PREVALANCE OF DIARRHEA AND ASSOCIATED FACTORS AMONG CHILDREN UNDER FIVE YEARS IN INTERNALLY DISPLACED POPULATIONS OF HODAN DISTRICT, SOMALIA

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DECLARATION OF ORIGINALITY

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DEDICATION

This dissertation is dedicated to my wife Naima, my parents, my lovely children and my entire family.

Your support, motivation and encouragement were truly an inspiration.

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ABSTRACT

Introduction: Globally, diarrhea is a major cause of morbidity and mortality among children. It is one of the highest ranked cause of child mortality rate in Somalia with about 19% of all deaths of children aged below 5 years. Poor sanitation, unsafe water and inappropriate personal hygiene are responsible for 90% of diarrhea occurrence globally.

Objective: This study sought to assess the prevalence of diarrheal disease and associated factors among children under 5 years among internally displaced populations of Hodan District, Somalia.

Methods: This was a cross-sectional study that used a mixed methods approach. Participants were selected through a two-stage sampling process. In stage one, the camps were sampled proportional to the population size while in stage two, the households were randomly sampled from the list of all household in the internally displaced population camps of Hodan District. A total of 327 caregivers were interviewed using a structured questionnaire. Purposive sampling method was used to recruit participants for the focus group discussions. Interview guides were used to collect qualitative data. Logistic regression analysis was used to test for factors associated with diarrhea among children under 5 years. Qualitative data was thematically analyzed to provide an in-depth understanding of factors associated with diarrhea.

Results: The study established that the prevalence of diarrhea among children under 5 years in Hodan internally displaced population camps was 21%. Factors that were significantly associated with diarrhea among these children were the child's age (Adjusted Odds Ratio: 2.622; 95% Confidence Interval 1.237 - 5.559, p=0.01), the caregivers marital status (Adjusted Odds Ratio: 0.428; 95% Confidence Interval 0.238 - 0.769, p=0.01), disposal of feacal matter (Adjusted Odds Ratio: 2.372; 95% Confidence Interval 1.096 - 5.131, P 0.03), hand washing after using the toilet (Adjusted Odds Ratio: 0.497; 95% Confidence Interval 1.0.253 - 0.979, p=0.043), hand washing with soap (Adjusted Odds Ratio: 0.232; 95% Confidence Interval 0.70 - 0.772, p=0.017) and use of treated drinking water (Adjusted Odds Ratio: 0.144, 95% Confidence Interval 0.034 - 0.610, p=0.01).

Conclusions: There was high prevalence of diarrhea among children of internally displaced populations of Hodan District in Somalia. The diarrhea is more likely to occur among children who are less than 25 months of age. Other factors that are independently associated with diarrhea in Hodan internally displaced population camps are the caregivers' marital status, as well as their water, sanitation and hygiene practices.

Recommendations: The government, the community and the Health and Water, Sanitation and Hygiene (WASH) implementing agencies in Somalia should consider: increasing awareness on care for children under 25 months of age who are most vulnerable to diarrhea. Furthermore, training caregivers in Hodan Internally Displaced Population camps on the recommended hand washing practices, use treated water in the households for food preparation and drinking as well as on use of toilet facilities in disposal of feacal matters. More rigorous qualitative studies should also be conducted in the Hodan internally displaced population camps to understand the factors associated with diarrhea among children under 5 years.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
AOR	Adjusted Odds Ratio
APHRC	African Population and Health Research Center
AWD	Acute Watery Diarrhea
CI	Confidence Interval
CDC	Centers for Disease Control
EBF	Exclusive Breastfeeding
E.COLI	Escherichia Coli
FGD	Focus group discussion
FSNAU	Food Security and Nutrition Analysis Unit
GAVI	Global Alliance for Vaccines and Immunization
HIV	Human immunodeficiency virus
IDP	Internally Displaced Population
IQR	Inter Quartile Range
MUAC	Mid upper arm circumference
NIH	National Institutes of Health
ORS	Oral Rehydration Solutions
PATH	Program for Appropriate Technology in Health
SPSS	Statistical Package for Social Science
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
UNOCHA	United Nations Office for the Coordination Humanitarian Affairs
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

DEFINITION OF OPERATIONAL TERMS

Diarrhea: In this study diarrhea was assessed as passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the child) at the time of interview or any cases of diarrhea in the 2 weeks preceding the study.

Malnutrition: this referred to under nutrition as measured by mid up circumference.

Exclusive breast feeding: Feeding of infants with only breast milk and no other liquids or solids given – not even water – with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines.

Prevalence: Number of children presenting with diarrheal symptoms two weeks before the time of the study.

Sanitation: This is referred to collection and disposal of waste as well as facilities used in the disposal of the waste.

Household: A group of people living together and sharing a cooking arrangement.

Hygiene: Conditions and practices that household members engage in to maintain health and prevent the spread of diseases.

Settlement: This referred to the collection of camps in specific location.

Knowledge: Having an understanding of what diarrhea is, its causes, signs and symptoms.

Attitude: Perceptions on what causes diarrhea, how its spread, it being seen as a hazard for children under 5 years and how they can be prevented.

Practices: Health seeking behaviors of individuals and households when faced with diarrhea as well as their practices that promote, manage, or prevent chances of episodes of diarrhea.

CHAPTER ONE: INTRODUCTION

1.1 Background

There are numerous definitions of diarrhea. World Health Organization defined diarrhea as the passage of three or more loose or liquid stools per day, or more frequently than normal for the individual (WHO, 2013). Epidemiologist also defined diarrhea as the alteration in a normal bowel movement characterized by an increase in the water content, volume, or frequency of stools (Guerrant & Van Gilder, 2001). It accompanied by vomiting, fever, and abdominal pain (Harrison, 2015. The most common causes of diarrhea are variety of bacterial, viral and parasitic organisms' as well non-infectious agent, such as, food allergy, dietary indiscretion or a new medication ((Mobalk K, 2000; Kakulu, 2012; Willie, Valerie, and David, 2012; Hossain, 2013; Mustafa & Hassan, 2012; Leopold & Kangam, 2013 and Amerine & Keirsey, 2006). Most pathogens that cause diarrhea share a similar mode of transmission – from the stool of one person to the mouth of another. This is known as feacal-oral transmission. The infectious agents are spread through contaminated food, drinking water and of poor hygiene (UNICEF/WHO, 2009a; WHO, 2013; Edward Buzigi, 2015).

There are three clinical types of diarrhea: namely: Acute Watery Diarrhea (AWD), Dysentery and Persistent Diarrhea (WHO, 2013).

AWD refers to diarrhea which is less than two weeks (Harrison, 2015). It is commonly caused by rotavirus and accounts for 40 per cent of the diarrheal episodes that lead to hospital admission worldwide (Blanca Ochoa, 2012; UNICEF/WHO, 2009a). The most common complication is dehydration that occurs when there is excessive loss of fluids and minerals (electrolytes) from the body (Mobalk K, 2000). Dehydration is especially dangerous in infants and young children due to rapid body water turnover, high body water content and relatively larger body surface (Mobalk K, 2000; WHO, 2005a).

Dysentery refers to diarrhea containing blood and mucus in feaces (World Gastroenterology Organisation, 2012). It accounts for 10% to 15% of diarrheal episodes in children under the age of 5 years, but up to 25% of diarrheal deaths. The main dangers associated with dysentery are damage to the intestinal mucosa, sepsis, malnutrition and dehydration. Shigellosis is most common causes of bloody diarrhea (WHO, 2005b).

Persistent diarrhea refers to diarrhea more than 2 weeks (Bushen & Guerrant, 2003; Sean, 2009). It commonly caused by E Coli, Giardia lamblia,, food allergies, inflammatory bowel disease, lactose intolerance, and dietary fructose intolerance (Cheng AC, 2005; Edward Buzigi, 2015; Sean, 2009 and NIH, 2014).

Globally, diarrhea is a major cause of morbidity and mortality in all regions, especially among children (Pond, Rueedi, & Pedley, 2004). The prevalence of diarrheal disease is higher in the developing nations than in the developed world partly due to lack of safe drinking water, sanitation, and poor hygiene coupled with poor health and nutritional practices. Diarrhea also accounts for 9% of all deaths among children under 5 years worldwide (UNICEF, 2016). This translates to 1,400 young children dying each day or more than 530,000 children yearly .The majority of these deaths occur in South Asia and sub-Saharan Africa (UNICEF, 2016). In Somalia, the prevalence of diarrhea among children under five years stands at 19% (WHO/UNICEF, 2011a). Over 78,000 AWD/cholera cases and 1,159 deaths have been recorded in 2017. The worst affected areas were Banadir, Lower Shebelle and Lower Juba. The rampant cases of diarrhea outbreak in Mogadishu and its environs are not only a concern to public health authorities, but also to humanitarian organizations (UNOCHA, 2018).

Globally, it is estimated that close to 2.5 billion people lack improved sanitation facilities while close to one billion people do not have access to safe drinking water. These in turn allow for diarrhea-causing pathogens to spread more easily (UNICEF/WHO, 2014). In

Somali, 45% of the population have access to improved water sources while only 25% of the population have access to improved sanitation (UNOCHA, 2018). The prevalence of open defecation at 56% in rural areas and at 39% national level (UNICEF, 2015; UNOCHA, 2018). Hand washing practices with soap are very low, with only ten per cent of the population having access to a hand washing facilities with soap (UNOCHA, 2018). Lack of access to safe water, poor hygiene, poor sanitation practices, and overcrowding of IDP are major causes of diseases, such as, cholera among children and women and this increases the risk of outbreaks of other waterborne diseases.

This study determined the prevalence of diarrheal disease and associated factors among children under 5 years in internally displaced populations of Hodan District, Somalia.

1.2 Statement of the Problem

Diarrhea remains the second leading cause of death among children under five years globally and mainly in sub Saharan Africa (CDC, 2015; Pond, Rueedi, & Pedley, 2004). Each year, an estimated 2.5 billion cases of diarrhea occur among children under five years of age worldwide. Each day diarrhea kills around 2,195 children under five. It kills more young children than AIDS, malaria and measles combined (CDC, 2015; UNICEF/WHO, 2009a). In Somalia, more than two decades of the war and ongoing civil unrest led to further deterioration of Somalia's health situation. Limited access to basic health and WASH services due to insecurity and instability has contributed to the spread of diarrhea in Somalia (UNOCHA, 2018).

Although there are numerous studies on the determinants of diarrheal diseases among children under 5 years worldwide (Pond, Rueedi, & Pedley, 2004; UNICEF/WHO, 2009a; CDC, 2015), there is very scanty documented information on the associated factors of diarrhea among children in IDP Camps. This study sought to generate information on the prevalence of diarrheal disease and associated factors among children under 5 years in

internally displaced populations of Hodan District, Somalia. The findings will be useful for the Somalia government and other stakeholders in designing community-based interventions of diarrheal diseases among children living in IDP camps.

1.3 Study Objectives

1.3.1 Broad Objective

The aim of study was to determine the prevalence of diarrheal disease and associated factors among children under 5 years in internally displaced populations of Hodan District, Somalia.

1.3.2 Specific Objectives

1. To determine the prevalence of diarrheal disease among children under 5 years in IDP camps of Hodan District of Banadir Region, Somalia.
2. To assess knowledge of caregivers regarding childhood diarrheal disease in IDP camps of Hodan District of Banadir Region, Somalia.
3. To assess the attitude of caregivers regarding childhood diarrheal disease in IDP camps of Hodan District of Banadir Region, Somalia.
4. To assess the practices of caregivers regarding childhood diarrheal disease in IDP camps of Hodan District of Banadir Region, Somalia.
5. To determine factors associated with diarrheal disease among children under 5 years in IDP camps of Hodan District of Banadir Region, Somalia.

1.4 Research Questions

1. What is the prevalence of diarrheal disease among children under 5 years in IDP camps of Hodan District of Banadir Region, Somalia?
2. What are the factors associated with diarrheal disease among children in IDP camps of Hodan District of Banadir Region, Somalia?

3. What are the knowledge, attitude and practices of caregivers regarding childhood diarrheal disease in IDP camps of Hodan District of Banadir Region, Somalia?

1.5 Justification of the Study

Diarrheal disease is one of the major public health problems that cause morbidity and mortality in children in Somalia(World Bank, 2015;CDC, 2015).Globally, an estimated 1,400 children under the age of five years die every day from diarrheal diseases (UNICEF, 2016). An estimated 90 percent of under-five mortality from diarrhea are due to use of contaminated drinking water, poor sanitation and inadequate hygiene (UNICEF, 2013). Interventions, such hygiene education and promotion of hand washing have been found to contribute to a reduction in diarrheal cases up to 45 % (WHO, 2004; UNOCHA, 2018). The situation of IDP camps in Hodan District of Banadir Region is attributed to poor knowledge in health and feeding practices; inappropriate traditional beliefs and poor hygiene and sanitation with inadequate safe water supply (UNICEF, 2013; UNOCHA, 2018). The findings from this study will provide a basis for interventions in management and control of diarrhea in IDP camps of Hodan District.

1.6 Conceptual Framework

The main outcome variable was prevalence of diarrhea in children under the age of 5 years within the last 2 weeks preceding the study in households in Hodan IDP camps. Figure 1.1 shows the interaction of factors that are believed to contribute to diarrhea in children. These factors may be demographic, socio economic or water, sanitation and hygiene and individual child related factors. (UNICEF, 2013; UNICEF/WHO, 2009a; UNOCHA, 2018; WHO,2005b; Mbugua Samwel, 2014; WHO, 2013).

Independent variables: **Intermediate variable** **Dependent variable**

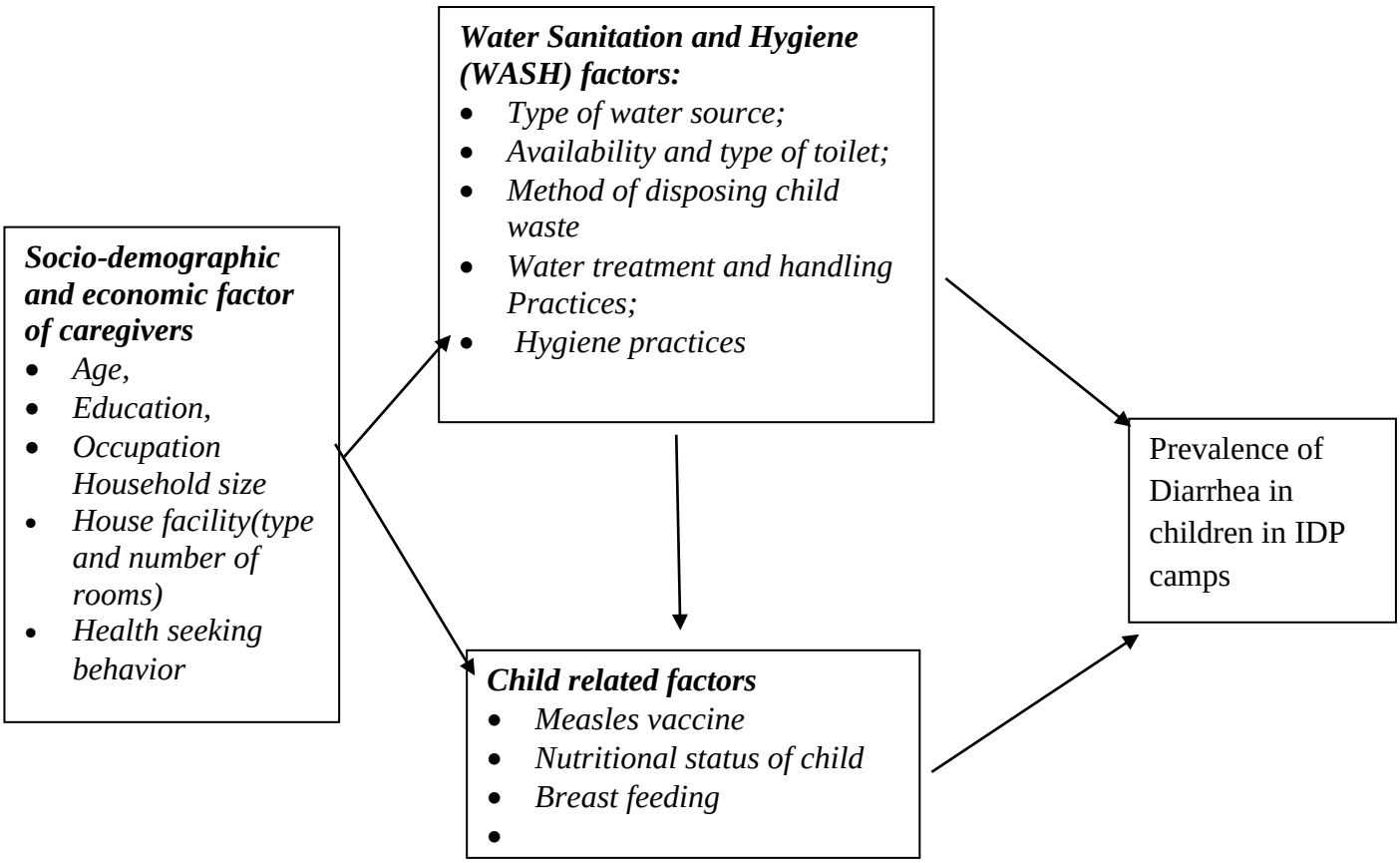

Figure 1.1: Conceptual framework for factors associated with diarrhea among children under five years of age

CHAPTER TWO: LITERATURE REVIEW

2.1 The Burden of Diarrheal Diseases in Children

Each year, an estimated 2.5 billion cases of diarrhea occur among children under five years of age, and estimates suggest that overall incidence has remained relatively stable over the past two decades (Boschi Pinto, 2009). More than half of these cases are in Africa and South Asia, where attacks of diarrhea are more likely to result in death or other severe outcomes.

The incidence of diarrheal diseases varies greatly with the seasons and a child's age (UNICEF/WHO, 2009a). The youngest children are most vulnerable; Incidence of diarrhea is highest in the first two years of life and declines as a child grows older (WOH/UNICEF, 2011a; WHO, 2009c)

Mortality from diarrhea has declined over the past two decades from an estimated 5 million deaths among children under five to 1.5 million deaths in 2004 which parallels downward trends in overall under-five mortality during this period (Boschi Pinto, 2009). However, diarrhea remains the second most common cause of death among children under five globally following closely behind pneumonia, the leading killer of young children (UNOCH,2018). Together, pneumonia and diarrhea account for an estimated 40 percent of all child deaths around the world each year. Nearly one in five child deaths is due to diarrhea, a loss of about 1.5 million lives each year. It is greater than deaths caused by AIDS, Malaria and Measles combined. Africa and South Asia are home to more than 80% of child deaths due to diarrhea (UNOCH,2018; UNICEF/WHO, 2009a). Just 15 countries account for almost three quarters of all deaths from diarrhea among children under five years of age annually (UNICEF/WHO, 2009a).

In Somalia, diarrhea is the second most common cause of under-five mortality in Somalia and it is 19% of all deaths of children aged less than 5 years (WHO/UNICEF, 2011a). Infants are particularly susceptible to severe diarrhea with fatal outcome due to unsafe drinking water

or when given substitutions for breast milk prepared with unsafe water (UNOCHA, 2018). In this way the infant is exposed to harmful pathogens at an early stage and may soon suffer from acute diarrhea because of delay in commencement of breastfeeding until several days after delivery and the fact that newborn baby's are given sugar-water prepared with unsafe water (FSNAU, 2007). The fatal course of diarrhea is very often combined with malnutrition. Somalia is among the seven most affected countries in the world in terms of mortality resulting from rotavirus caused diarrhea (WHO, 2009b).

In Somalia an estimated number of diarrheal deaths in children under 5 years old was 8276 in 2013 and 41.8% of diarrheal deaths were associated to rotavirus (WHO, 2016b). WHO surveillance report in Somalia between January and April 2016, AWD case was at 366; 236 being children under 5 years (WHO, 2016f). Of which 7,343 cholera cases were reported in the first 4 months of 2016 (WHO, 2016f). These diarrheal diseases attributed by unsafe water, sanitary disposal of human waste and hand washing, poor housing conditions, (UNICEF, 2013).

2.3 Water, Sanitation and Hygiene Practices

About 90 per cent of diarrheal deaths among children under-five is attributed to unsafe water, poor sanitation and hygiene (UNICEF, 2013). The situation regarding access to safe water and to an appropriate sanitation facility and the practice of hand washing with soap is unsatisfactory in Somalia (UNICEF, 2015;UNOCHA,2018). Studies conducted in Kenya, Uganda and Tanzania found that the households without sanitation facilities has higher prevalence of diarrhea compared to those with pit or modern latrine (Tumwine, et al., 2002). A study conducted in Ethiopia showed that the children in the households with open dump refuse around the house had higher chances of having diarrhea compared to children in the households who used a waste disposal pit (Bezatu Mengistie, 2013). Another study in Ethiopia showed that about a 60% reduction of childhood diarrhea in households where the

stool of children was disposed in a safe way than those children from households where the stool was disposed in an unsafe manner (Thomas, Getahun, & Alemayehu, 2014). Burial of children's feaces in the soil appears to be positively and significantly associated with reported incidence of diarrhea in Uganda (Tumwine, et al., 2002). Inappropriate disposal of waste provides breeding site for insects, which may carry diarrhea pathogens from the waste to water and food (Godana & Mengiste, 2013b).

Safe disposal of feaces is critical for reducing the number of diarrhea cases (UNICEF/WHO, 2009a). Most diarrheal diseases are spread by person-to-person contact or by feacal-oral routes, many times by way of contaminated hands. Hand washing can stop the spread of many diarrheal disease-causing germs, such as, typhoid and cholera, by removing bacteria, parasites, and viruses from the hands. Some studies showed that a 42%-47% reduction in diarrhea can occur when hand washing with soap and water is introduced into a community. Thus, hand washing promotion and interventions are estimated to have the potential to prevent one million deaths from diarrheal diseases (Curtis & Cairncross, 2003). Hygiene is also an important barrier against the spread of diarrheal disease, as it is the only barrier that inhibits the transmission of feaces on an individual's fingers to the inner body. It also prevents transmission from flies to new hosts and decreases the likelihood of food being prepared with unclean tools or unclean hands. When there are no sanitation interventions in place to prevent the presence of feaces on a field or floor, hygiene is a vital factor that can prevent further transmission (Diana, 2012).

Children in the households without hand washing facilities had higher likelihoods of having diarrhea compared to children in the households with no hand washing facility (Bezatu Mengistie, 2013). Three meta-analysis which examined the impact of hand washing on diarrhea risk found that hand washing hygiene reduces the risk of diarrhea by 50% (Cairncross, 2003). A study carried out in Vietnam found that the irregular latrine cleaning,

latrine-sharing among more than 5 people; irregular hand washing by mothers after going to toilet; no hand-washing by mothers before feeding children; unsafe storage of food for later use; irregular kitchen cleaning and infrequent cleaning/emptying of storage container before refilling it with fresh water were significantly associated with the risk of diarrhea among children less than five of age admitted to Dong Anh Hospital (Bui, 2006).

Keeping water in a bucket with lid was significantly protective with the protective factor of 69% and storing water in bucket without lid significantly increased the risk to diarrhea (Kakulu, 2012). The usage of narrow-mouth container for storage of drinking was found a protective factor for diarrhea morbidity (Ayuk , Leonie , & Nchang, 2015).

Households with unprotected drinking water sources had higher chances of risk for childhood diarrhea than protected water sources (Mbugua Samwel, 2014). Households which did not use treated water had higher odds of contracting childhood diarrhea than those which treated their drinking water (Mbugua Samwel, 2014). The safe water can become contaminated during collection, transport and drawing in the home (Wright, 2003).

A meta-analysis of 32 studies supports the findings that water treatment at the point of use, particularly flocculation or disinfection is more effective in reducing risk to diarrheal disease than water source improvements (Clasen, 2007). Interventions to improve water quality at the source, along with treatment of household water and safe storage systems, have been shown to reduce diarrhea incidence by as much as 47 per cent (WHO, 2008). Improving accesses to safe drinking water and adequate sanitation, as well as promoting good hygiene, are key components in preventing diarrhea (UNICEF/WHO, 2009a).

Between 1990 and 2006, the proportion of the developing world's population using an improved drinking water source increased from 71 per cent to 84 percent and reduced incidence of diarrheal disease (UNICEF/WHO, 2009a). Occurrence of diarrhea could be

decreased by interventions aimed to improve sanitation, hygiene, economic status of the households and child birth spacing (Alambo, 2015).

2.4 Feeding Practices

2.4.1 Breast Feeding

Exclusive breastfeeding (EBF) means that the infant receives only breast milk no other liquids or solids are given – not even water – except for oral rehydration solution, or drops/syrups of vitamins, minerals or medicines (WHO, 2016). The concept of EBF is not well understood in Somalia. Somali women delay the commencement of breastfeeding until several days after delivery and give newborn babies sugar-water prepared with unsafe water to drink (FSNAU, 2007). Only 5.3% of Somali women exclusively breastfeed their children under six months of age (FSNAU, 2009). This way the infant is exposed to harmful pathogens at an early stage and may soon suffer from acute diarrhea. Children breastfed in the first half an hour after birth reduce the probability of diarrhea by 4–5% (Bbaale, 2011). Infants and children who are breastfed have less incidence of diarrhea or dysentery due to Shigella; if it happens, they are less severe than in those who are not breastfed (WHO, 2005b). This protection is greatest in infants who are exclusively breastfed until six months of age (WHO, 2005b). Children who were being bottle fed had the highest odds of contracting diarrhea than those that are breast fed (Mbugua Samwel, 2014).

Infants who are not breastfed have a seven-time higher risk of dying from diarrhea during the first six months of life, as compared to those who are exclusively breastfed (Black R.E., Allen L.H., 2008). Also, Infants who are only partially breastfed are two– three times more likely to die from diarrhea, compared to those who have been exclusively breastfed (UNICEF/WHO, 2009a). A bottle-fed child having diarrhea was greater than for children who were not bottle fed (Godana & Mengistie, 2013a).

Adequate and the exclusive breastfeeding of the child during the first six months of life, followed by breastfeeding together with complementary foods until the age of at least 12 months, radically reduces the risk of the child becoming ill and suffering from serious infections, and it also significantly reduces the risk of infant mortality in diarrhea, pneumonia and neonatal sepsis (Black R.E., Allen L.H., 2008)

2.4.2. Complementary Feeding

Complementary feeding is defined as the process of starting when breast milk alone is no longer enough to meet the nutritional requirements of infants and therefore other foods and liquids are needed along with breast milk. The transition from exclusive breastfeeding to family foods referred to as complementary feeding – typically covers the period from 6 - 24 months of age, even though breastfeeding may continue to two years of age and beyond. This is a critical period of growth during which nutrient deficiencies and illnesses contribute globally to higher rates of under nutrition among children under five years of age (WHO, 2016). Inappropriate feeding practices have been acknowledged as major causes of the onset of malnutrition in young children.

Research findings from Ethiopia and Thailand showed that the children aged from 6 to 23 months were at high risk of developing diarrhea compared to other age groups (Shikur & Dessalegn, 2014; Calistus & Alessio, 2009). This might be due to transition from an exclusive breastfeeding to introduction of complementary food. The exclusive breastfeeding of the child during the first six months of life, followed by breastfeeding together with complementary foods until the age of at least 12 months, radically reduces the risk of the child becoming ill and suffering from serious infections, and it also significantly reduces the risk of infant mortality in diarrhea, pneumonia and neonatal sepsis (Black R.E., Allen L.H., 2008).

If the dietary intake of breast milk or formula is not complemented with appropriate food in children above six months of age, they will develop malnourishment with a deficiency of carbohydrates, proteins, iron, vitamin A and zinc. This in turn significantly increases the risk of morbidity and possible death in diarrhea, pneumonia, measles and malaria (Happiness & Abdulsudi, 2014).

Culture and religion play a key role for perception of causes and treatment of diarrheal disease. A portion, but not all the Somalia communities believe that the diarrhea during hot season is caused by consumption of sorghum and cow's milk and mutton; hence children are prohibited from consuming these foods in hot seasons (FSNAU, 2007).

2.4.3 Malnutrition

Undernourished children are at higher risk of suffering from more severe, prolonged and often more frequent episodes of diarrhea. Repeated bouts of diarrhea also place children at a greater risk of worsening nutritional status due to decreased food intake and reduced nutrient absorption combined with the child's increased nutritional requirements during the repeated episodes (UNICEF/WHO, 2009a).

Children whose immune systems have been weakened by malnutrition are the most vulnerable to diarrhea. Diarrhea, especially persistent and chronic diarrhea, undermines nutritional status, resulting in malabsorption of nutrients or the inability to use nutrients properly to maintain health. A number of studies have reported higher incidence of diarrhea in malnourished children (Mobalk K, 2000).

Diarrheal diseases are more likely to cause death in children who are malnourished (Forsberg, 2007). A study conducted in Yemen found that malnutrition or failure to thrive, were statistically significantly linked to cause diarrhea (Ali & Jalil, 2015). Diarrhea often leads to stunting in children due to its association with poor nutrient absorption and appetite loss. The

risk of stunting in young children has been shown to increase significantly with each episode of diarrhea (Black R.E., Allen L.H., 2008). Therefore, improved feeding practices and prevention and/or treatment of malnutrition could save up to 800,000 children lost to diarrheal diseases and malnutrition each year (Jones, 2003).

2.5 Measles and Rotavirus Vaccine

Global measles immunization coverage is 80 % (GAVI, 2005) while Somalia is at 46% (World Bank, 2016). Measles associate to diarrheal disease secondary to measles-induced immunodeficiency. Diarrhea is most frequent or severe in children with measles (Tefera Belachew, 2001). Its association with diarrhea accounted for one third or more of diarrhea related deaths in young children (Tefera Belachew, 2001). Measles immunization can substantially reduce the incidence and severity of diarrheal diseases, including shigellosis (WHO, 2005b). Diarrheal diseases are strongly associated with incomplete vaccination or unvaccinated children (Ali & Jalil, 2015).

Globally, an estimated number of rotavirus deaths in children under 5 years declined from 528,000 in 2000 to 2150000 in 2013 as a result of rotavirus vaccine adopted as national childhood immunization program (WHO, 2016a). As of January 2014, 53countries had introduced rotavirus vaccines through their national immunization programs, including 20 low-income countries eligible for vaccine introduction support from Global Alliance for Vaccines and Immunizations (GAVI) (PATH, 2014). Somalia has not yet introduced rotavirus vaccination into its routine immunization program (PATH, 2014).

2.6 Health Seeking Behaviors

Health seeking behavior has been defined as any action undertaken by individuals who perceive themselves to have a health problem or to be ill for the purpose of finding appropriate treatment (Olenja, 2003). If parents perceive a certain illness to be unrelated to biomedical causes, they are less willing to go for biomedical care, or at the very least, may

delay the speed at which they take up biomedical care (FSNAU, 2007). In Somalia communities, part of their beliefs is that diarrhea during hot season were caused by consumption of sorghum, cow's milk and mutton; hence children are prohibited from consuming these foods in hot seasons (FSNAU, 2007).

Caregivers also report spiritual healing and use of home remedies to address illness, prior to seeking assistance from a health facility at least for minor ailments in Somalia (FSNAU, 2007; Lynch, 2005). A study carried out in Guatemala to analyze the relationship between child illnesses and healthcare-seeking practices showed that only one third of illnesses result in a visit to a health provider (Goldman & Heuveline, 2000). It also showed that the likelihood of a provider's visit depends considerably on the characteristics of the child and his or her illness, with families being much more likely to seek treatment from a provider when the child experienced fever and gastrointestinal symptoms, such as, vomiting, or diarrhea compared to respiratory and other symptoms (Goldman & Heuveline, 2000).

Furthermore, some studies have documented a prevailing belief in Somalia that a patient must be very ill to warrant taking him or her to the hospital. In one documented account, a seriously ill woman close to a Regional Hospital explained why she had not sought medical attention, using the logic: "The disease had not yet spread into the whole of my body" (Helander, 1990). Although in developing countries, access to health facilities is poor due to geographical and/or economic barriers (Fotso & Mukiira, 2011), illness perception and inadequate resources have also been reported as barriers to seeking health care outside the home (Negussie & Chepngeno, 2005). Delay in seeking appropriate care or not seeking any care causes a number of child deaths (Desilva, 2001; D' Souza, 2003). In Somalia, diarrhea is managed through use of ORS, prayer, traditional home therapies in form of fluids, traditional herbs and lastly use of health facility (FSNAU, 2007).

For most Somalis, fathers are decision makers regarding management of most illnesses in children. A mother can treat by removing a tooth without consulting their husbands if they believe that diarrhea is caused by teeth (FSNAU, 2007). Decision making also depend on availability of resources of modern health care (FSNAU, 2007). Caregivers may find it difficult to take children to facilities because of competing priorities at home. In such instances, home care might be the only means by which children can receive care, if at all they do. The mothers in a study in Togdheer of Somalia reported that costs for both transport and consultation were the biggest problems in accessing health care, but they also expressed the fear of finding no health care provider present at the facility (Save the Children, 2008). A study conducted in Nairobi showed that healthcare-seeking practices for diarrhea remains a great challenge among the urban poor with more than half (55%) of the caregivers seeking inappropriate health care and about 35% of the caregivers taking no action regarding the child diarrheal illness (Carol, 2012).

While cost is clearly a barrier, an evaluation in Waajid District of Somalia recommended carefully considering whether free services cause communities to perceive the services to be of low value (Oirere, 2006). A study conducted in Nairobi slum settlements showed that caregivers tend to seek care for different illnesses based on how severe they perceive the illness to be among other factors (Ndugwa & Zulu, 2008). Studies have shown that practicing appropriate health care-seeking has great prospects of reducing morbidity and mortality due to childhood illnesses (Tsion , 2008; Taffa , 2003).

A study conducted in Saudi Arabia found that, the younger and less educated mothers were more likely to reduce breastfeeding during episodes of diarrhea (Bani, Saeed, & Othman, 2002). Mothers reported stopping or reducing breastfeeding because of beliefs that breast milk was too fatty to be digested (Moawed & Saeed, 2000). Others reported continued breastfeeding would not reduce the duration of diarrhea (Ogunbiyi & Akinyele , 2010;

Moawed & Saeed, 2000) or could cause or worsen the diarrhea (Pylypa , 2009). Caregivers in two studies believed specific types of diarrhea must be treated with breastfeeding cessation (Ogunbiyi & Akinyele , 2010). A study on the health and livelihood needs of residents of informal settlements carried out in Nairobi, showed that mothers waited for days while using home - made remedies until the situation became worse, after which their first line of service was a chemist and drug stores. Only until the child's health deteriorated that is when the child was taken to a health facility (APHRC, 2002). This study will assess knowledge, attitude and practices of caregivers on health seeking behaviors for children suffering from acute diarrheal disease.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Study Design

This study adopted a cross-sectional descriptive study design utilizing mixed methods approach where both quantitative and qualitative data were collected at the same time.

3.2 Study Area

The study was conducted in the IDP camps of Hodan District. Hodan is one of the 16 districts of Banadir Region. It lies between latitude 2°2'46"N and longitude 45°18'10"E and borders Daynile to the North, Holwadag to the East, Wadajir and Dharkenley to the West and Wabari to the South (Appendix V-Map A). The district has four sub divisions namely: October, Taleex, Kacaan, and Ahmed Gurey. There are also for IDP settlements; Zona K and Tarabunka in October Sub district, Horsed in Taleex and Sigale in Ahmed Gurey. Horsed was previously a sport complex, Tarabunka was previously used for annual celebrations by the former military government in Somalia for parades in honor of the revolution while Zona K was previously National University of Somalia and Sigale was an empty private land (Appendix V-Map B). It is estimated that Somalia has 1.1 million IDPs out of total estimated Somali population of 12,317,000 (UNFPA, 2014). Approximately 360,000 of these IDPs reside in Banadir Region (UNHCR, 2015). Table 3.1 shows population in Hodan IDP camps.

Table 3.1: Summary of IDP in Hodan District, Banadir Region

Name of settlements	**Households profiled**	**Total People**	**Average Household size**	**Source**
Zona K	16,600	99,600	6	(UNICEF, 2012)
Horsed	1,559	8,824	5.6	(Mohamed, 2014)
Tarabunka	1,477	8,332	5.6	
Sigale	2,415	13,353	5	
Total	***22,051***	***130,109***		

3.3 Study Population

The study population consisted of children under 5 years and their caregivers living in IDP camps of Hodan District of Banadir Region, Somalia.

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion criteria

Any consented households with children below five years in the IDP camp in Hodan District were included in the study.

3.4.2 Exclusion criteria

Households were excluded in the study if:

1. They had children above 5 years of age,
2. They had children under 5 years of age who were critically ill,
3. The caregivers refused to consent.

3.5 Sample Size Determination.

The sample size for the survey was determined using the statistical formula for population sample size estimation (Daniel, 1999).

Sample size $n = \frac{Nz^2p(1-p)}{d^2(N-1)+z^2p(1-p)}$

Where:

n = desired minimal sample population

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/UNICEF, 2011a).

d = degree of accuracy (0.05)

N= Total number of under-fives among the IDP in the four settlements of Hodan District was estimated at 17,760 (13.65% of 130,109) (UNFPA, 2014)

Therefore, using a confidence of 95% that corresponds to the standard normal deviate of 1.96, the proportion in the target population is estimated at 19%, total number IDP in the four settlements was 17,760 and the degree of accuracy required is 0.05. This was applied as follows:

$$n=\frac{Nz^2p(1-p)}{d^2(N-1)+z^2p(1-p)}$$

$$n=\frac{17760*1.96^2*0.19(1-0.19)}{0.05^2(17760-1)+1.96^2*0.19(1-0.19)} = \frac{10500.11}{44.99} = 233$$

Design Effect (DEFF) of 1.4 was adopted for this study. This was based on the findings of a similar study conducted in Ethiopia. In that study by (Boisson, 2009), the following three reasons were provided to justify the design effect: It provided as reasonable sample size; the study area had similar characteristics and there was availability of resources for the study.

Based on the foregoing (DEFF*n= 233*1.4), the sample size translated to approximately 327 households which was the exact number sampled and interviewed in the study.

3.6 Sampling and Recruitment Procedure:

The survey adopted 2-stage sampling procedure whereby in stage I, all the IDP camps in Hodan District were sampled from all the camps proportional to the population size of the camps (Table 3.2). In stage II, simple random sampling was used to select households with under 5 years from the list of all households in each camp. The sampling frame was coded as follows: Zona K (between 0 and 252); Tarabunka (between 0 and 21); Horeseed (between 0 and 21) and Sigale (between 0 and 36). These were based on the population of the camps in each settlement areas as shown in (Table 3.2).

Table 3.2: Summary of weighted sampled sizes by Camps

Settlement Area	Number of Camps	Sample Size weighting (%)	Sample Size
Zona K	51	77.3	252
Tarabunka	4	6.1	20
Horeseed	4	6.1	20
Sigale	7	10.5	35
Total	66	100	327

Households that met the inclusion criteria were identified with the help of camp leaders who are also considered as gatekeepers in IDP camps. The researcher then approached and explained the purpose of the study to the caregivers, allowed them to ask questions on areas that were not clear to ensure that they understood the purpose and the procedure to be followed before signed a consent form (Appendix I-English version and VI-Somali version) as concurrence to be recruited into the study.

Purposive sampling was used to recruit caregivers for the FGDs. According to the population sizes of the IDP camps in Hodan District, Zona K camp were given five FGDs while others 3 camps given one FGD in each. Each group had an average of nine participants. In total of 74 caregivers participated in the FGDs. Any caregivers from the camps who did not participate in questionnaire for the study was selected and included in FGDs. The participants were identified with the help of that camp leaders in camps of Hodan District. The researcher approached and explained the purpose of the study to the identified participants, allowed them to ask questions on areas that were not clear to ensure that they understood the purpose and procedure of the study before signing a consent form (Appendix II-English version and VII-Somali version).

3.7 Data Collection Procedure

In the quantitative study, each participant was interviewed by a trained research assistant in a private area where they felt comfortable in answering questions. The researcher used four (4) research assistants trained on ethical consideration involving human subjects. These were public health students who were able to communicate fluently in Somali and English.

The questions included personal details, such as, age, education, occupation status, marital status, number of household members as well as information on prevalence, knowledge, attitude and practices of diarrheal disease, associated factors and prevention measures of diarrhea, such as, source of drinking water, treatment of water, sanitation and hygiene practices and breastfeeding and vaccination. The average time taken to complete each questionnaire was 15-20 minutes depending on the caregivers' response to the questions. The research assistants ensured completeness of tools by cross checking the completed questionnaires.

The focus group discussion was conducted in enclosed areas to ensure that participants were comfortable in participating in the discussions. The discussions were conducted in the local language of Somalia and note taking by the researcher with support from research assistants using the focus group discussion guide (Appendix II).

3.8 Validity and Reliability of data

Prior to the pre-testing the research instruments, professional opinion and expertise from the assigned university supervisors and from the public health specialist from Somalia were sought for purposes of face and content validity of the instruments. Validity of qualitative data was also ensured through triangulation of the results from quantitative with the information from the FGDs. Pretesting of the study tools ensured that the required information was collected.

Data collection plan ensured that mobilization and data collection for both quantitative and qualitative interviews were conducted concurrently to ensure that participants for the survey and the participants for FGDs were not the same ones. This ensured that the study captured diverse opinions to enrich the study findings.

3.9 Ethical Considerations

Prior to commencing the study, ethical approval was obtained from Kenyatta National Hospital and University of Nairobi Ethics and Research Committee (Appendix V111). In Somalia, ethical approval to conduct the study was obtained from the Ministry of Health (Appendix IX). In addition, permission was obtained from the Hodan District Commissionaire and camp leader. The study tools were made available in English language while consent forms were made available in both English and Somali languages to ensure participants understood what was being asked. To maintain confidentiality, the completed study tools were serialized to prevent the possibility of being traced back to the participants.

3.10 Data Management and Analysis

The quantitative data was entered into MS Excel spreadsheet package. It was coded, cleaned and exported to Statistical Package for Social Sciences (IBM SPSS) version 21 where univariate and bivariate analyses were conducted. Descriptive statistics were computed for the independent variables of age, sex, socio-economic status, environmental related factors, breast feeding, and health seeking behavior and vaccination status. Bivariate and multivariate analyses were also conducted. For the qualitative survey, the FGDs notes were transcribed and the information coded and organized into relevant sub-themes and analyzed thematically by organizing the information collected. The coding framework was developed based on the study guide and from reading the interview scripts.

CHAPTER 4: RESEARCH FINDINGS

4.1 Socio-demographic characteristics of participants

4.1.1 Response Rate

All the 327 caregivers selected from households with children under 5 years in IDP camps of Hodan District of Banadir Region participated in the study. This represented a response rate of 100%.

4.1.2 Socio-demographic characteristics

A majority of participants were mothers (88.7%), followed by fathers (10.2%), and only 1.2% were grandparents. The majorities of the participants were aged between 18 and 35 years (72.5%), married (78%) and had no formal education (76%). The median age of the caregivers was 30 (IQR=11) years. Most household were headed by men (72%). Slightly more than a half of sampled households had unemployed caregivers (57%). About 79% of the household had more than 4 members, and the mean household size was 6.59 members. (Table 4.1).

Table 4.1: Socio demographic and economic characteristics of the household and prevalence of diarrhea (N=327)

Socio Demographic Characteristics	**Frequency (n)**	**Percentage (%)**
Caregiver's Status		
Father	33	10.1
Mother	290	88.7
Grand Parents	4	1.2
Age of caregivers (in years)		
<18	4	1.2
18-25	88	26.3
26-35	151	46.2
36-45	74	22.6
>46	12	3.7
Household Head:		
Father	234	72
Mother	80	24
Other	13	4
Marital Status:		
Married	254	78
Unmarried	73	22
Highest Level of Education:		
None	247	76
Primary	61	19
Post Primary	19	6
Mother/Caretaker's Employment Status:		
Unemployed	187	57
Employed (self, organizations, casual laborer)	140	43
Household members (mean = 6.59)		
<= 4	69	21
>4	258	79

4.2 Prevalence of diarrhea among children under 5 years

The study found that 20.8% (95% CI: 16.8 - 25.6) of participating caregivers reported that their children had experienced at least one episode of diarrhea 14 days prior to the study. (Table 4.2).

Table 4. 2: Prevalence of diarrhea among children under 5 years (N=327)

Diarrhea experience during past 14 days	Frequency (n)	Percentage (%)	95%CI*
Had Experienced diarrhea	68	20.8	16.2 - 25.3
Had not experienced diarrhea	259	20	

** Confidence interval*

Table 4.3 shows the prevalence of diarrhea by age of children and residential camps. 86.8% of children who experienced diarrhea were below 25 months of age. The highest proportion of children who had experienced an episode of diarrhea were from Zona K camp (78%) while the Tarabunka camp had the least 12%. (Table 4.3)

Table 4. 3: Proportion of children with diarrhea by age of child and residential camps (N=68)

	Frequency (n)	Percentage (%)
Age of child (in months)		
6-12	21	30.9
13-24	38	55.9
25-36	2	2.9
37-48	3	4.4
49-59	4	5.9
Residential camp		
Zona K	53	77.9
Tarabunka	3	4.4
Horseed	4	5.9
Sigale	8	11.8

4.3 Knowledge, attitude and practices of caregivers

4.3.1 Knowledge and attitude of caregivers on diarrhea among children under 5 years

Table 4.4 shows the caregivers' knowledge on symptoms and causes of diarrhea in children. About 80% of participants understood what diarrhea was about. Seventy-two percent (72%) of caregivers had adequate knowledge on diarrhea symptoms. Finding on causes indicated that 62% of caregivers had adequate knowledge on diarrheal causes while 38% of them had inadequate knowledge. Eighty percent (80%) of participating caregivers had adequate

knowledge on how diarrhea is spread. 95% of the caregivers felt that diarrhea is a hazard to the health of children under 5 years of age (Table 4.4)

Table 4. 4: Knowledge and attitude of caregivers on diarrhea (N=263)

	Frequency (n)	**Percentage (%)**
Understood what diarrhea is	Yes	
Yes	263	80
No	64	20
Knowledge on symptoms of diarrhea		
Adequate knowledge on symptoms of diarrhea (*those who reported three or more unformed stools within a day and dehydration*)	190	72.2
Inadequate knowledge on symptoms of diarrhea *(those who reported Repeated Vomiting, Abdominal Cramps and Blood in Stool)*	73	27.8
knowledge on Causes of diarrhea		
Adequate knowledge on causes of diarrhea (*those who reported Germ and worm infection*)	163	61.98
Inadequate knowledge on causes of diarrhea (*those who reported teething, Indigestible foods and poor weather)*	100	38.02
knowledge on how diarrhea is spread		
Adequate knowledge on how diarrhea is spread (*those who reported poor hygiene, drinking dirty water and eating contaminated food*)	209	79.5
Inadequate knowledge on how diarrhea is spread (*those who reported flies/insects and weather*)	54	20.5
Perceive of diarrhea hazard to the health of children under 5 years		
Yes	250	95
No	13	5

A majority of participants in FGD also mentioned that they believed that mis-handling of infant feacal matter had the potential of spreading diarrhea among household members.

In terms of how best diarrhea can be prevented, majority of the participants mentioned ‘maintenance of proper hygiene’ as a way of preventing diarrhea cases. More specifically, participants believed that diarrhea can be prevented through frequent hand washing (37%),

cleanliness of utensils (21%), and covering of prepared food (17%) as presented on figure 4.1.

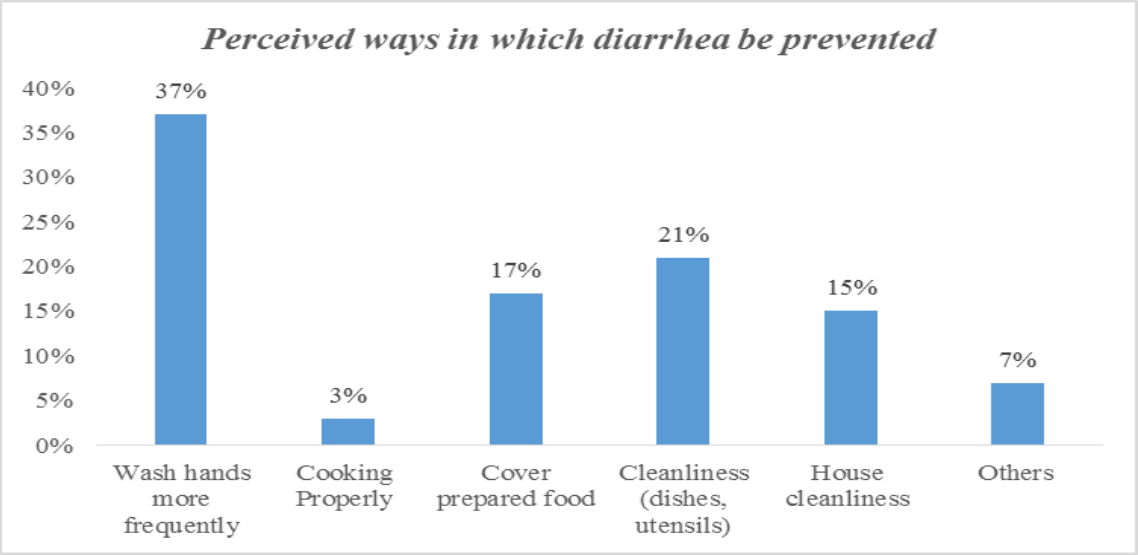

Figure 4.1: Perceived ways in which diarrhea be prevented (N=263)

4.3.2 Practices of caregivers regarding diarrhea among children under 5 years

4.3.2.1. Health seeking behavior

The study found that only 23.5% of the children with diarrhea were taken to a health facility and 47% were given medicine from the pharmacy. The study also found that the main decision maker to take the child to the hospital was the child's father (47%) or grandparents (28%). Mothers were the least decision maker (25%). Most participants (76.5%) reported that they had difficulties in accessing the health facilities due to lack of money (90.4%) to pay for health services as shown (Table 4.5).

Table 4. 5: Health seeking behavior among caregivers with children with diarrhea (N=68)

	Frequency (n)	**Percentage (%)**
Where do you seek for treatment?		
Traditional healer	3	4.4
Sheikh for prayer s	8	11.8
Purchase medicine from Pharmacy	32	47.0
Health facility	16	23.5
No action taken /wait to subside	4	5.9
Home treatment with traditional remedies	5	7.4
Decision maker on whether to take the child to hospital		
Child's father	32	47.1
Child's mothers	17	25.0
Grandparents	19	27.9
Difficulty in reaching health facility?		
Yes	52	76.5
No	16	23.5
Type of difficulty in reaching health facility		
Transportation and security	5	9.6
Lack of money	47	90.4

Information from FGDs regarding health seeking behaviors indicated that most caregivers preferred to purchase drugs from local chemists wherever a child had diarrhea due to lack of money for consultation fees and transportation to the health facility. Households also resorted to other traditional remedies, such as, administration of boiled water with salt and sugar or visiting a nearest pharmacy to get oral dehydration salts (ORS) to administer to the children as they await the means to get to a health facility. Some households, however, gave the sick child white rice with yoghurt or bread with tea or lemon as a traditional remedy for the situation as the excerpts below further confirms:

"Mothers first of all tried home remedies before seeking medical assistance from the health centers. It takes at least one day before they take the next step. Deteriorations of the diarrhea condition always changed the frequency of seeking medical help." ***FGD participant, Hodan, Zona K***

"Home remedies used in diarrhea included lemon and a fluid with sugar and salt with food items used being white rice with yogurt and bread with tea". ***FGD participant, Hodan, SIIGALE.***

"….we don't give remedies at home except ORS. The food provided is rice with yogurt milk." ***FGD Participant, Hodan, Zona K.***

4.3.2.2 Treatment and storage of drinking water

Seventy-four percent (74%) of households mainly used piped water. The other households used borehole, shallow well or bought water from vendors (figure 4.2).

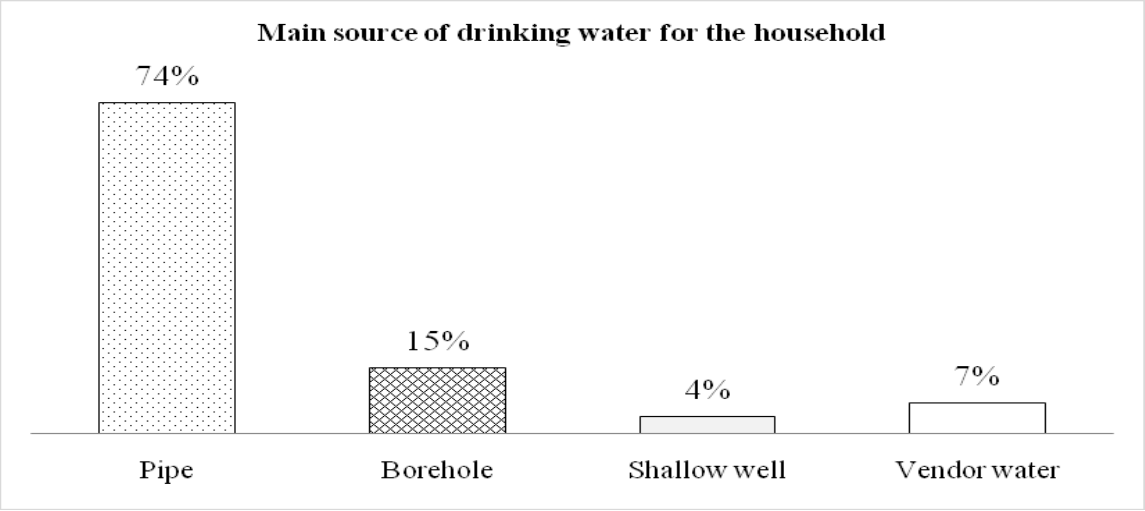

Figure 4. 2: Main source of drinking water for the household (N=327)

Most caregivers (73%) did not store drinking water safely. In 87 households where the drinking water was stored, jerry cans (59%) were the main storage containers. Treatment of drinking water was reported by only 14.4% of the study participants. Among those who

treated their drinking water, boiling (61.7%) and chlorination (18.3%) were the main methods used. According to the participants, these two methods were believed to be the most effective methods (83%) of water treatment. Most of those who did not treat their drinking water believed that water was safe from the source (55%) as shown Table 4.6.

Table 4 6: Treatment and storage of drinking water (N=327)

	Frequency (n)	**Percentage (%)**
Treated drinking water		
Yes	47	14.4
No	280	85.6
Method of treating drinking water		
Boiling	29	61.7
Chlorination	18	38.3
Reason for choice of method of treating drinking water		
I don't know other option	8	17
The method is effective	39	83
Reason for not treating drinking water		
Costs	49	17.5
Bad taste and smelly of treated water	34	12.1
I believe water is safe from the source	160	57.1
I am used to drink untreated, nothing happen to us	37	13.2
Storage of drinking water		
Separated from other water	87	27
Not separate	240	73
Use container for storing water		
Bucket with a lid	25	29
Bucket without a lid	11	13
Jerry cans	51	59

Qualitative data from FGDs also confirmed that majority of the households in the study area mainly obtained water from pipes which were privately owned. Whether or not a household used the same container to keep water for drinking and for other domestic purposes was determined by the household's ability to purchase more jerry cans for water storage. The households with the ability to purchase more jerry cans were able to store their drinking water separate from the water used for other purposes. Water was fetched using jerry cans at a cost of approximately US $1.72 to $3.42 as the following excerpts further confirmed:

"The source of water is a privately owned pipe in the settlement, and we buy water at the rate of SSH 1,000 per 20-liter jerry-can of water. Accessibility of water is not that difficult, but affordability is not easy since most of the IDPs are squatters that have no reliable income." ***FGD participant, Hodan, Zona K.***

"Families living in this camp get water from the borehole. The proximity of water is not far, and the cost is 2000 SH SO." ***FGD Participant, Zona K.***

"Yes, we feel safe on water we buy from the vendor. Because the borehole is so deep, and water are treated at source level. The reason why we don't treat water at household level is that we always used to believe that water is safe as long as the source is a borehole, not a shallow well." ***FGD Participant, Hodan, Zona K***

4.3.2.3 Sanitation practices

Title 4.7 shows the use of toilet facilities. All the 327 households sampled had access to a toilet facility which they reported that they use it all the time (100%). Majority of the toilet facilities were pit latrines (98%). Eighty-one (81%) of the toilets were in use by the general public with only 19% owned and used privately. The average number of people using one toilet facility was 23. Sixty-six percent (66%) reported that the toilet facilities were clean every day.

Seventy-nine percent (79%) of caregivers reported that their children under 5 years could not use the toilets on their own. All the caregivers who reported that the children could use the toilets on their own (n=68), reported that they provide children with water to clean themselves after they used the toilets (100%).

Table 4.7: Use of toilet facilities reported by participants (N=327)

	Frequency n	**Percentage %**
Access to a latrine		
Yes*	327	100
No	0	0
Frequent use of latrine		
Yes, all the time	327	100
Yes, sometimes	0	0
Type of latrine		
Pit latrine	319	98
Modern flush toilet	8	2
Private/Public latrine		
Private	62	19
Public	265	81
Frequency of cleaning latrines		
Every time it is spoiled	47	14
Every day	217	66
1-2 times a week	61	19
Not cleaned	2	1
Children use of latrine on their own		
Yes	68	21
No	259	79
Care given to children after going to toilet		
With water	68	100

****this is referred to access to a latrine and not ownership***

The main method of feacal matter disposal among the caregivers whose children could not use the latrines on their own was throwing in the latrine (85%). The rest of participants buried (14%) or threw the feacal matter in the open surrounding (1%) as seen on figure 5.4.

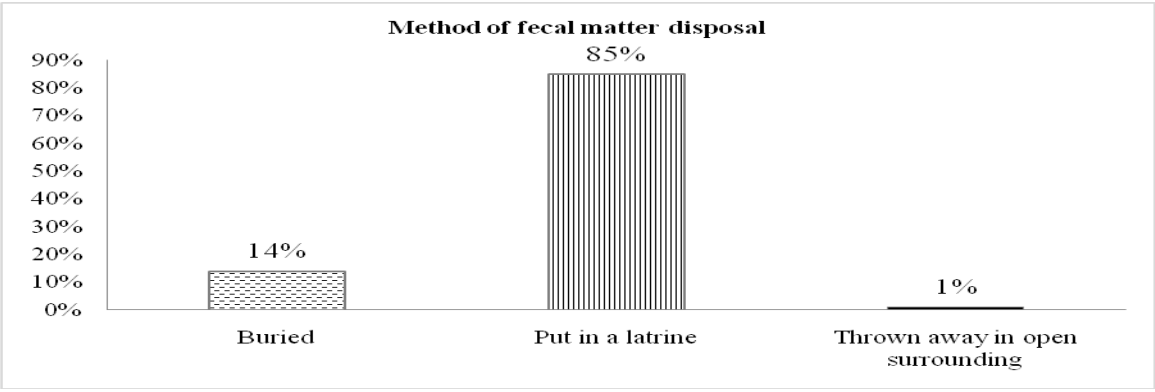

Figure 4. 3: Method of feacal matter disposal (N=259)

4.3.2.4 Hand washing practices among caregivers

Hand washing practices were mainly reported to happen before meals (59.3%) and before cooking or preparing food (42.8%). About 29% of the participants reported that they washed their hands other times, such as, after touching a visibly dirty object or at will. Only 27.5% of participants reported that they washed their hands after using the toilet. Only 16.4% of the caregivers reported they used soap for washing their hands (Table 4.8).

Table 4. 8: Hand washing practices among caregivers (N=327)

	Frequency (n)	**Percentage (%)**
Hand washing after using the toilet		
Yes	90	27.5
No	237	72.5
Hand washing before meals		
Yes	194	59.3
No	133	40.7
Hand washing before cooking/preparing food		
Yes	140	42.8
No	187	57.2
Hand washing other times		
Yes	94	28.7
No	233	71.3
Washes hands with soap		
Yes	46	16.4
No	281	85.9

Qualitative data from the FGDs, also confirmed that hand washing before meals and after visiting toilets not widely practiced (participants from 6 out of 8 FGDs).

The children are encouraged to wash their hands after and before eating and after going to the toilet with water only." FGD Participant, Sigaale, Zona K.

4.3.2.5 Breastfeeding practices among children under 25 months of age

During the study period, 26.2% of the study children were breastfeeding. Sixty-one percent (60.9%) of those who currently breastfeeding were under 12 months of age. Those who were

exclusive breastfed were only 14.1%. Most caregivers (79.1%) were aware that breastfeeding reduces infections in children as shown (Table 4.9).

Table 4.9: Breastfeeding practices among children under 25 months of age (N=244)

	Frequency (n)	**Percentage (%)**
Child is current breastfeeding		
Yes	64	26.2
No	180	73.8
Child' age of current breastfeeding		
Under 12 months	39	60.9
Over 12 months	25	39.1
Caregiver's aware on exclusive breastfeeding reduces infection in children		
Yes	193	79.1
No	51	20.9
Child was Exclusive breastfed		
Yes	9	14.1
No	55	85.9

Finding from the 8 FGDs established that the rate of breastfeeding within the first hour of birth was low among caregivers in the study area. The few caregivers who reported breastfeeding infants immediately after birth reported that it was because they understood the importance of colostrum for their infants with those who didn't mentioning that they believed that it would add to their pain. It was also noted that majority of the women in the community did not practice exclusive breastfeeding as expected due to lack of appropriate information regarding what exclusive breastfeeding was. Excusive breastfeeding was considered as provision of mother's milk together with water and goat milk as excerpts below suggest:

"We can say that all mothers don't give breast milk to their children in the first hour of life. We think this is due to mother get ill in the first hours of delivery." ***FGD Participant, Sigaale, Zona K***

"One in three of the children in this community get breast feeding in the first life of hour, because the most of mothers in ground belief the breast feeding in the first hour increase pain to the mother." ***FGD Participant, Hodan, Zona K***

"The majority of the mothers here introduce other feeding to their infants before the six months" ***FGD Participant, Hodan, Tarabunka***

4.4 Associated factors with diarrhea among children under 5 years

4.4.1 Socio-demographic characteristics

The study explored the relationships between diarrheal disease and socio demographic factors.

Among the socio-demographic factors, only age of the child and marital status of caregivers were statistically significantly associated with diarrheal disease ($p=0.01$). The remaining socio-demographic factors, namely, residential camp, household head, age of the caregiver, level of education of caregiver and employment status, were not statistically significant ($p>0.05$). (See Table 4.10)

Table 4. 10: Association between diarrhea and socio demographic and economic characteristics of study (N=327)

Socio Demographic and Economic characteristics of participants	**Diarrhea experienced**		
	Had diarrhea (n=68)	***Did not have experienced (n=259)***	***P-value***
Age of child (in months)			
Under 25 months	59 (24.2)	185 (75.8)	p=0.012**
Over 25 months	9 (10.8)	74 (89.2)	
Residential Camp			
Zona K camp	53 (21.03)	199 (79.97)	p=0.847
Others camps (Tarabunka, Horseed and Sigale)	15 (20.0)	60 (80.0)	
Household Head			
Father	12 (22.2)	42 (77.8)	p=0.221
Mother	38 (18.2)	171(81.8)	
Other Relatives	18(28.1)	46(71.9)	
Age of caregivers (in years)			
<18	0 (0%)	4(100%)	p=0.950
18-25	20 (23%)	66 (77%)	
26-35	25 (17%)	126 (83%)	
36-45	18 (24%)	56 (76%	
>45	5 (42%	7 (58%)	
Marital Status			
Married	44 (17.3%)	210 (82.7%)	p=0.004**
Unmarried	24 (32.9 %)	49 (67.1%)	
Highest Level of Education			
None	51 (20.6 %)	196 (79.4%)	p=0.908
Primary or higher	17 (21.3%)	63 (78.7%)	
Employment Status			
Unemployed	33 (17.6 %)	154 (82.4 %)	p=0.105
Employed (self, organizations, casual laborer)	35 (25% %)	105 (75%)	

*****Significant at 1% level of significant, In parentheses are percentages.***

4.4.2. Knowledge and attitude of caregivers on symptoms, causes and how diarrhea is spread among children under 5 years of age

There was no statistical significant association between diarrheal disease among children under 5 years and having adequate knowledge of diarrhea about symptoms, causes and how diarrhea is spread ($p>0.05$) as shown (Table 4.9). Similarly, the association between diarrhea in under-fives and caregivers perception regarding the disease were not statistically significant ($p>0.05$).

Table 4.11: Association between diarrhea and knowledge and attitude of caregivers on symptoms, causes and how diarrhea is spread

Caregivers' knowledge on diarrhea	**Diarrhea experienced**		
	Had diarrhea (n=68)	***Did not have diarrhea (n=259)***	***P-value***
Caregivers' knowledge on symptoms of diarrhea			
Adequate knowledge on symptoms of diarrhea (*those who reported three or more unformed stools within a day and dehydration*)	46 (23.7)	144 (76.3)	p=0.688
Inadequate knowledge on symptoms of diarrhea *(those who reported Repeated Vomiting, Abdominal Cramps and Blood in Stool)*	14 (19.2)	59(80.8)	
Caregivers' knowledge on Causes of diarrhea			
Adequate knowledge on causes of diarrhea (*those who reported Germ and worm infection*)	28 (28)	72 (72)	p=0.118
Inadequate knowledge on causes of diarrhea (*those who reported teething, Indigestible foods and poor weather)*	32 (19.6)	131 (80.4)	
Caregivers' knowledge on how diarrhea is spread			
Adequate knowledge on how diarrhea is spread (*those who reported poor hygiene, drinking dirty water and eating contaminated food*)	47 (22.5)	162 (77.5)	p=0.804
Inadequate knowledge on how diarrhea is spread (*those who reported flies/insects and weather*)	13 (24.)	41 (75.9)	
Diarrhea perceived as a hazard to the health of a child			
Yes	57 (22.8)	193 (77.2)	p=0.98
No	3 (23)	10 (77)	

In parentheses are percentages.

4.4.3 Water Sanitation and Hygiene (WASH)

There was statistically significant association between diarrheal disease among children under 5 years of age and methods disposal of feacal matter (p=0.025), hand washing after using the toilet (p=0.043), use of soap for hand washing (p=0.017) and treatment of drinking water (p=0.009). The households that reported episodes of diarrhea were those that did not prioritize hand washing after using the toilet (23.6%) compared to those who washed their hands after using the toilet (13.3%).The households that had experienced diarrhea also reported that they did not use soap for their hand washing (23.1%) compared to those who used soap for their hand washing (6.5%).The households that had experienced diarrhea also reported that they did not treat drinking water (23.6%) compared to those that treated drinking water (4.3%) as shown in Table 4.11.

Table 4.12: Association between diarrheal disease and feacal matter disposal, hand washing and treatment of drinking water

WASH practices	**Diarrhea experienced:**		
	Had diarrhea (n=68)	***Had not diarrhea (259)***	***P-value***
Child can use the latrine on their own:			
Yes	20 (29.4)	48 (70.6)	p=0.051
No	48(18.5)	211(81.5)	
Method of disposing feacal matter:			
Buried or thrown in open surrounding	12 (31.6	26(68.4)	p=0.025*
Put in a latrine	36(16.3)	185(83.7)	
Hand washing after using the toilet for caregivers			
Yes	12 (13.3)	78 (86.7)	p=0.043*
No	56(23.6)	181(76.4)	
Hand washing before meals for caregivers			
Yes	41 (21.1)	153 (78.9)	p=0.855
No	27 (20.3)	106 (79.7)	
Hand washing before cooking/preparing food for caregivers			
Yes	34 (24.3)	106 (75.7)	p=0.178
No	34 (18.2)	153 (81.1)	
Hand washing other times			
Yes	19 (20.2)	75 (79.8)	p=0.869
No	49 (21%)	184 (79%)	
Washes hands with soap:			
Yes	3(6.5)	43 (93.5)	p=0.017*
No	65(23.1)	216(76.9)	
Main source of drinking water for the household:			
Pipe	50 (20.7)	192 (79.3)	p=0.975
Borehole	10 (20.4)	39 (79.6)	
Shallow well/water vendor	8 (22.2)	28 (77.8)	
Dinking treated water			
Yes	2(4.3)	45(95.7)	p==0.009**
No	66(23.6)	214(76.4)	

Significant at 5% level of significant; **Significant at 1% level of significant, In parentheses are percentages.

4.5 Multivariate logistic regression analysis on associated factors with Diarrheal Disease

The variables that were significant at bivariate analysis using chi square test at 5% level of significance were subjected to multivariate analysis at the same level of significance to establish if they were independent factors in determining prevalence of diarrhea among children under 5 years. The variables of interest were: the age of the child (p=0.012), marital status (p=0.01), method of feacal matter disposal (p=0.03), hand washing after toilet use (p=0.043), hand washing with soap (p=0.017) and use of treated drinking water (p=0.01).

The study found that the households with younger children below 25 months of age, had more than two and half times higher odds of developing diarrhea (AOR: 2.622, 95% CI 1.237-5.559, p=0.01) when compared to households where children were more than 25 months of age. Furthermore, children from households where the feacal matter was thrown or buried were more than two times more likely to experience diarrhea (AOR:2.372,95% CI 1.096 - 5.131, p=0.03) than in households where feacal matter was properly disposed of.

The study also found that diarrhea was less likely to occur among children from households where the caregivers were married (AOR: 0.428, 95% CI0.238-0.769, p=0.01) , washed their hands after toilet use (AOR: 0.497,95% CI 1.0.253-0.979, p=0.043), washed their hands with soap (AOR: 0.232, 95% CI 0.70-0.772,p=0.017) and used treated drinking water (AOR:0.144,95% CI 0.034-0.610,P=0.01), see (Table 4.13).

Table 4. 13: Multivariate analysis of associated factors to diarrhea among children under 5 years

	AOR:	**95% C.I. for Odds Ratio**	**p-value**
Age of child			
Under 25 months	2.622**	1.237-5.559	0.01
Over 25 months	1		
Marital Status			
Married	0.428**	0.238 - 0.769	0.01
Not married	1		
Method of feacal matter disposal			
Put in latrine	1		
Buried or thrown away in open surrounding	2.372*	1.096 - 5.131	0.03
Hand washing after toilet use			
Yes	0.497*	0.253 - 0.979	0.043
No	1		
Hand washing with soap			
Yes	0.232*	0.70 - 0.772	0.017
No	1		
Treated drinking Water			
Yes	0.144**	0.034 - 0.610	0.01
No	1		

****Significant at 5% level of significant; **Significant at 1% level of significant***
AOR adjusted odds ratio

CHAPTER 5: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussions

The main objective of the study was to determine the prevalence of diarrheal disease and associated factors among children under 5 years in internally displaced populations of Hodan District, Somalia.

The prevalence of diarrhea among children under 5 years in Hodan IDP camps was 20.8% (95% CI: 16.8 - 25.6). These findings suggest that one in every five children living in Hodan IDP camps are at risk of dying from diarrheal disease. This finding is in line with Somalia prevelance of diarrhea in children under 5 years which is 19% (WHO/UNICEF, 2011a). However, this result was lower than 33% of prevalence of diarrhea among children under 5 years in Dharkenley IDP Camp in Somalia (Yusuf, 2018). Furthermore, the finding was also lower than 43.3% of prevalence of diarrhea among children under five years in refugee camps in Uganda (Izale, 2015).

More than 70% of caregivers in this study were aware of the main symptoms of diarrhea among the under 5 years' old children as being loose stools and dehydration. The loose stool and dehydration leads to excessive loss of fluids and minerals from the body (WHO, 2005a; Mobalk .2000; Guerrant & Van Gilders, 2001). However, this study focused only on reported causes of diarrhea among children under 5 years and did not investigate the microbiological. The findings from this study suggested that diarrhea in children was caused by germs and worm infestation. This is in line with other studies which reported that diarrhea is likely to be caused by infectious agents, such as, bacterial, worm or viral invasion (Amerine & Keirsey, 2006; Blanca Ochoa, 2012; David, 2013). These agents are spread by poor hygiene, drinking dirty water and eating contaminated food. IDPs are characterized by high population density, poor sanitation and inadequate WASH programs. The spread of diarrhea through eating contaminated food or drinking dirty water, or poor hygiene has been observed in other similar

studies (WHO, 2013; Tefera Belachew, 2001; UNICEF/WHO, 2009a; Kakulu, 2012; Edward Buzigi, 2015). Correct knowledge on the causes of diarrhea as well as its mode of transmission is critical in prevention of the diarrhea in children. It helps caregivers understand the route cause and spread of the disease.

The factors that were significantly associated with diarrheal disease among children under 5 years in this study were the age of the child, caregivers' marital status and the water, sanitation and hygiene practices.

In this study, younger children below 25 months of age were more likely to experience diarrheal disease than the older children. These findings from Hodan IDP camps were expected from an IDP camp settlement environment which are often densely populated with poor water and sanitation facilities. These findings are in agreement with other studies (Alambo, 2015; Bezatu Mengistie, 2013; Thomas, Getahun, & Alemayehu, 2014). When children start moving around the house and feed on other foods apart from breast milk they are exposed to organism causing diarrhea. Furthermore, young children are at risk of ingesting contaminated materials which they pick from the environment. The risk of diarrhea, however, decreases after the age of 25 months probably because the children begin to develop immunity to pathogens after repeated exposure (WHO/UNICEF, 2011a; WHO, 2009c).

The health seeking behaviors among the caregivers was notably poor, with less than 25% of the caregivers seeking for care at the health facility. The fact that either the child's father or grandmother was the main decision maker on seeking for healthcare implied that the delay in taking the child to the hospital while waiting for these decision makers was likely to contribute to child deaths from diarrhea (FSNAU,2007, Lynch ,2005). This is further complicated by poor financial resource base among the IDPs. Other studies have shown that

access to the health facilities is a challenge in developing countries such as Somalia due to geographical and/ or economic barriers which accordingly cause delays in seeking for healthcare and resulting in child deaths (Desilva, 2001; D' Souza, 2003). Most caregivers are likely to seek treatment from a provider when the child experiences fever and gastrointestinal symptoms such as vomiting, or diarrhea compared to respiratory and other symptoms. Whereas these maybe some of the symptoms of acute diarrhea, they may manifest too late further increasing the risk of the child succumbing to the diarrhea (Goldman & Heuveline ,2000; APHRC ,2002).

Marital status was also statistically significantly associated with diarrhea. The caregivers who were in a marital relationship reported fewer children with diarrhea (17.3%) compared to the unmarried caregivers (32.9%). This could be because married caregivers are also more likely to have more chance to stay at home and take care of their children than the unmarried, single caregivers.

The study also found that diarrhea was more likely to occur in under-five years old children among caregivers who practice inappropriate feacal disposal method compared to those who used the latrines (AOR: 2.372, 95% CI 1.096 - 5.131, p=0.03). The findings are in a line with other findings reported earlier (Teklemichael Gebru, 2014; Ikua, 2009). Poor disposal of excreta and unsanitary environment allow diarrhea-causing pathogens to spread easily (UNICEF/WHO, 2009a). Although all participants had access to and used latrines, more than 80% of the latrines were communally owned. This implied that maintaining the cleanliness and hygiene of these latrines was a challenge for the study population. Furthermore, close to 80% of the study children were not able to use the latrines on their own and 15% of the households either buried or threw the children feacal matter in the open surrounding. Burial of children's feaces in the soil has been associated with diarrhea in children. The feaces

provides breeding sites for insects that carry diarrhea pathogens from the waste to water and food (Godana & Mengiste, 2013b).

Poor hand washing practices among caregivers were observed in this study. It is important that caregivers wash their hands before handling a child's meal or after using the toilets. In this study, appropriate hand washing using soap was low (14%) among the caregivers. The poor practices of washing hands with soap after visiting the toilet or handling food was attributed to ignorance among caregivers, and poor socio-economic status. Similar findings were reported in Ethiopia where children who did not wash their hands had higher incidence of diarrhea (Bezatu, 2013). A study carried out in Vietnam also found that inappropriate hand washing by mothers after going to the toilet or before feeding children were significantly associated with the risk of diarrhea among children less than five of age (Bui, 2006)

Another significant finding in this study was that children who drunk treated warer (AOR: 0.144, 95% CI 0.034-0.610, p=0.01) were less likely to experience diarrhea compared to those who did not use treated water. In Kenya children did not use treated drinking water had higher odds of contracting childhood diarrhea than those which treated their drinking water (Mbugua Samwel, 2014). Improving accesses to safe drinking water and adequate sanitation, as well as promoting good hygiene, are therefore key components in preventing diarrhea (UNICEF/WHO, 2009a). The management of water and sanitation at household level is crucial in the prevention and management of diarrhea since water is a common mode of transmission of diarrhea causing organism. Most of caregivers in this study had access to piped water at the camps which provides an opportunity for central used water treatment. However, this water was fetched and stored in jerry cans and buckets. These water storage containers had the potential to contaminate the water with diarrhea causing organisms as reported in other studies (Kakulu, 2012; Ayuk, Leonie, & Nchang, 2015; Mbugua ,2014).

Water becomes contaminated during collection, transport and drawing in the home (Wright, 2003). Infants are particularly susceptible to severe diarrheal disease with fatal outcome due to drinking unsafe water or taking breast milk substitute prepared with unsafe water (WHO/UNICEF, 2011a; Kakula, 2012; Edward Buzigi, 2015). This is mainly due to exposure to harmful pathogens at an early stage. Auto infection through water and food are ways through which diarrhea is spread (Belachew, 2001). This is because most pathogens that cause diarrhea share a similar mode of transmission (UNICEF/WHO, 2009a).

5.2 Weakness and Strengths of the study

Findings from this study were based on self-reported information by caregivers on diarrhea in children. Stool samples from the children were not collected, nor analyzed to confirm the clinical presentation of the reported diarrhea.

The triangulation of the quantitative findings with FGDs, however, enriched the understanding of diarrhea in children at Hodan IDP camps in this study.

5.3 Conclusions

There is high prevalence of diarrhea among children of internally displaced populations of Hodan District in Somalia. The diarrhea is more likely to occur among children who are less than 25 months of age. Other factors that are independently associated with diarrhea in Hodan IDP camps are the caregivers' marital status, as well as their water, sanitation and hygiene practices.

5.4 Recommendations

1. The government, the community and health and WASH implementing agents in Somalia should consider:
    i. Increasing awareness on care for the children under 25 months of age who are most vulnerable to diarrhea.
    ii. Increasing awareness among the caregivers in Hodan IDP camps on appropriate hand washing practices.
    iii. Creating awareness among the caregivers on treatment and use of treated water in the households for food preparation and drinking.
    iv. Increasing awareness among the population of Hodan IDP camps on important of use toilet facilities in disposal of feacal matters.
2. More rigorous qualitative studies should be conducted in the Hodan IDP camps to understand the factors associated with diarrhea among children under five years of age.

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APPENDICES

APPENDIX I: INFORMED CONSENT EXPLANATION FORM (ENGLISH VERSION) FOR PARTICIPANTS FOR QUESTIONNAIRE

Participant code _____Date_____

Introduction:

I am **Mohamud Hersi** from School of Public Health, University of Nairobi. I am conducting a study on **THE PREVALENCE OF DIARRHEAL DISEASE AND ASSOCIATED FACTORS AMONG CHILDREN UNDER 5 YEARS IN INTERNALLY DISPLACED POPULATIONS OF HODAN DISTRICT, SOMALIA.**

The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in a medical research: i) Your decision to participate is entirely voluntary ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal

iii) Refusal to participate in the research will not affect you .We will give you a copy of this form for your records.

May I continue? YES / NO

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee protocol no. _____

WHAT IS THIS STUDY ABOUT?

I will interview caregivers with children under 5 years old in IDPs of Hodan District, Somalia. The aim of this study is to at assessing the risk factors of diarrheal diseases among children under 5 years and living in IDP camps of Hodan District of Banadir Region of Somalia. A total of 327 caregivers will be chosen to participate in this study. We are therefore kindly requesting for your consent to consider participating in this study.

WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?

If you agree to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 15-20 minute. The interview will cover topics, such as, your personal details, knowledge, attitude and practices of diarrheal disease and risk factors and prevention measures of diarrhea, such as, source of drinking water, treat water, sanitation and hygiene practices, lastly breast feeding and vaccination. Throughout the interview, every answer from the caregiver will be recorded according to the designed questionnaire

ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. Effort will be put in place to minimize such risks. One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out information about you.

Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview. We will do everything we can to ensure that this interview is done in private. Furthermore, all study interviewers are professionals with special training in these interviews. Also, **having a sick child with diarrheal disease may be stressful.** In case of an injury, illness or complications related to

this study, contact the study staff right away at the number provided at the end of this document. The study staff will treat you for minor conditions or refer you when necessary.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

You may benefit from participating in this study by receiving free health education. You may also benefit indirectly that the information you provide will help us better understand of prevalence and risk factors of diarrheal diseases as well as knowledge ,attitude and practices of diarrheal disease among children under 5 years living in IDP camps of Hodan District of Banadir Region of Somalia .This information is a contribution to science and policy makers.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

You will not be required to make any payments in participating in this study.

WILL YOU GET REFUND FOR ANY MONEY SPENT AS PART OF THIS STUDY?

All participants will be refunded for any call charges related to the study.

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about participating in this study, please contact me on the mobile number provided in last page.

For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee on mobile No. 0735-274288/0721-665077 or email uonknh_erc@uonbi.ac.ke.

WHAT ARE YOUR OTHER CHOICES?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

CONSENT FORM (STATEMENT OF CONSENT) FOR PARTICIPANTS IN QUESTIONNAIRE RESPONSE

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

I agree to participate in this research study: Yes No

I agree to provide contact information for follow-up: Yes No

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and have willingly and freely given his/her consent.

Researcher's Name: _____ Date: _____

Signature

_____

Role in the study: _____ (The study staff who explained informed consent to participant).

For further information, questions or queries you can contact:

The Principle Investigator: Dr Mohamud Mohamed Hersi MPh student, School of public health University of Nairobi. Cell phone number +252615057981, Email: mmmhersi@gmail.com

Witness Printed Name (If witness is necessary, a witness is a person mutually acceptable to both the researcher and participant)

Name _____Contact information: _____

Signature /Thumb stamp: _____Date: _____

APPENDIX II: INFORMED CONSENT EXPLANATION FORM FOR PARTICIPANTS FOR FOCUS GROUP DISCUSSION ((ENGLISH VERSION)

Participant code _____ Date_____

Introduction:

Introduction:

I am **Mohamud Hersi** from School of Public Health, University of Nairobi. I am conducting a study on **THE PREVALENCE OF DIARRHEAL DISEASE AND ASSOCIATED FACTORS AMONG CHILDREN UNDER 5 YEARS IN INTERNALLY DISPLACED POPULATIONS OF HODAN DISTRICT, SOMALIA.**

The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in a medical research: i) Your decision to participate is entirely voluntary ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal

iii) Refusal to participate in the research will not affect you. We will give you a copy of this form for your records.

May I continue? YES / NO

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee protocol no. _____

WHAT IS THIS STUDY ABOUT?

I will conduct focus group discussion for caregivers with children under 5 years old in IDPs of Hodan District, Somalia. The aim of this study is to at assessing the risk factors of diarrheal diseases among children under 5 years and living in IDP camps of Hodan District of Banadir Region of Somalia. A total of about 6 focus group will be undertaken and you will be chosen to participate in this study. We are therefore kindly requesting for your consent to consider participating in this study.

WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?

If you agree to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The discussion will last approximately 40-50 minute. The discussion will cover topics related for water, sanitation and hygiene practices, breast feeding and health seeking behavior. During the FGD, the researcher will take notes and reviewed them immediately after FGD to ensure that all information will be captured. Research assistants was ensured completeness of tools by cross checked and verified with the caregivers

ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. Effort will be put in place to minimize such risks. One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out information about you. Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview. We will do everything we can to ensure that this interview is done in private. Furthermore, all study interviewers are professionals with special training in these interviews. Also, **having a sick child with diarrheal disease may be stressful.**

In case of an injury, illness or complications related to this study, contact the study staff right away at the number provided at the end of this document. The study staff will treat you for minor conditions or refer you when necessary.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

You may benefit from participating in this study by receiving free health education. You may also benefit indirectly that the information you provide will help us better understand of prevalence and risk factors of diarrheal diseases as well as knowledge ,attitude and practices of diarrheal disease among children under 5 years living in IDP camps of Hodan District of Banadir Region of Somalia .This information is a contribution to science and policy makers.

WILL BEING IN THIS STUDY COST YOU ANYTHING?

You will not be required to make any payments in participating in this study.

WILL YOU GET REFUND FOR ANY MONEY SPENT AS PART OF THIS STUDY?

All participants will be refunded for any call charges related to the study.

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about participating in this study, please contact me on the mobile number provided in last page.

For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee on mobile No. 0735-274288/0721-665077 or email uonknh_erc@uonbi.ac.ke..

WHAT ARE YOUR OTHER CHOICES?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

CONSENT FORM (STATEMENT OF CONSENT) FOR PARTICIPANTS IN FOCUS GROUP DISCUSSION RESPONSE

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

I agree to participate in this research study: Yes No

I agree to provide contact information for follow-up: Yes No

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher's Name: _____ Date: _____

Signature

_____

Role in the study: _____ (The study staff who explained informed consent to participant).

For further information, questions or queries you can contact:

The Principle Investigator: Dr Mohamud Mohamed Hersi from School of public health University of Nairobi. Cell phone number +252615057981 or Email: mmmhersi@gmail.com

Witness Printed Name (If witness is necessary, a witness is a person mutually acceptable to both the researcher and participant)

Name _____Contact information: _____

Signature /Thumb stamp: _____Date: _____

APPENDIX III: STUDY QUESTIONNAIRE

THE PREVALENCE OF DIARRHEAL DISEASE AND ASSOCIATED FACTORS AMONG CHILDREN UNDER 5 YEARS IN INTERNALLY DISPLACED POPULATIONS OF HODAN DISTRICT, SOMALIA.

Good morning/afternoon. My name is **Mohamud Hersi**, and a student of Public Health, University of Nairobi.

I am carrying out a study as part of fulfillment of the requirements for my Master of Public Health (MPH) degree. The title of my study is ***"prevalence of diarrheal disease and associated factors among children under 5 years in internally displaced populations of Hodan District, Somalia"***

I am talking randomly to household heads and care-givers in households with a child under 5 who has experienced diarrhoea in the last 2 weeks to understand the risk factors associated with that episode of diarrhoea. Your household is one of such household and that is why I am here to speak to you.

Before I speak to you about this episode of diarrhea by your dependent or household member, I would like to request you kindly to agree to freely participate in this study and discuss as honestly as you can. Please note that you are not under any obligation to participate and you can quit at any stage, additionally there are neither direct benefits for participating nor any penalty for not participating. I am requesting for your own free will.

Do you agree to participate in the study? Yes …. No …….

Thank you very much.

Now I would like to ask you some questions and I would like to assure you that your answers and opinions will remain confidential and will only be used for purpose of this study. Your name will not appear anywhere in the study report.

Questionnaire Number …….Date: ……. Name of Interviewer.....

District: …… Sub District …….Name of the IDP camp…….

NO	QUESTIONS & FILTERS	CODING CATEGORIES		SKIP
SECTION A: DEMOGRAPHIC AND SOCIO-ECONOMIC INFORMATION				
1	Respondent' status (Only one respondent)	Father	1	
		Mother	2	
		Grand father	3	
		Grand Mother	4	
		Other	5	
2	Age of respondent			
3	Marital status	Married	1	
		Divorced	2	
		Windowed	3	
		Widower	4	
4	Level of education	Illiterate	1	
		Primary	2	
		Secondary	3	
		Colleges	4	
5	Mother's/Caretaker's main occupation:	House wife	1	
		Business	2	
		Government employee	3	
		Employee of private organization	4	
		Causal labor	5	
6	Household headed	Father	1	
		Mother	2	
		Grand father	3	
		Grand father	4	
		Other	5	
7	Type of the living house	Hut	1	
		Iron sheet	2	
		Concrete	3	

		Other	4	
8	Number of household members			
9	Number of f under five years old			
10	How many rooms are there in your house			
SECTION B: INFORMATION OF PREVALENCE, KNOWLEDGE, ATTITUDE OF & PRACTICES OF DIARRHEAL DISEASE				
11	Has any child experienced any episode of diarrhea any time in the past 2 weeks (Past 14 days)?	Yes	1	
		No	2	
12	If yes, what was the age of the child in months?	0-11	1	
		12-23	2	
		24-35	3	
		36-47	4	
		48-59	5	
13	Where do you seek for treatment?	Traditional healer	1	
		Prayer-Sheikh	2	
		Purchase medicine from Pharmacy	3	
		Health facility	4	
		No action taken /wait to subside	5	
		Home treatment with traditional remedies	6	
14	Who made decision from your household to take the child to hospital?	Husband		
		Wife		
		Grand mother		
		Grand father		
		Other		
15	Was there any problem to reach the health facility?	Yes	1	
		No	2	

16	If no mention the problem	Transportation problem		
		lack of money		
		Security		
		Other		
17	Do you understand what diarrhea is?	Yes	1	
		No	2	
18	What are the main signs/symptoms of diarrhea that you know of?	Three or more unformed stools within a day		
		repeated Vomiting		
		Severe dehydration within very short time		
		Abdominal Cramps		
		Blood in Stoll		
		Other		
19	What do you think causes diarrhea among children under 5 years?	Indigestible foods		
		Teething		
		Worm infection		
		Germ infection		
		Weather		
		Spirits		
		Others		
20	What do you think spreads diarrhea among children under 5 years?	Drinking dirty water		
		Eating contaminated food		
		Flies/Insects		
		Poor hygiene		
		Weather		
		Spirits		
		Other		
21	What is the most common childhood illness that you know of?	Diarrhea		
		HIV/AIDS		
		Malaria		
		Trauma (injuries)		

		Respiratory diseases		
		Anemia		
		Skin disease		
		Others		
		Don’t know		
22	Do you think diarrhea is a hazard to the health of children under 5 years?	Yes	1	
		No	2	
23	According to you, how can diarrhea be prevented?	Wash hands more frequently	1	
		Cooking toughly	2	
		Cover prepared food	3	
		Cleanliness (dishes, utensils)	4	
		House cleanliness	5	
		Others	6	
		Don’t know	7	
SECTION C: RISK FACTORS AND PREVENION MEASURES OF DIARRHEA DISEASE				
24	What is the main source of drinking water for this household?	Pipe	1	
		Borehole	2	
		Shallow well	3	
		Vendor water	4	
25	Do you do anything to make water safer to drink?	Yes	1	
		No	2	
26	What do you usually do to make the water safer to drink?	Boiling	1	
		Chlorination	2	
		Filtration	3	
		Let it stand and settle	4	
		I don’t use any method	5	
		Others (specify)……	6	
27	Why do you use the above method	I don’t know other option	1	

	to make your water safer for drinking?	The method is effective	2	
		I don't know	3	
		Others (specify) ……..	4	
28	Why don't you treat your drinking water	Costs	1	
		Bad taste and smelly of treated water	2	
		I believe water is safe from the source	3	
		I am used to drink untreated, nothing happen to us	4	
		I don't know	5	
		Others	6	
29	Do you store water for drinking separately from water for other domestic purposes?	Yes	1	
		No	2	
		Not Sure	3	
30	What kind of utensils do you use for storing water?	Bucket with a lid	1	
		Bucket without a lid	2	
		Small pans	3	
		Gerry cans	4	
Sanitation and Hygiene:				
31	Do you have a latrine?	Yes	1	
		No	2	
32	Do you use latrines frequently?	Yes, all the time	1	
		Yes, sometimes	2	
		No	3	
33	Which type of latrine do you use?	Bit latrine	1	
		Modern flush toilet	2	
34	Is it private or public?	Private	1	
		Public	2	
35	How often is the latrine cleaned?	Every time it is spoiled	1	
		Every day	2	

		1-2 times a week	3	
		Not cleaned	4	
36	How many people use the latrine?			
37	***(If No in Q31 and/or Q32)*** Where do you normally you defecate?	……		
38	Are your children able to use the latrine on their own?	Yes	1	
		No	2	
39	What care is given to children after going to toilet?	With water	1	
		With paper	2	
		Other	3	
		Not clean at all	4	
40	How do you dispose of the fecal matter?	Buried	1	
		Put in a latrine	2	
		Thrown away in open surrounding	3	
		Other	4	
41	When do you wash hands?	After using the toilet	1	
		Before meals	2	
		Before cooking/preparing food	3	
		Others	4	
42	Do you use soap?	Yes	1	
		No	2	
Breast feeding and vaccination:				
43	Is the child currently being breastfed?	Yes	1	
		No	2	
44	Is or was the child been exclusively breastfed in the first six month of his/her life?			
45	If the child less than 6 months old, has he or she been exclusively been breastfeeding so far?			
46	How long after birth was the child			

	introduced other foods to other food?			
47	Do you know that breastfeeding adequately reduces infections in a child?	Yes	1	
		No	2	
48	Nutritional status of child by using MUAC	Severe acute Malnutrition (<11.5cm) or Oedema	1	
		Moderate acute Malnutrition (>11.5cm-<12.5cm)	2	
		Normal (>12,5cm	3	
49	Has the child been vaccinated against measles?	Yes	1	
		No	2	

APPENDIX IV: FOCUS GROUP DISCUSSION GUIDE

I would like to thank each of you for agreeing to be a part of this focus group discussion. My name is **Mohamud Hersi**, a student from the University of Nairobi, School of Public Health.

My colleague here is called …… He/she will help in taking notes during this discussion. The purpose of conducting this discussion is to assess ***the prevalence of diarrheal disease and associated factors among children under 5 years in internally displaced populations of Hodan District, Somalia***.

. We would wish to inform you that there are no wrong or right answers in this discussion. Please be assured that your personal details or what you say as a person will not be used at any time. What you say is therefore confidential and anonymous. This discussion will also be anonymous – your names will not be recorded in the notes; rather we shall assign codes to the names. You are therefore encouraged to participate actively and to feel free during the discussion. Kindly also respond to the questions with sincerity.

Water Sanitation and Hygiene (WASH)

1. Where does the families living in this camp get water for their households? ***Probe:*** Main sources of water and the proximity to the water sources, ease of getting the water at the source, cost of water
2. How do members of the community in this IDP camp handle the water they use for drinking? ***Probe:*** Is the water the same as the one used for other household chores? Is the water treated? If yes, is it treated at the household or at the source?
3. What can you say about the safety of the water your household uses for drinking? ***Probe:*** Do they feel it is safe? Why do they think it is safe/not safe? What are they doing about its safety? In this community what are some of the reasons why people treat/don't treat their drinking water?
4. How is water stored in most households in this camp? Is it stored separately from water for other domestic purposes? What kind of facilities are mainly used for water storage? Why are the facilities preferred for storing water by the community members?

5. How can you rate the sanitation and hygiene standards in your community? What are the reasons for the rating? Are children encouraged to wash their hands before and after eating/going to toilet?
6. Do you think that infants and children's faeces can cause health problems? How are infants and children's faeces disposed of in this community?
7. What is the most common childhood illness in this camp?
8. What are the main sanitation & hygiene problems/issues affecting children's health in this community?

Breastfeeding and Vaccination

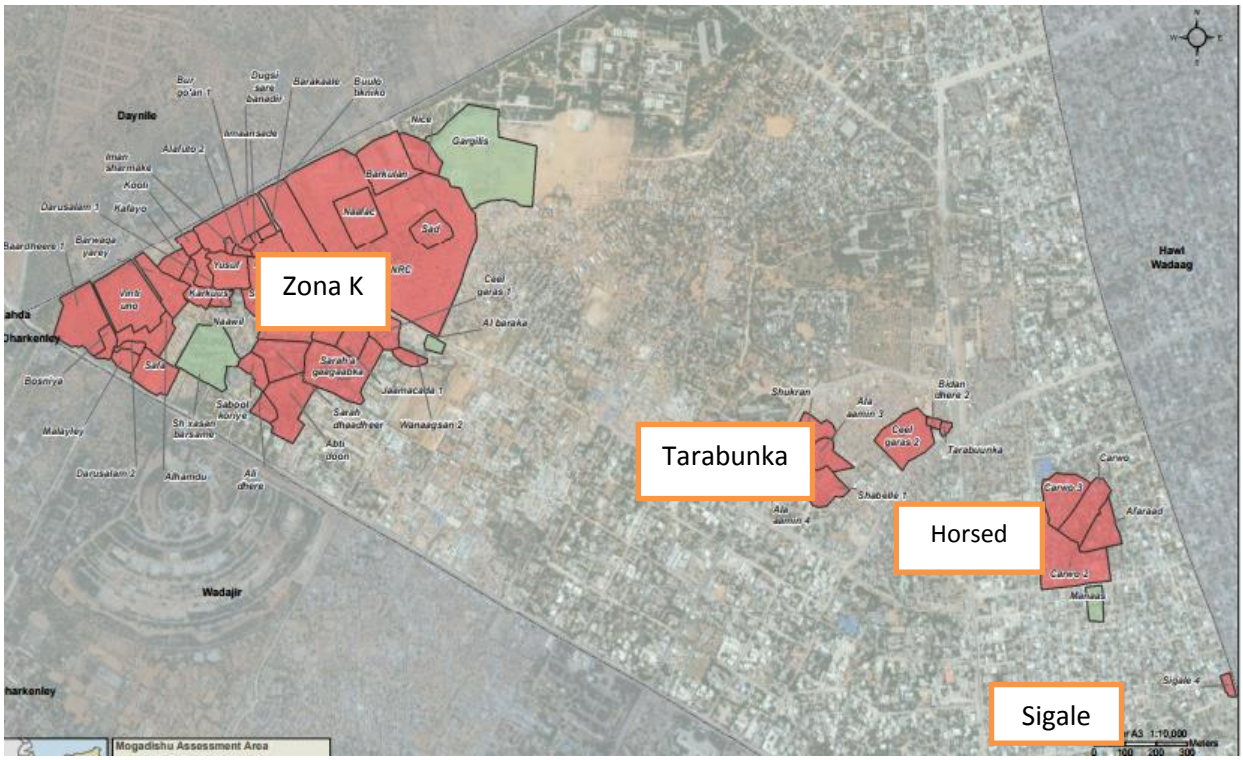
1. In your opinion, what proportion of children in this community can you say get breastfed from the first hour of life? Why do you think this is so?
2. In your opinion, what proportion of children in this community can you say get breastfed from within the first 3 days of life? What do you give during this period? For those who do not give colostrum, what are the reasons? What are the reasons and what do they feed children between 2 and 3 days?
3. In this community, at what age do majority of mothers introduce other feeds to infants apart from breast-milk? For how long do mothers exclusively breastfeed without giving any other liquids or solid foods?
4. What is the understanding in this community exclusive breastfeeding among women? When should mothers stop breastfeeding (If several ages are given, do proportional piling to establish proportions for different periods)?
5. How do members of this community view immunization of children against diseases? Does it affect how they expose their children to immunization? If it affects, how does it affect the uptake of immunization services among children in the community members?

Health seeking behavior

1. What is the general understanding of diarrhoea among children in this community? What do people understand causes it? What do they understand spreads it? Do they think diarrhea is a hazard to the child's health?
2. How do members of this community handle episodes of diarrhoea among children under 5 years? What are the actions they take to seek treatment? How long does it take before the next action?
3. Who mainly makes decisions on treatment of sick children in most of the households in this community? What factors influence a mother's decision to take her child for treatment?
4. In this community, what home remedies do people use for diarrhoea cases among children under 5 years? What food items are usually given to the diarrhea patient?
5. What can you say about the community reporting of childhood illnesses in this community? Probe separately for reporting to community health workers and health facilities? Are there health services in the community related to diarrhoea cases? If yes, which services? How do these social support systems enhance or undermine appropriate care of the sick child?

APPENDIX V: MAPS OF STUDY LOCATION

Map A: Hodan Disrecit



Map B: ID camps in Hodan District

LIFAAQA VI: Foomka Sharaxaadda Ogolaanshaha Xog-Ururinta Ee Ka Qeyb-Galayaasha Su'aalaha

Nambarka ka qaybgalaha _____ Taariikhda_____

Horudhac:

Anigoo ah Maxamuud Xirsi oo ka socda Dugsiga Caafimaadka Bulshadda ee Jaamacadda Nairobi. Waxaan daraasad cilmiyeed ku sameynayaa baahsanaanta shuban biyoodka iyo sababaha halista ah ee keena shubanka caruurta ku dhaqan xeryaha barakacayaasha ee Degmada Hodan, Gobalka Banaadir.

Ujeedada foomkan ogolaanshaha waa inaan ku siino macluumaadka aad u baahan doonto si ay kaaga caawiso inaad go'aansato haddii aad tahay qof ka qayb qaadanaya daraasadda iyo in kale. Adigu xor baad u tahay in aad i weydiiso wixii su'aalo ah ee ku saabsan ujeedada cilmi-baarista, maxaa dhacaya haddii aad ka qaybgasho daraasadda, khatarta suurtagalka ah iyo faa'iidooyinka, xuquuqda tabarucaha, iyo wax kasta oo kale oo ku saabsan cilmi-baarista oo aan kala cadeeyn. Markaan ka jawaabno dhammaan su'aalahaaga ku qanacsanaantaada, waxaad go'aansan kartaa in aad daraasaddan ka qeeyb qaadato ama aad iska diido. Nidaamkan waxaa loo yaqaan ‘ogolaansho la wargeliyay'. Markaad fahamto oo aad ogolaato inaad ku ka mid noqotid daraasaddan, waxaan ku weydiin doonaa inaad saxiixdo foomkan. Waa inaad fahamtaa mabaadi'da guud ee khuseeya dhammaan ka-qeybgalayaasha cilmi baarirtan caafimaadka ah:

i) Go'aankaaga ka qeybgalka waa gebi ahaanba waa mid ikhtiyaari ah

ii) Waxaad ka noqon kartaa ka qeeybqaadashada daraasaddan wakhti kasta adigoo aadan bixin wax sabab ah.

iii) Diiditaanka inaad ka qaybqaadato cilmibaarista kuma saameyn doonto adiga. Waxaanu ku siin doonaa nuqul foomkan ah si aad u diiwaangashatid.

Miyaan sii wadi karaa? HAA / MAYA

Daraasaddan waxaa ogolaaday gudiaga anshaha ee Jmacadda Nairobi qeybteeda isbitalka kenyaata.

Gudiga bartikoola ee celmi barista numberka. _____

MAXAY KU SAABSAN TAHAY CILMI-BAARISTAN?

Waxaan waraysan doonaa daryeel-bixiyeyaasha carruurta ka yar 5-ta sano ee dadka gudaha ku barokacay ee deggan degmadda Hodan ee gobalka Banaadir . Ujeedada daraasaddan ayaa ah in la qiimeeyo isirrada halista ah ee cudurrada shubanka ah ee carruurta ka yar 5 sano ee ku nool xeryaha barokacayaasha ee Degmada Hodan ee Gobolka Banaadir ee Soomaaliya. Wadar ahaan 327 daryeele ayaa loo dooran doonaa inay ka qayb qaataan daraasaddan. Sidaa daraadeed waxaan si naxariis leh u codsaneynaa ogolaanshahaaga si aad uga qeyb-qaadatid ka qaybgalka daraasaddan.

MAXAAD DHICI DOONA HADDII AAD GO'AANSATO INAAD KA QEYB GASHID CILMI-BAARISTAN?

Haddii aad ogolaato inaad ka qayb-qaadato daraasaddan, waxyaabahan soo socda ayaa dhici doona:

Waxaa ku wareeysan doona qof loo tababaray daraasaddan, wuxuuna kugu wareysan doonaa goob gaar ah oo aad ku dareemi kartid inaad si fiican uga jawaabto su'aalaha. Wareysigu wuxuu socon doonaa qiyaas ahaan 15-20 daqiiqo. Wareysiga wuxuu dabooli doonaa mowduucyada sida faahfaahintaada shakhsi ahaaneed, sida da'da, waxbarashada,aqoonta guud, dabeecadda iyo hab-dhaqanka cudurka shubanka, sababaha halista iyo tallaabooyinka ka hortagga shubanka sida (isha biyaha la cabo, dawaynta biyaha,) dhaqannada fayadhowrka

iyo nadaafadda, naas-nuujinta iyo tallaalka. Inta lagu jiro waraysiga, jawaab kasta oo ka socota daryeel-bixiyaha ayaa loo qorayaa sida ku qoran su'aalaha la qorsheeyay.

MA JIRAAN WAX KHATAR AH, DHIBAATOOYIN, JAHAWAREER LA XIRIIRA CILMI-BAARISTAN?

Cilmi-baarista caafimaadku waxay awood u leedahay inay soo bandhigto khataraha dhanka maskaxda, bulshada, shucuurta iyo mid jireedba. Dadaal ayaa la gelin doonaa si loo yareeyo dhibaatada. Khatarta halis ah oo ku iman karta daraasadda waa luminta asturnaanta. Waxaanu si qarsoodi ah u hayn doonaa wax kasta oo aad noo sheegto. Waxaan isticmaali doonaa lambarka dahsoon si aan ugu aqoonsano keydka macluumaadka kumbuyuutarka ee lambarka sirta ah lagu xiray, waxaanan ku hayn doonaa dhammaan waraaqaheena sanduuq xiran. Si kastaba ha noqotee, nidaamka ilaalinta sirtaada ayaa noqon karta mid gebi ahaanba sugan, hasa ahaatee waa suurtogal in qof uu ku ogaan karo inaad daraasaddan ku jirtay oo aad ka qeyb qaadatay.

Sidoo kale, ka jawaabidda su'aalaha wareysiga ayaa laga yaabaa inay ku dhibaan adiga. Haddii ay jiraan wax su'aalo aadan rabin inaad ka jawaabto, waad ka boodi kartaa. Waxaad xaq u leedahay inaad diido wareysiga ama wixii su'aalo ah ee lagu waydiinayo inta lagu jiro waraysiga. Waxaan sameyn doonaa wax kasta oo aan awoodno si aan u hubino in waraysigan loo fuliyo si gaar ah. Intaas waxaa dheer, dhammaan wareysiyeyaashu waa xirfadlayaal leh tababar gaar ah. Sidoo kale, haysashada ilmo xanuunsan oo qaba cudurka shubanka ayaa noqon kara mid walaac leh. Haddii ay dhacdo dhaawac, caafimaad daro ama dhibaatooyin la xiriira daraasaddan, la xiriir shaqaalaha daraasaddan fulinaya. Shaqaalaha daraasaddu waxay daaweyn doonaan xaalado yaryar ama waxay kuu gudbin karaan xarumo caafimaaqd hadiiba loo baahdo.

MA JIRAAN WAX FAA'IIDO AH EE KA QEYBGALKA CILMI-BAARISTAN?

Waxaa laga yaabaa inaad ka faa'iideysan karto ka qaybgalka daraasaddan adigoo helaya waxbarasho caafimaad oo bilaash ah. Waxaa kale oo aad si macquul ah uga faa'iidi kartaa in macluumaadka aad bixiso ay naga caawineyso in aan si fiican u fahanno saameynta cudurada shubanka iyo weliba aqoonta, dabeecada iyo ficillada cudurrada shubanka ee carruurta ka yar 5-ta sano ee ku nool xeryaha barokacayaasha ee degmada Hodan, gobolka Banaadir, Soomaaliya. Xogtani waxay qayb ka noqoneeysaa sayniska iyo siyaasad dejiyayaasha.

WAX LACAG MIYAA LA IGA DOONAYAA SI AAN QEYB UGA NOQDO CILMI-BAARISTAN?

Looma baahna inaad bixiso wax lacag si aad uga qaybqaadato daraasaddan.

MA LAGUU CELINAYAA WIXII QARASH AH OO AAD ISTICMAASHAY ?

Dhammaan ka qaybgalayaashu waa loo celinayaa wixii qarash ah oo ay u adeegsadeen wicitaan dhanka telefoon ah inta lagu guda jiray daraasaddan.

WAA MAXAY HADDII AAD QABTO SU'AAL MUSTAQBALKA?

Haddii aad qabtid su'aalo dheeraad ah ama walaac ku saabsan ka qaybgalka daraasaddan, fadlan aniga ila soo xiriir lambarka taleefanka gacanta ee ku qoran bogga ugu dambeeya.

Wixii macluumaad dheeraad ah oo ku saabsan xuquuqda aad leedahay ka-qeybqaate ahaan, waxaad la xiriiri kartaa Xoghayaha / shir-gudoonka, Isbitaalka ummadda ee Kenya qeebta Jaamacadda Nairobi. Telefan numberka 0735-274288 / 0721-665077 ama emailka uonknh_erc@uonbi.ac.ke .

WAA MAXAY DOORASHOOYINKAAGA KALE?

Go'aankaaga ka qeybqaadashada cilmi-baarista waa ikhtiyaari. Waxaad xor u tahay in aad diiddo ka qaybgalka daraasadda waadna ka noqon kartaa daraasadda wakhti kasta.

FOOMKA OGOLAANSHIYAHAY (ORAAHDA OGOLAANSHIYAHAY) EE KA JAWAABAYAASHA SU'AALAHA.

Waan aqriyay foomkaan oggolaanshiyaha ama waa la ii akhriyey. Waxaan fursad u helay inaan ka doodo daraasaddan cilmi-baarista. Su'aalaheyga ayaa la igu jawaabay luqad aan fahmi karo. Khatarta iyo faa'iidooyinka ayaa la ii sharaxay. Waxaan fahamsanahay in ka qayb galkayga daraasaddan ay tahay mid ikhtiyaari ah iyo in aan dooran karo inaan ka laabto wakhti kasta. Waxaan fahamsanahay in dadaal la sameyn doono si loo hayo macluumaadka ku saabsan aqoonsigayga shakhsi ahaaneed.

Markaan saxiixo foomkan ogolaanshaha, ma aanan bixinin mid ka mid ah xuquuqda sharciga ah ee aan u leeyahay ka qaybqaadashada daraasaddan cilmibaaris

Waxaan oggolahay inaan ka qayb qaato daraasaddan cilmibaarista Haa / Maya

Waxaan oggolahay inaan bixiyo meel la igala soo xiriiri karo Haa / Maya

Saxeexa ka qaybgalaha / suul saar _____ Taariikh _____

Qoraalka Cilmi-baarista

Anigoo ah qofka hoos ku saxiixan, waxaan si buuxda u sharxay faahfaahinta muhiimka ah ee daraasaddan cilmibaarista ee kaqeybgalaha sare ee kor ku xusan waxaanna aaminsanahay in kaqaybgalaha uu fahmay oo uu si xor ah u dhiibtay ogolaanshihiisa.

Magaca Cilmi baaraha: _____Taariikhda: _____

Saxiixa

_____

Doorka daraasaddan: _____ (Shaqaalaha daraasadda ee u sharxay kaqeybgalaha ogoloaanshiyaha ka mid noqoshaha daraasaddan).

Wixii macluumaad dheeraad ah, su'aalaha ama weydiimo ah waxaad la xiriiri kartaa:

Baaraha: Dr Mohamud Mohamed Hersi – arday wado Caafimaadka Bulshadda qeebta labaad ee Iskuul Jaamacadda Caafimaadka Bulshadda eeJaamacaadda Nairobi. Taleefanka +252 615057981, Email: mmmhersi@gmail.com

Marqaati (Haddii markhaati loo baahan yahay, markhaati waa qof ay raali ka yihiin cilmibaaraha iyi ka qaybgalaha)

Magaca _____ _____Xiriir: _____

Saxeexa_____suul-saar :_____ Taariikh : _____

LIFAAQA VII: FOOMKA OGGOLAANSHIYAHA KA QAYB-GALAYAASHA DOODA KOOXAHA

Lambarka ka-qaybgalaha _____ Taariikhda_____

Horudhac:

Magaceygu waa Maxamuud Xirsi oo ka socda Dugsiyada Caafimaadka Bulshadda, Jaamacadda Nairobi. Aniga waxaan daraasad cilmiyeed ku sameynayaa baahsanaanta shuban biyoodka iyo sababaha halista ah ee keena shubanka ee caruurta ku dhaqan xeryaha barakacayaasha ee Degmada Hodan, Gobalka Banaadir.

Ujeedada foomkan ogolaanshaha waa inaad ku siiso macluumaadka aad u baahan doonto si ay kaaga caawiso inaad go'aansato haddii aad tahay qof ka qayb qaadanaya daraasadda. Waxaad si xor ah u waydiisaa wixii su'aalo ah ee ku saabsan ujeedada cilmi-baarista, maxaa dhacaya haddii aad ka qaybgasho daraasadda, khatarta suurtagalka ah iyo faa'iidooyinka, xuquuqdaada tabaruce, iyo wax kasta oo kale oo ku saabsan cilmi-baarista ama foomkan ee aan caddayn. Markaan ka jawaabno dhammaan su'aalahaaga ku qanacsanaantaada, waxaad go'aansan kartaa in aad daraasadda ku jirto ama aadan ku jirin. Nidaamkan waxaa loo yaqaan 'ogolaansho la wargeliyay'. Markaad fahamto oo aad ogolaato inaad ku jirto daraasadda, waxaan ku weydiin doonaa inaad saxiixdo magacaaga foomkan. Waa inaad fahamtaa mabaadi'da guud ee khuseeya dhammaan kaqeybgalayaasha cilmi-baarista caafimaad:

i) Go'aankaaga kaqeybgalka waa gebi ahaan ikhtiyaari ah. ii) Waxaad ka noqon kartaa daraasadda wakhti kasta iyada oo aanad bixin waxsabab ah ka noqoshada. iii) Diiditaanka inaad kaqaybqaadato cilmibaarista kuma saameyn doonto adiga. Waxaanu ku siin doonaa nuqul foomkan ah diiwaanadaada.

Miyaan sii wadi karaa? HAA / MAYA

Daraasaddan waxaa ogolaaday gudihaga anshaha ee Jmacadda Nairobi qeybteeda isbitalka kenyaata.

Gudiga bartikoola ee celmi barista numberka. _____

MAXAY KU SAABSAN TAHAY CILMI-BAARISTAN?

Waxaan fulin doonaa wareysi kooxeed oo aan la yeelan doono daryeel-bixiyeyaasha carruurta ka yar 5 sano ee Dadka Gudaha Ku Barokacay ee deggan Degmadda Hodan ee Gobalka Banaadir. Ujeedada daraasaddan ayaa ah in la qiimeeyo isirrada halista ah ee cudurrada shubanka ah ee carruurta ka yar 5 sano ee ku nool xeryaha barokacayaasha ee Degmada Hodan ee Gobolka Banaadir ee Soomaaliya. Wadar ahaan 327 daryeele ayaa loo dooran doonaa inay ka qaybqaataan daraasaddan. Sidaa daraadeed waxaan si naxariis leh u codsaneynaa ogolaanshahaaga si aad uga qeyb-qaadaitid ka qaybgalka daraasaddan.

MAXAAD DHICI DOONA HADDII AAD GO'AANSATO INAAD KA QEYB GASHID CILMI-BAARISTAN?

Haddii aad ogolaato inaad ka qayb-qaadato daraasaddan, waxyaabahan soo socda ayaa dhici doona:

Waxaa ku wareeysan doona qof loo tababaray wuxuuna kugu wareysan doonaa goob gaar ah oo aad ku dareento inaad si fiican uga jawaabto su'aalaha. Wareysigu wuxuu socon doonaa qiyaas ahaan 40-50 daqiiqo. Wareysiga wuxuu dabooli doonaa mowduucyada la xiriira biyaha, nadaafadda iyo fayo-dhowrka, naas-nuujinta, dabeecadda baadigoobka daryeelka caafimaadka. Inta lagu guda jiro wareeysi kooxeedka, cilmi-baaraha wuuxuu ururin doonaa wixii war ah, isla mar ahaantiina dib ayuu u milicsan doonaa wixii laga wada hadlay si uu u xaqiijiyo in dhammaan wixii xog ah la wada qabtay. Kaaliyaha cilmi-baaraha ayaa xaqiijin doona dhameystirnaanta agabka isagoo dib u eegis ku sameeyn doona wixii laga

wada hadlay isagoo kaashanaya daryeel bixiyeyaasha, hogaamiyeyaasha fikradaha iyo shaqaalaha caafimaadka.

MA JIRAAN WAX KHATAR AH, DHIBAATOOYIN, JAHAWAREER LA XIRIIRA CILMI-BAARISTAN?

Cilmi-baarista caafimaadku waxay awood u leedahay inay soo bandhigto khataraha dhanka maskaxda, bulshada, shucuurta iyo mid jireedba. Dadaal ayaa la gelin doonaa si loo yareeyo Khatarta halis ah oo ku iman karta daraasadda waa luminta asturnaanta. Waxaanu si qarsoodi ah u hayn doonaa wax kasta oo aad noogu sheegayso ah. Waxaan isticmaali doonaa lambarka dahsoon si aan ugu aqoonsano keydka macluumaadka kumbuyuutarka ee lambarka sirta ah lagu xiray, waxaanan ku hayn doonaa dhammaan waraaqaheena waraaqdaheena meel xiran. Si kastaba ha noqotee, nidaamka ilaalinta sirtaada ayaa noqon karta mid gebi ahaanba sugan, hasa ahaatee waa suurtogal in qof uu ku ogaan karo inaad daraasaddan ku jirtay.

Sidoo kale, ka jawaabidda su'aalaha wareysiga ayaa laga yaabaa inay ku dhibaan adiga. Haddii ay jiraan wax su'aalo aadan rabin inaad ka jawaabto, waad ka boodi kartaa. Waxaad xaq u leedahay inaad diido wareysiga ama wixii su'aalo ah ee lagu waydiinayo inta lagu jiro waraysiga. Waxaan sameyn doonaa wax kasta oo aan awoodno si aan u hubino in waraysigan loo sameeyo si gaar ah. Intaas waxaa dheer, dhammaan wareysiyeyaashu waa xirfadlayaal leh tababar gaar ah. Sidoo kale, haysashada ilmo xanuunsan oo qaba cudurka shubanka ayaa noqon kara mid walaac leh. Haddii ay dhacdo dhaawac, jirro ama dhibaatooyin la xiriira daraasaddan, la xiriir shaqaalaha daraasadda isla markiiba lambarka lagu bixiyey dhamaadka dukumeentigan. Shaqaalaha daraasaddu waxay ku daaweyn doonaan xaalado yaryar ama waxay kuu gudbin karaan xarumo caafimaaqd hadiiba loo baahdo.

MA JIRAAN WAX FAA'IIDO AH EE KA QEYBGALKA CILMI-BAARISTAN?

Waxaa laga yaabaa inaad ka faa'iideysan karto ka qaybgalka daraasaddan adigoo helaya waxbarasho caafimaad oo bilaash ah. Waxaa kale oo aad si macquul ah uga faa'iidi kartaa in macluumaadka aad bixiso ay naga caawineyso in aan si fiican u fahanno saameynta cudurada shubanka iyo weliba aqoonta, dabeecada iyo ficillada cudurrada shubanka ee carruurta ka yar 5-ta sano ee ku nool xeryaha barokacayaasha ee Degmada Hodan, Gobolka Banaadir, Soomaaliya. Xogtani waa qayb ka mid ah sayniska iyo siyaasad dejiyayaasha.

WAX LACAG MIYAA LA IGA DOONAYAA SI AAN UGA QEYBGALO CILMIBAARISTAN?

Looma baahna inaad bixiso wax lacag si aad uga qaybqaadato daraasaddan.

MA LAGUU CELINAYAA WIXII QARASH AH OO AAD ISTICMAASHAY?

Dhammaan ka qaybgalayaashu waa loo celinayaa wixii qarash wicitaan telefoon ah oo aay adeegsadeen inta lagu guda jiray daraasaddan

WAA MAXAY HADDII AAD QABTO SU'AAL MUSTAQBALKA?

Haddii aad qabtid su'aalo dheeraad ah ama walaac ku saabsan ka qaybgalka daraasaddan, fadlan aniga ila soo xiriir lambarka taleefanka gacanta ee ku qoran bogga ugu dambeeya.

Wixii macluumaad dheeraad ah oo ku saabsan xuquuqda aad leedahay ka-qeybqaate ahaan, waxaad la xiriiri kartaa Xoghayaha / shir-gudoonku, Isbitaalka Ummadda ee Kenyatta-qeebta Jamacadda Nairobi. Telephon numberka 0735-274288 / 0721-665077 ama email uonknh_erc@uonbi.ac.ke .

WAA MAXAY DOORASHOOYINKAAGA KALE?

Go'aankaaga kaqeybqaadashada cilmi-baarista waa ikhtiyaari. Waxaad xor u tahay in aad diiddo ka qaybgalka daraasadda waadna ka noqon kartaa daraasadda wakhti kasta.

FOOMKA OGOLAANSHIYAHA (ORAAHDA OGOLAANSHIYAHAY) EE KA QEYB-GALAYAASHA DOOD-KOOXEEDKA

Waan aqriyay foomkaan oggolaanshiyaha ama waa la ii akhriyey. Waxaan fursad u helay inaan ka doodo daraasaddan cilmi-baarista. Su'aalaheyga ayaa la igu jawaabay luqad aan fahmi karo. Khatarta iyo faa'iidooyinka ayaa la ii sharaxay. Waxaan fahamsanahay in ka qayb galkayga daraasaddan ay tahay mid ikhtiyaari ah iyo in aan dooran karo inaan ka laabto wakhti kasta. Waxaan fahamsanahay in dadaal la sameyn doono si loo hayo macluumaadka ku saabsan aqoonsigayga shakhsi ahaaneed.
Markaan saxiixo foomkan ogolaanshaha, ma aanan dhiibin mid ka mid ah xuquuqda sharciga ah ee aan u leeyahay ka qaybqaadashada daraasaddan cilmibaadhista.
Waxaan oggolahay inaan ka qayb qaato daraasaddan cilmibaarista Haa / Maya
Waxaan oggolahay inaan bixiyo meel la igala soo xiriiri kari Haa / Maya

Saxeexa ka qaybgalaha / suul saar _____ Taariikh _____

Qoraalka Cilmi-baarista
Anigoo ah qofka hoos ku saxiixan, waxaan si buuxda u sharxay faahfaahinta muhiimka ah ee daraasaddan cilmibaarista ee kaqeybgalaha sare ee kor ku xusan waxaanna aaminsanahay in kaqaybgalaha uu fahmay oo uu si xor ah u dhiibtay ogolaanshihiisa.
Magaca Cilmi baaraha: _____Taariikhda: _____
Saxiixa
_____
Doorka daraasaddan: _____ (Shaqaalaha daraasadda ee u sharxay kaqeybgalaha ogoloaanshiyaha ka mid noqoshaha daraasaddan).

Wixii macluumaad dheeraad ah, su'aallo ama weydiimo ah waxaad la xiriiri kartaa:

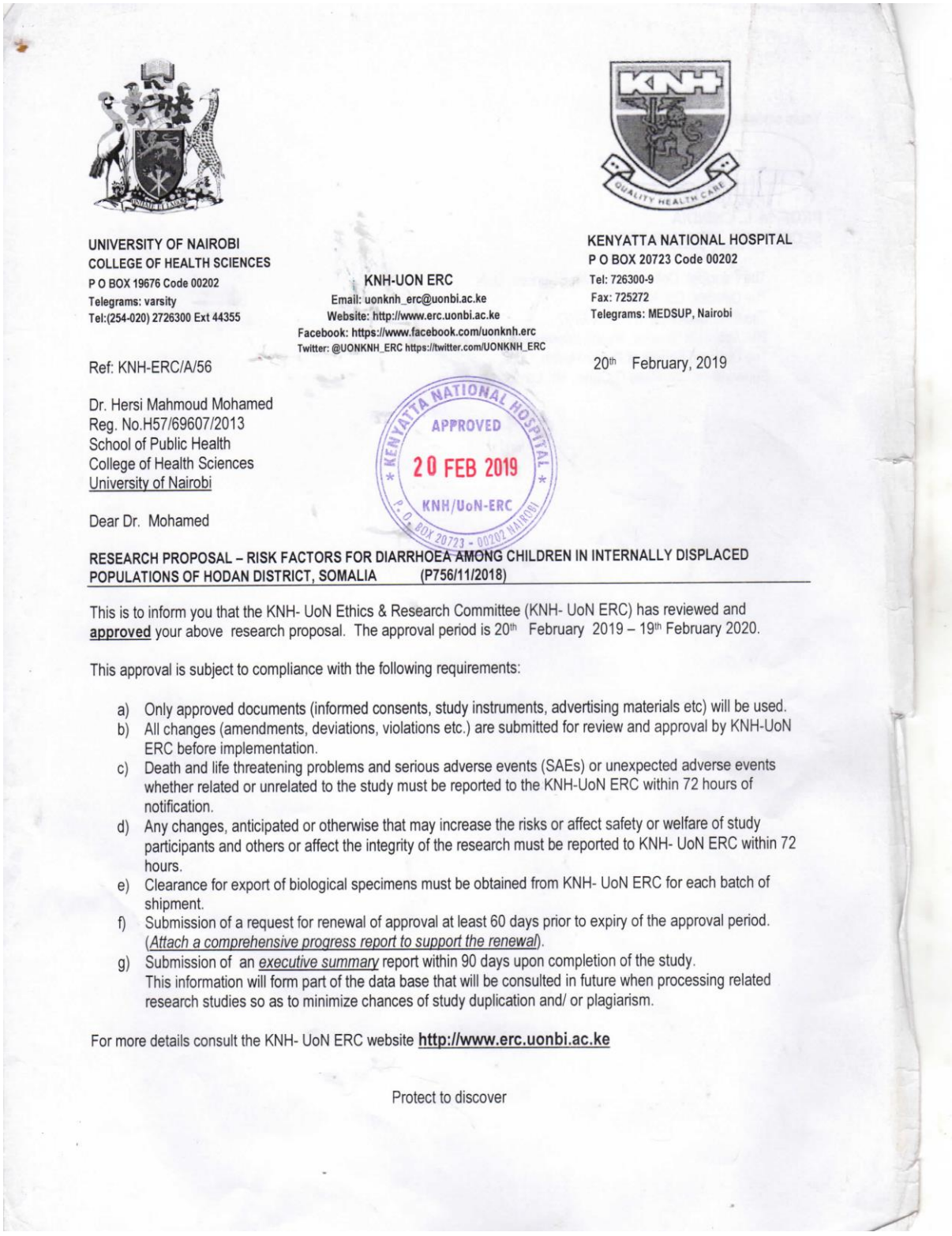
Baaraha: Dr Mohamud Mohamed Hersi – arday wado caafimaada Bulshadda qeebta labaad ee Iskuul Jaamacadda Caafimaadka dBulshadda Kaamacadda Nairobi. Taleefoonka +252 615057981 ama Email: mmmhersi@gmail.com

Marqaati (Haddii markhaati loo baahan yahay, markhaatigu waa qof ay raali ka wada yihiin cilmibaaraha iyo ka qaybgalaha)

Magaca _____ _____Xiriir: _____

Saxeexa_____suul-saar :_____ Taariikh : _____

APPENDIX VIII- ETHICAL APPROVAL FROM KENYATTA NATIONAL HOSPITAL AND UNIVERSITY OF NAIROBI ETHICS AND RESEARCH COMMITTEE



UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/56

20th February, 2019

Dr. Hersi Mahmoud Mohamed
Reg. No.H57/69607/2013
School of Public Health
College of Health Sciences
University of Nairobi

KENYATTA NATIONAL HOSPITAL
APPROVED
20 FEB 2019
KNH/UoN-ERC
P.O. BOX 20723 - 00202 NAIROBI

Dear Dr. Mohamed

RESEARCH PROPOSAL – RISK FACTORS FOR DIARRHOEA AMONG CHILDREN IN INTERNALLY DISPLACED POPULATIONS OF HODAN DISTRICT, SOMALIA (P756/11/2018)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 20th February 2019 – 19th February 2020.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
e) Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
f) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
g) Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website **http://www.erc.uonbi.ac.ke**

Protect to discover

Yours sincerely,

PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
The Director, School of Public Health, UoN
Supervisors: Dr. Rose O.Opiyo, Mr. Lambert Nyabola,

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APPENDIX IX: ETHICAL APPROVAL FROM RESEARCH AND ETHICS REVIEW COMMITTEE-MINISTER OF HEALTH AND HUMAN SERVICES

Somali Federal Republic
Ministry of Health & Human Services

RESEARCH & ETHICS REVIEW COMMITTEE

ETHICAL APPROVAL

This is to certify that the proposal submitted by:

Principal investigator: **Mohamud Mohamed Hersi**

Reference No:
MOH&HS/DGO/0700/Mar 2019

Full project Title:

Risk factors for diarrhea in internally displaced population of Hodan district, Mogadishu, Somalia.

To be undertaken in
Somalia

Starting Date: 07th Mar 2019 **Finishing Date: 30th April 2019**

For the proposed period of research
Has been approved by the Research & ethics committee at the Ministry of Health
On the 5th Mar 2019

for Director of Policy & Planning

Secretary

Chairman

Ministry of health, Somalia Tell: +252612375800 Email: dg@moh.gov.so