termination of the project”.

The research asked the issue of health facility closure after project close. Then the clinical officer said,

“The health institutions of Somalia are very weak and integration health system with projects it’s not well strong and all the projects are funded by international agencies for short period without thinking of sustainability of the projects, thus continuation of the projects will be difficulty due to poor planning of exit strategy, capacity building of the staff and shortage of funds.” (Clinical officer 2)

4.4.4 Health education is a key factor in prevention of diarrhea among under fives

According to the health workers, control and prevention of diarrheal disease in the camp could be done through health education, especially, sensitizing the community on the root causes of diarrhea, the importance of hygiene and proper sanitation and encouraging them to visit health facilities once they are sick in order to reduce the use of traditional healers, as illustrated by the following sentiments.

“We can control diarrhea in this camp by educating the people here on diarrheal disease issues like causes, proper sanitation, hygiene and bring their children as soon as they fall sick” (Clinical Officer 2).

The health workers all echoed the need to enhance promotional health programs aimed at prevention of common diseases in the community as noted by the following sentiments.

“It will be nice to see stakeholders conduct sessions to promote hygiene and sanitation, and enhance community awareness on diarrheal disease which is a major concern here”. (Clinical Officer 1)

“Also it can prevent diarrhea to improve community awareness among sanitation and hygiene campaigns and to indicate the people when they visit the health facility the ways that can prevent diarrhea disease in their children” Clinical Officer 1).

4.5 Secondary data: results from health facility records

In the field there were problem of data record keeping and there was insufficient data. Secondary data was obtained from the Ministry of Health 2014 report, which aggregated data from health facilities reports from inside Hodan IDP camps. The report shows only the morbidity cases of diarrhea among under-five children living in Hodan camps in 2014. Total number of under-five children in Hodan camps is 18,682 (UNDP, 2014). The report also shows that there is seasonal variation in diarrheal occurrence among under-five children living in the camps. In the months of January, February and March the cases of diarrhea were high. These months are the driest and there is scarcity of water, forcing the IDP populations to use whichever water is available even if it is unclean (Table 4.3.1).

Table 4.4: Records of health facilities inside Hodan IDP camps

Months	Gender		Total Number of cases
	Boys	Girls	
January	50	65	115
February	50	67	117
March	59	58	117
April	23	35	58
May	35	30	65
June	27	38	65
July	15	10	25
August	33	38	71
September	25	31	56
October	28	39	67
November	42	50	92
December	39	58	97
Total	426	547	945

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Prevalence of diarrheal disease among under-five children

Generally, diarrhea was common disease reported by mothers/ care givers affecting 47.9% of the children in the past two weeks before carried the study. And also diarrhea was most common disease reported by mothers/care givers affecting 45.3%. This is higher than the country estimate of 19% as estimated by the WHO (2012). The health workers also reiterated that among other common childhood illnesses affecting children in the camps such as malaria, acute respiratory infections and malnutrition, diarrhea was the most prevalent. Diarrhea prevalence varies seasonally, with peaks in the hot and dry season, as illustrated by the health facility records. The findings are in line with other studies that reported high prevalence of diarrhea among under-fives in refugee camps (Hershey, et al., 2011) and that associated dry and hot climates with the occurrence of diarrhea (ACF, 2012). In Somalia, December to March is the hot (Jilal) season, which is the harshest and driest season of the year and this study were carried out this time. These findings imply that diarrhea prevention efforts need to be intensified during this period, especially improving access to clean and safe water.

5.1.2 Demographic and socioeconomic risk factors associated with diarrhea

Education was significantly associated with diarrhea morbidity among the children. The occurrence of diarrheal disease was highest among children of mothers who did not attend school. Similar findings were found in India and Kenya where the incidence of diarrhea was reported to be higher among children whose mothers had no or low levels of education (Shahnawaz, Kumar, Singh, & Kumar, 2014; Onyango, 2010). It has been

established that educated mothers may be able to reduce risk of exposure from a contaminated community environment or lack of safe water and their knowledge allows them to early recognize the disease, and use health care facilities effectively (Mulugeta, 2003). In the context of Somalia, only 32% of the population is literate (UNDP, 2012). Similarly, our study found a higher proportion of the population in the camps had no education compared to those with education. This implies that improving the education levels of mothers/care givers could reduce diarrhea prevalence by improving the understanding of diarrhea transmission, preventive and treatment measures and the importance of prompt treatment.

Although the results were not significant, this study found that the occurrence of diarrhea was slightly higher among children younger than 24 months compared to children older than 24 months. While this implies that diarrhea reduces as children grow older, it shows that diarrheal disease occurred among under-five children irrespective of their ages. In contrast to the present study findings, a study in Bangladesh found diarrhea attacks to be more likely in children between 6 and 29 months of age with peak in age group 1 to 1.5 years (Usfar, Iswarawanti, Davelyna, & Dillon, 2010). It has also been established that the risks of acquiring of diarrhea increase that the time the child starts moving around the house and receiving food other than breast milk (Piechulek, 2003). This could be explained by the fact that the environment in the camps places all under-five ages are at risk of the diarrhea episode due to overcrowding, lack of proper hygiene. Similar findings were also reported in Sudan IDP camps where diarrhea among under-five children irrespective of their ages (Wafa, Humodi, El-Fadhil, & Abdelwahid, 2013). Hence improving the environment of the camps, especially poor housing, hygiene and sanitation

may reduce the risk of children getting diarrhea and easy spread of diarrhea among IDP camps.

5.1.3 Environmental factors associated with morbidity of diarrhea disease

The occurrence of diarrheal disease was highest among children whose main source of water was public tap. The public taps are usually provided by NGO and are located inside the IDP camps where the safety of the public tap water was not guaranteed since the water is sourced from wells outside the camps, where the water is not purified. This result is similar with the findings of study in Indonesia the household that had private drinking water source reported fewer children with diarrhea than the household with sharing or used public facility drinking water source (Adisasmito, 2007). A study of refugee camps in south Ethiopia also showed that sources of drinking water are subject to contamination and require appropriate treatment to remove disease-causing contaminants (Mulugeta, 2003). Contamination of drinking water supplies can occur at the water source as well as in the distribution system after water treatment has already occurred. There are many sources of water contamination, including naturally occurring chemicals and minerals, local land use practices, manufacturing processes, and sewer overflows or wastewater releases (CDC, 2014). The public taps require regular monitoring to ensure the quality and safety of water supplies to reduce the risk of association of drinking water with diarrhea among households.

The study also showed that the occurrence of diarrhea was similar among children of households that stored drinking water by jerry cans and in pots, but slightly less among in households that used tanks. While this implies that storage in tanks reduces the risks of diarrhea, it also shows that diarrhea occurred among under-five children in households

irrespective of method of water storage. The water-storage containers used in the camps households are often not cleaned and are exposed to fecal contamination due to children who put their hands into the water, unhygienic handling of the water-storage containers, the use of dirty utensils to withdraw water, dust, animals, and various types of insects, which could increase the risk of diarrhea (Mintz, Reiff, & Tauxe, 1995; Nicole, 2015). Other studies reported that diarrhea occurrence was highest where water was stored in containers without a tap, necessitating collecting drinking water by dipping into the storage containers (UN-HABITAT, 2003; Oloruntoba, Folarin, & Ayede, 2014). Storing drinking water in water tanks with a tap would avoid contamination thus reduce diarrheal episodes.

This study also found that diarrhea occurred among children irrespective of water availability in the households, but that the occurrence among households provided with water by NGOs was significantly higher compared to households provided water by private operators. This indicates that the occurrence of diarrheal disease was not associated with availability of water, but was associated with the type of water provider. Similar findings have been reported by Fana & Mahalb (2011) suggest that improving the availability of water supply alone without considering the quality of water accessed by the household is unlikely to be sufficient to prevent diarrhea. Access to clean and safe water in Somalia is one of the main challenges due to a combination of factors- arid climate, chemical concentration of water sources and human-induced conflict. Moreover, existing water sources are inadequate in terms of accessibility, quality and quantity. The high concentration of chemical components and salinity in the groundwater makes it unsafe for human consumption and even the available surface water is often

contaminated, needing treatment (IOM, 2014). Observation of the source of water provided by the NGOs by the researcher showed that there is a borehole and small pipes inside the camps and the sources of those pipes are wells outside the camps, and it could not be confirmed whether there was a purification system for this water. It is therefore important that all water that is used in the camps is treated to ensure it is clean and safe. Teaching the mothers/care givers how to clean/ purify the water to prevent consumption of contaminated water is also important.

The study did not find any association between type of toilet facility and occurrence of diarrhea, since not only there was no clear trend in the occurrence by type of facility but also the analysis returned non-significant results. Contrary to this, a study in a Kenyan refugee camp found that latrine sharing among three or more households was found to be a significant risk factor for diarrhea due to an increase in the fecal-oral transmission of the disease (Shultz, et al., 2009). Toilets of the camps were shared among the households; it is possible that even though some households had appropriate toilets, the risk of diarrhea was still high due to the high toilet to population ratio. It has also been shown that people using shared latrines tend to be less hygienic compared to those who do not share latrines with other households (Fuller, Clasen, Heijnen, & Eisenberg, 2014). By promoting the importance of cleanliness in communal latrine areas and the association with diarrhea, people in the camps can be made change their toilet use behavior, thus reducing the prevalence of the disease.

The study results also indicate that diarrhea occurred among children under-five in Hodan IDP camps irrespective of timing and method of hand washing. These findings contradict

the findings made by UNICEF and WHO in which it was noted that washing hands with soap was been found to reduce diarrhea by more than 40% (UNICEF & WHO, 2009).It has also been proved that washing one's hands with soap can reduce rates of diarrheal disease when carried out at critical moments: after using the toilet, after cleaning a child's bottom and before handling food (UNICEF & WHO, 2009). A report from IDP camps in Sudan showed that the households practiced hand washing but incorrectly and not at critical moments. This was because comprehensive public awareness and education strategy of hygiene and sanitation (hand washing) were not implemented sufficiently (Rulashe, 2013). The findings from the two camps imply the mothers/care givers of camps may have been reporting what they know to be correct but that they did not actually practice it. Badowski et al. (2011) asserted that while people verbalized the importance of hand washing with soap and water, this awareness does not translate to practicing recommended hand washing habits. Many factors contribute to poor hand washing compliance among camp households, including lack of knowledge/practice of hand washing, poor access of hand washing facilities and lack of knowledge of critical time of hand washing. It is important to improve the hand washing at the right time and in right way.

The occurrence of diarrheal disease among households that dispose garbage in open surrounding was similar to those households which burn garbage but slightly higher than among households that use the community waste management system. Similar findings were made by Oloruntoba, Folarin, & Ayede (2014) in which they found out that there was increased risk of diarrhea among children whose care givers/mothers used community dumping method compared to those using government waste management. If

not properly disposed of, scattered garbage can contaminate environment and especially the water in the camps resulting in easy transmission and spread of diarrhea. It is important to ensure safe garbage disposal in the camps and providing the household containers that collect garbage wastes and place outside of the camp to minimize access of children and contamination of the camp environment.

5.1.4 Health system factors associated with morbidity of diarrhea disease

Results from the KII showed that the number of health facilities, number of qualified staff were insufficient compared to the population in the camps. This has also been reported in IDPs camps in Sudan where there were long time waiting because of inadequate health facility (Reeves, 2011). In Hagadera Camp, the most populated of the Dadaab camps there have been reports of overworked clinicians who are unable to serve all the patients or provide timely services and congested waiting lines at health posts because of insufficient number of staff (Oxfam, 2012). When supply of health services does not match the supply, the result is often long waiting times and compromised quality of health services. This could explain the negative health seeking behavior also reported, whereby the mothers first seek alternative sources of health care, only taking the children to the facility when they are severely ill. Proper supervision, and support of internally displaced health facilities will enable the provision of basic health services to care givers/mothers, children and families in camps (Krause, Jones, & Purdin, 2000; Curry, Rattan, Nzau, & Giri, 2015). It is important to improve access to services by increasing the number of health facilities and number of qualified staff. In addition, supportive supervision of the staff can promote compliance with standard of practice and assure the delivery of quality care service.

5.2 Conclusion

Based on the above findings and discussion, the study concludes as follows:

1. Diarrhea is the most prevalent disease reported among under-five children in Hodan IDP camps, affecting 45.3% of the children. However, the prevalence varies seasonally, with peaks in the hot and dry season.
2. Diarrhea occurrence in Hodan IDP camps is more likely among children of less or non-educated mothers/care givers. Improving the education levels of mothers/care givers will improve the understanding of diarrhea transmission, preventive and treatment measures and the importance of prompt treatment.
3. Diarrhea occurrence is more likely among children from households whose source of water is a public tap and where the water was supplied by NGOs. Regular monitoring of the water source by the provider may help to improve water safety.
4. Although the study findings showed no significant association between hand washing, type of toilet facility and garbage disposal with occurrence of diarrheal disease, the environment (improper garbage disposal, sharing of toilet among households) and infrequent hand washing at critical times in the camp still remain as risk factors for diarrhea transmission, putting the camp population, especially under-five at risk.
5. The number of health facilities and number of qualified staff in Hodan IDP camps are insufficient compared to the population living there. The facilities and staff also lack of adequate supportive supervision.

5.3 Recommendations

1. Education levels of the mothers/care givers should be improved. There is high level of illiteracy in Somali country so to improve education may need public intervention among whole the country.
2. Water at the camp needs to be treated at the source to improve its safety. In addition, regular monitoring of the water from taps should be done to ensure its quality. Storage of drinking water in buckets fitted with a tap should also be promoted within the households to prevent water contamination when fetching the water.
3. To reduce the prevalence of risk factors for diarrhea, the environment of camps needs to be improved by promoting hygienic toilet behavior and cleanliness of the toilet facilities, hand-washing at critical times and proper garbage disposal, preferably through a community waste management system.
4. Access to health services by increasing the number of health facilities and number of qualified staff. This will promote prompt health seeking and ensure timely treatment for children with diarrhea.

The above diarrhea prevention efforts may lead to a reduction in diarrhea prevalence in the camps, especially when intensified during this peak transmission period.

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Appendices

Appendix 1: Informed consent

My name is Hawa Ali Warsame, from Kenyatta University student pursuing a Master of Public Health specializing in Epidemiology and Disease Control. I am carrying out a research on morbidity of diarrheal disease among under-five children living in IDPs of Hodan district, Mogadishu Somalia. I am seeking your consent to participate in the study whose findings might be beneficial to your child and other children. There will be no direct reference of your name nor will your contact information be published at the end of the study. There is no financial or other personal benefit from participating in this study and there are no risks to you resulting from your participation. Your participation is voluntary and it will be highly appreciated. Your response will be purely for academic purpose and you are assured of almost confidentiality. When you sign or thumb print below, it shows that you have understood the purpose of the study and you have agreed to participate.

Signature/ thumb print of the participant.....

Date.....

Appendix 2: Questionnaire

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

I. PLACE INFORMATION

District..... sub-districtName of the IDP camp.....

Household ID

II. HOUSEHOLD INFORMATION

1. Gender of household head-----
2. Number of household members-----
3. Number of under five children living in the household-----
4. Age of child selected for interview-----
5. Gender of child selected for interview-----

III. MOTHER/CAREGIVER INFORMATION

6. Age of caregiver -----
7. Marital Status of Mother/caretaker:
 - a) Single
 - b) Married
 - c) Divorced
 - d) Widowed/widower

8. Mother's/Caretaker's highest level of education:

- a. None
- b. Primary
- c. completed primary
- d. Secondary and above

9. What is the main source of income in your family?

- a. Wages from civil service employment
- b. Wages from private employer
- c. Own business
- d. Agriculture
- e. No income

SECTION B: INFORMATION OF PREVALENCE OF DIARRHEAL DISEASE

10. What is the most frequent disease in your community

- a) Diarrhea
- b) malaria
- c) respiratory infections
- d) malnutrition
- e) injuries (trauma)

11. Has there been an episode of diarrhea in your household children?

- a) Yes
- b) No

12. Has the child had diarrhea in the past 2 weeks (Past 14 days)

- a) Yes
- b) No

**SECTION C: RISK FACCTORS AND PREVENION MEASURES OF
DIARRHEA DISEASE**

13. What is the main source of water drinking?

- a. Public tap
- b. Tube well
- c. Protected dug well or protected spring
- d. Unprotected dug well or spring 6
- e. water boozer
- f. others(specify)

14. How do you store your water for drinking?

- a) Jerry cans
- b) Tank
- c) Port
- d) Other(specify)

15. Do you store water for drinking separately from water for other domestic purposes?

- a) Always
- b) Sometimes
- c) never

16. Is water available all the times?

- a) Yes
- b) No

17. What type of toilet facility does your household use?

- a. No toilet facility
- b. communal pit latrine
- c. single pit latrine
- d. Others(specify)

18. Who is providing water for you?

- a) NGOs
- b) Government
- c) Privet operator
- d) Others(specify)

19. When do you wash your hands?

- a) After using the toilet
- b) Before preparing/cooking the food
- c) Before meals
- d) Other(specify)

20. What do you use for hand washing after using the toilet or after helping your child use the toilet?

- a) Hand washing with soap and water
- b) Hand washing with water only
- c) Other(specify)

21. What is done about the garbage from your household?

- a) Open surrounding
- b) You burn it
- c) Taken away by a community utility services
- d) Other(specify)

22. When this child is sick for diarrhea do you seek medical assistance?

- a) Yes
- b) No

23. If yes, where do you go

- a) Traditional healers
- b) Private clinic/Pharmacy
- c) Public health facility (Health centre/dispensary/Hospital)
- d) Other (specify)

24. Has the child ever been breastfed?

- a. Yes
- b. No
- c. Do not know

25. Is the child still breastfed?

- a. No
- b. Yes
- c. Do not know

26. When was the child first breastfed?

- a. Within 2 hours of birth
-

b. Within 24 hours of birth

c. After 24 hours

d. Do not know

27. How often is the child breastfed or how often was the child breastfed?

a. According to a regular daily schedule 1

b. On demand 2

c. Do not know

28. Do you know some ways for preventing diarrhea

a) Yes

b) No

29. If yes, mention some of them.....

30. How did you know about diarrhea, signs, mode of spread and prevention?

a) health facility

b) Friends

c) Radio

d) Other

31. Which method have you used to prevent diarrhea in your family?

a) Hand washing more frequently

b) Cooking toughly

c) Cover prepared food

d) Improve hygiene and sanitation

Appendix 3: Informed Consent Form in Somali

Magacayga waa Hawa Ali Warsame, waxaan ahay arday ka socda jamcada Kenyatta wadana Master ka public Health taqasuska Epidemiology and Disease Control. Waxaan samaynayaa cilmi baris la xariirta cudurka shubanka ee ilmaha ka yar shanta sano eek u nool xerayaha qaxootiga eek u yaala degmada Hodan, Mogadishu Somalia. Waxaan kaa rabaa ogolaanshahada in aad ka qaybqadato cilmi baristan, Natijada ka soo baxada darasadan waxay wax tar u ledahay ilmahada iyo ilmaha kalaba. Marna si toos ah looma soo xigan doono magacada ama laguma dabaci doono xogtada shaqsiyadeed darasan. Ma jiraan wax dhaqalo ah ama lacag ah oo aad ka faidayso darasan. Sidoo kale wax Qatar ah kaagama iman doonan ka qaygalkada darasadan. Waxaad oga qayb qadanaysaa si bilaasha wana aan kaga mahadcelinaynaa. Jawabahada si gaar ahaned ayaa logu isticmali donaa ujeedo tacliimeed wana la xifdin doona amankeda. Marka aad saxixdo ama aad suulka qada ah aad sarto, waxay mujinaysaa inaad fahamtay ujeedada darasadan cilmayadeed aadna aqbashay ka qayb galkeeda.

Saxiixa / suulka print qaybgalaha

Taariikhda

Appendix 4: Questionnaire in Somali

IV. QAYBTA (A): MACLUUMAADKA DHAQAN-dadka

V. II. MACLUUMAADKA GOOBTA

Degmada..... Degma hoosad.....Magaca xerada qaxootiga.....

Numberka qoyska.....

VI. XOGTA QOYSKA

32. Jinsiga madaxa qoyska-----

33. Tirada xubnaha qoyska-----

34. Tirada carurta ka yar shanta sano eek u nol qoyska-----

35. Da'da uu jira canuga la waraysanayo-----

36. Jinsiga canuga la waraysanayo-----

VII. XOGTA HOYADA/XAAANEYAHA

37. Da'da xanaaneyaha -----

38. Xaalada guur ee hoyada/xanaaneyaha:

e) Doob

f) Guursaday

g) Lafuray

h) Garoob

39. Heerka waxbarasho ee hoyada/xanaaneyaha:

- e. Maleh
- f. Dugsi hoose
- g. Dhamaysay dugsiga hoose
- h. Dugsi sare iyo ka koreya

40. Waa maxay isha ugu way nee daqliga qoyskada

- a. Mushaharka shaqalaha hay'adaha
- b. Mushaharka shaqo ee gaar loo leyahay
- c. Ganacsigada
- d. Beeraha
- e. Daqli la'aan

QAYBTA (B): MACLUUMADKABAAHSANANTA CUDURKA SHUBANKA

41. Waa maxay cudurka ugu soo noqnoqoshada badan bulshadada?

- f) Shuban
- g) Duumo
- h) Caabuqa neef mareenka
- i) Nafaqo daro
- j) Dhaawacyo (jugta)

42. Ma jiraan dhacdooyin shuban ee caruurta qoyskiina

- c) Haa
- d) Maya

43. Miyuu lahaa ilmahaga shuban 2dii isbuuc ee la soo dhafay (ka hor 14 malmood)

- c) Haa
- d) Maya

**QAYBTA (C) : FACTORSKA HALISTA AH IYO CABIRKA KA HORTAGA
CUDURKA SHUBANKA**

44. Waa maxay isha ugu muhiimsan ee biyaha la cabo?

- a. Tubada dadweynaha
- b. Tubada ceelka
- c. Ceel qodan oo daboolan
- d. Ceel qodan oon dabolnayn
- e. Biyaha booyadaha
- f. Kuwa kale(sheeg)

45. Maxaad ku kaysataan biyaha aad cabtaan

- e) Jirgaamo
- f) Haan
- g) Ashuun
- h) Kuwa kale (sheeg)

46. Ma kala soocdan biyaha cabida lo isticmalo iyo kuwa hawsha lagu qabsado

- d) Had iyo jeer
- e) Mar mar
- f) Mala kala sooco

47. Ma heshan biyaha mar kastaba

- c) Haa
- d) Maya

48. Waa noocee suuliga aad isticmashan

- a. Mala isticmalno suuli

- b. Musqul guud oo la wadago
- c. Musqul yar oo kaligen ah
- d. kuwa kale(sheeg)

49. Yaa biya siinta idin sameya?

- e) NGOs
- f) Dawlada
- g) Shirkada gooni loo leyahay
- h) Kuwa kale(sheeg)

50. Goormeed gacmaha dhaqataan

- e) Ka dib isticmaalka mushqusha
- f) ka hor diyarinta/ karinta cuntada
- g) Cuntada ka hor
- h) Wax kale(sheeg)

51. Maxaad u isticmaashaa gacma dhaqashada musqusha ka dib ama markaad ka

sacido ilamahga musqusha?

- d) Gacmaha lagu dhaqo saabun iyo biyo
- e) Gacmaha lagu dhaqo biyo kaliya
- f) Wax kale(sheeg)

52. Sidee lola dhaqmaa qashinka qoyska?

- e) Meelo banaan ayaa lagu shubaa
- f) Waa la gubaa
- g) Waxaa lagu fogaayaa xafada dhaxdeeda
- h) Wax kale (sheeg)

53. Markuu canuga shuban kaga dhaco gargaar cafimaad ma u raadisaa?

c) Haa

d) Maya

54. Hadii ay Haa tahay xageed gaysaa

e) Odayal dhaqameed

f) Xarun kali loo leyahay/ farmashiye

g) xarunta caafimadka dadwenaha(xarunta cafimadka/ farmashi/ isbitaal)

h) kuwa kale (sheeg)

55. Miyuu ilmaha waligii naasnuugay?

a. Haa

b. Maya

c. Ma ogi

56. Wali naaska miyuu nuuga yaa?

a. Maya

b. Haa

c. Ma aqaano

57. Goormee ugu horeysay ee ilamaha naaska nuugay?

e. 2 saacadooda dhalashada gudaheed

f. 24 saac dhalashada gudaheed

g. 24 saac ka dib dhalashada

h. Ma aqaano

58. Sidee badanaa ilamaha naaska u nuugaa ama u nuugi jiray?

d. SI joogta ah malin kastaba

e. Marka uu rabo

f. Ma aqaano

59. Ma taqaanaa siyaabaha looga horta cudurka shubanka

c) Haa

d) Maya

60. Hadii aad Haa tiri, qaar ka mid ah sheeg.....

61. Xageed ka ogaatay shubanka calamadahiisa sida loo kala qaado iyo sida looga hor tago?

e) Xarunta caafimaad

f) Saaxiibo

g) Raadiyaha

h) Meelo kale

62. Habkeed isticmaashaa si aad oga ilaaliso shubanka qoyskada?

e) Markasta oo gacmaha la dhaqdo

f) Cuntada oo si fiican loo kariyo

g) Cuntada la diyariyay oo la daboolo

h) In la hagajiyo nadaafada iyo faya dhawrka

Appendix 5: Interview guide

Introduction

The interview will be conducted inside the Hodan camps for the health workers of the facility. The information obtained from the participant(s) will be treated with confidentiality and only used for the purposes of this study. Anonymity will be guaranteed and will not use the names of the participants but will be used code number given to the interviewee. The purpose of the interview is to collect deeper information for health workers. During the interview will obtain information about the participants' experience of diarrheal disease and common health problems with regard of under children of Hodan IDP camps.

Given code Number.....How long has you being working in this camp.....

Job title: Qualifications:

1. What are the common health problems in children under five years of age in this camp? Example of probes: Is it the same for other camps? Which of the health problems cause the highest mortality? Why?
2. Is diarrhea among the leading causes of morbidity and mortality among under-five in this camp?

Probe: On average, how many cases do you receive in a week/month? Why do you think this is so?
3. How is the health seeking behavior of mothers when had getting diarrheal disease on their children?

Probe: Why mothers are bringing their children when they are severely ill? What influences this health seeking behavior? Why do mothers prefer seeking care from traditional healers rather than health facility? Why don't mothers come back for the follow-up visits?

4. Tell me about the capacity of this health facility to respond to the demands of the camp population.

Does the facility have a sufficient number of qualified staff, drug supplies and equipment? Does the facility well maintained? Does health personnel supervision in any way affect the quality of health services?

5. Who is responsible for running and managing of the health facilities? Who provides the funds, supplies and equipment?
6. Would you please tell me how mothers are attended to the at the health facility during health facility visit for diarrhea treatment?

Do you conduct sessions to educate mothers on diarrheal disease?

7. What are your suggestions on how to control and prevent diarrheal disease in your community?
8. Do you have any questions/comments/additional information that would you like to add?

Thanks for your participation in this interview

Appendix 6: Interview Guide in Somali

Hordhac

Waraysigan waxaa loo qabtay hawl wadenada cafimad eek a shaqeya xarumaha cafimad eek u dhaxyala xirada qaxootiga ee dagmada Hodan. Xogta laga aruuriya ka qaybgalayasha waa la xifdindoona waxana kaliya loo isticmali dona u jedada cilmi baristan oo kaliya. Magacyada ka qaybgalayaasha lama qori doono waxana la isticmali donaa hab number ah oo lagu aqonsandono ka qayb galayasha. U jeedada cilmi baristaan waa in xog qota dheer laga aruuriyaa hawl Wadena caafimadka. Inta lagu guda jira waraysiga waxaa la aruurin doonaa qibrada waya aragnimo eek a ka qaybgalayasha hawl Wadena cafimad ee ay u leyihin cudurka shubanka iyo dhibatooyinka cafimad ee ugu badan ee ku dhaca caruurta shan jirka ka yare e ku nool xeryaha qaxootiga ee dagmada Hodan.

Numberka la siyay ka qaybgalaha..... Muda intee la eg ayaad kasoo sahaqaysay xurantan cafimad ee xerada qaxootiga.....

Magaca shaqada: Aqoonta:

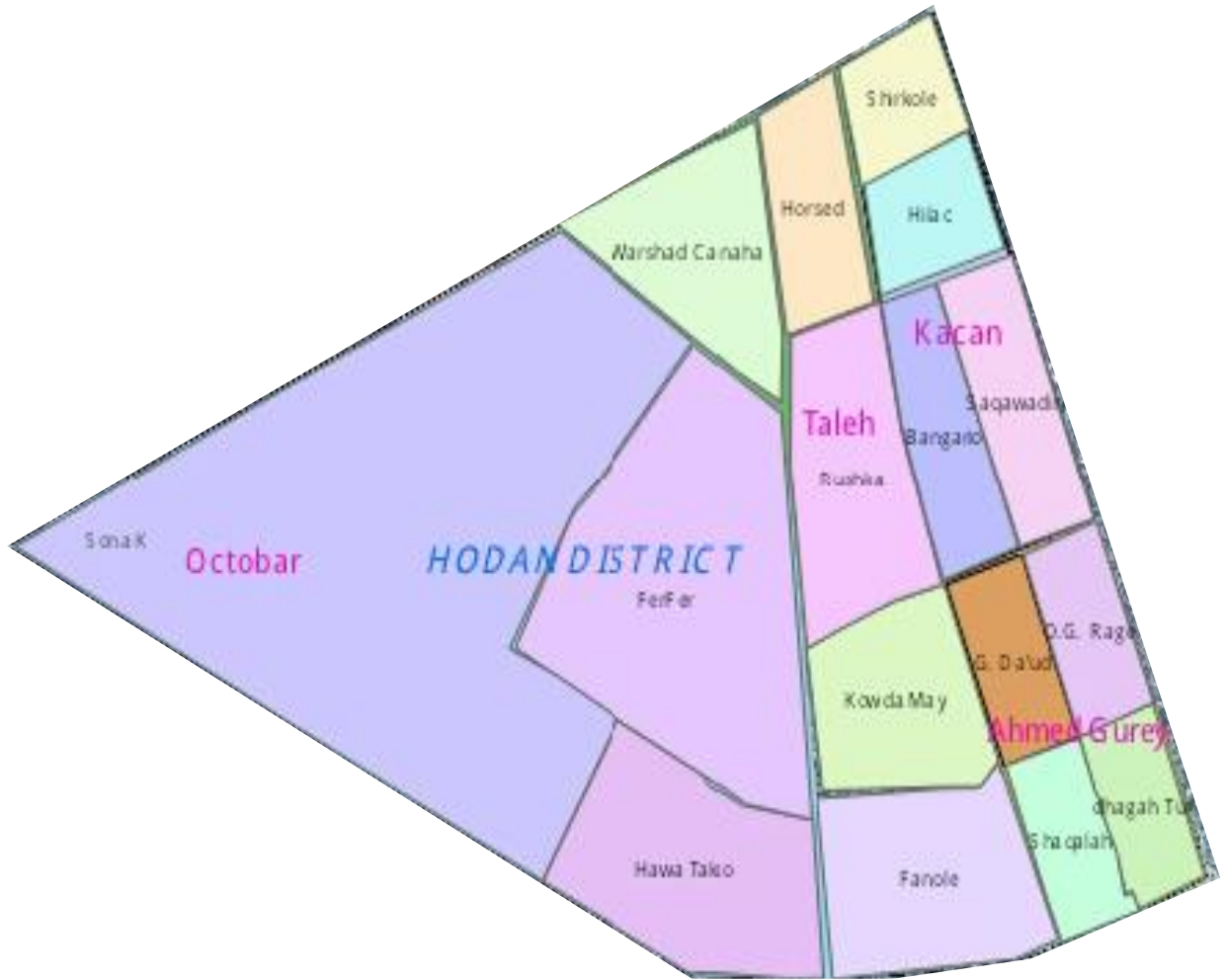
1. Waa maxay dhibatoyinka ugu badan ee cafimad ee ilamaha ka yar shanta sano ee qaxootigan ku nool? Tusale ahaan: ma isku mid baa dhaman qaxootiyada? Waa maxay dhibatoyinka cafimada ee sababa dhimashada ugu badan? Sababtana maxay tahay?
2. Shubanka ma waxuu ka mid yahay cudurada keena dhimashada iyo jirada ilmaha ka yar shanta sano eek u nool xiradan qaxootiga? Tusale: isku celcelin imisa case ayad qabatan isbuucii/ ama bishii? Maxad u malaynaysaa inay tahay?

3. Waa side dhaqanka caafimad radinta ee hoyoyinka marka uu shubanka ilmahooda ku dhaco? Tusale: sababtee hoyooyinka ay u keenan ilmahooda markay aad u sakaraadan? Sidebay u samaysay badeecadaha caafimad radinta? Maxay hoyoyinka u doorbidqan inay hoyoyinka inay ula cararaan ilmahooda mindaawadka ka hor intaysan gaynin xarumaha caafimadka? Maxaysan hoyoyinka dib ugu soo labanin noqodka rugta caafimadka?
4. Ii sheg baaxada inta ay la egtahay awooda ay xaruntan caafimad u leedahay inay u adeegto dhaman bulshada ku nool xeradan qaxootiga. Ma leedahay xaruntan caafimad tira ku filan ee shaqaalo caafimad ee tababar haysta, dawo ito qalab caafimad? Ma dhamaystirantahay xarunta caafimad? Ma ku leeyihin kormerayasha shaqalaha caafimad wax samayan ah tayada waxqabaka caafimad?
5. Yaa mas'uul ka ah halgalinta iyo mamulka xaruntan caafimad? Yaa siyo xaruntan caafimad daqliga, dawada iyo qalabka caafimad?
6. Fadlan ma ii shegi kartaa sida ay hoyoyinka ay u imadan xaruntan caafimad marka lagu guda jiro booqashada dawaynta shubanka? Ma loo qabtaa qaybo waxbarsaho caafimad ah hooyooyinka eek u sabsan cudurka shubanka?
7. Maxaad ku soo jeedinaysaa tala ahaan si looga hor tago cudurka shuban biyoodka eek u shacqa bulshadada?
8. Ma qabtaa wax su'aal ah ama siyado ah oo aad jeceshahay inad ku darto inta aan ka soo hadadlanay?

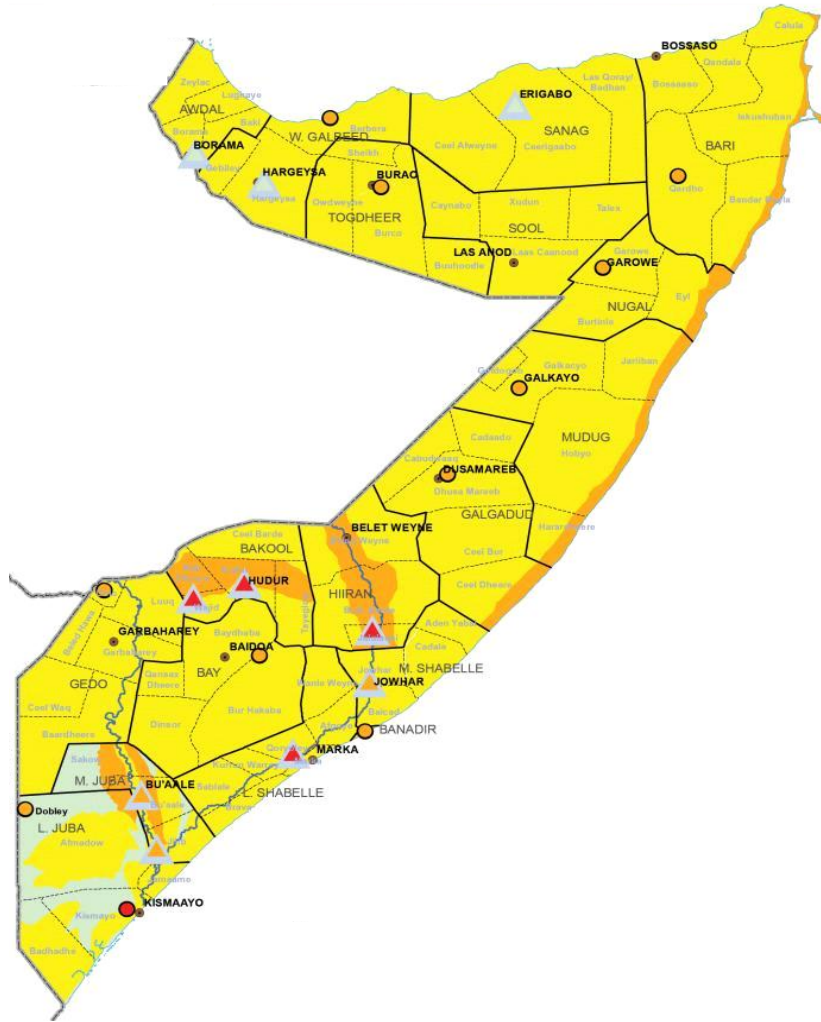
Wad ku mahadsaantahay ka qaybqadashadada waraysigan

Appendix 7: Map of Hodan District

HODAN DISTRICT



Appendix 8: Map of Somalia



Appendix 9: Kenyatta University Research Authorization**KENYATTA UNIVERSITY
GRADUATE SCHOOL**E-mail: dean-graduate@ku.ac.keWebsite: www.ku.ac.keP.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: Q57F/24170/2013

DATE: 19th January, 2015

The Principal Secretary,
Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,

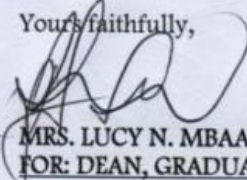
**RE: RESEARCH AUTHORIZATION HAWA ALI WARSAME- REG. NO.
Q57F/24170/2013**

I write to introduce Mr. Hawa Ali Warsame who is a Postgraduate Student of this University. He is registered for M.P.H degree programme in the Department of Community Health.

Mr. Warsame intends to conduct research for an M.P.H Proposal entitled, "Morbidity Burden of Diarrheal Disease among Under Five Years Children Living in Internally Displaced Population Camps of Hodan District, Mogadishu-Somalia".

Any assistance given will be highly appreciated.


Yours faithfully,



**MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL**

EM/nn

Appendix 10: Kenyatta University Research Proposal Approval



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke	P.O. Box 43844, 00100 NAIROBI, KENYA
Website: www.ku.ac.ke	Tel. 810901 Ext. 57530

Internal Memo

FROM: Dean, Graduate School	DATE: 19 th January, 2015
TO: Hawa Ali Warsame C/o Community Health.	REF: Q57F/24170/2013

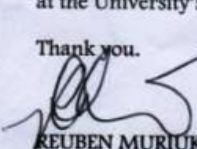
SUBJECT: APPROVAL OF RESEARCH PROPOSAL
=====

This is to inform you that Graduate School Board, at its meeting of 14th January 2015, approved your Research Proposal for the M.P.H Degree. Entitled, "Morbidity Burden of Diarrheal Disease among under Five Years Children-Living In Internally Displaced Population Camps of Hodan District, Mogadishu - Somalia".

You may now proceed with data collection, subject to clearance with the Permanent Secretary, Ministry of Higher Education, Science and Technology.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking forms per semester. The form has been developed to replace the progress report forms. The supervision Tracking Forms are available at the University's website under Graduate School webpage downloads.

Thank you.


REUBEN MURIUKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Community Health

Supervisors:

1. Dr. Eunice Chomi
C/o Department of Public Health
Kenyatta University
2. Dr. Ngwatu Peter
C/o Department of Paediatrics and Child Health
Kenyatta University

RM/aa

Appendix 11: Research Authorization Ministry of Health & Human Services



Ref: MOH/ 00056/2/ 20 15

12/ 02 /2015/ Mogadishu

TO: WHOM IT MAY CONCERN

Subject: Research Authorization

Following your application for authority to carry out research on 'Morbidity Burden of Diarrheal Disease Among Under Five Years Children Living in IDP Camps of Hodan District, Mogadishu. I am pleased to inform you that you have been authorized to undertake that research for a period of ending 1st April 2015.

You are advised to report to the Ministry of Health and Human Service before embarking on the research project.

On Completion of the research, you are expected to submit One Hard Copy and One Soft Copy of the research Report/Thesis to our Office.

Regards




Dr. Abdiqani Sheik Omar
Director General, Ministry of Health and Human Service
Federal Government of Somalia

Appendix 12: Research Clearance Permit

JAMHUURIYADA FEDERALKA SOOMAALIYA
Wasaarada Hidaha Iyo Tacliinta Sare



جمهورية الصومال الفيدرالية
وزارة الثقافة والتعليم العالي

Ministry of Culture & Higher Education

Ref: WHTS/XAG/00469/2015


Date: 08 February, 2015

TO WHOM IT MAY CONCERN

Subject: Research Clearance Permit

This is certify that Miss Hawa Ali Warsame of (Address) Kenyatta University P.O.Box 43884, Nairobi has been permitted to conduct for M.P.H.Degree in Hodan districton the Topic :” Morbidity Burden of Diarrheal Disease among under five Years Children Living in Internally Displaced Population Camps of Hodan District, Mogadishu-Somalia”. For a period 30 March, 2015.

Best Regards


Ismail Yusuf Osman
Director General

