MANAGEMENT PRACTICES OF DIARRHOEAL DISEASE AND ENVIRONMENTAL RISK FACTORS AMONG CHILDREN OF ADOLESCENT MOTHERS IN NYANDO SUB-COUNTY IN KISUMU COUNTY

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University for an award of a degree or diploma in any other university or institution.

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DEDICATION

This thesis is dedicated to my father and mother for their zeal to education, their prayers and always showing me the way. To my son and siblings who have always been a source motivation.

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ABSTRACT

In Kenya, 1 in every 5 adolescents is either a mother or already pregnant. Teen mother face different challenges, one main challenge being lack of maternal skills. The study examined the Environmental risk factors and management practices of diarrheal disease among adolescent mothers in Kisumu County, Kenya. The study employed a cross-sectional study using mixed methods approach for data collection. The study targeted 454 adolescent mothers from which 294 adolescent mothers aged 15-19 years were determined using Cochrane's formula. Data was collected using questionnaires and focus group discussion and analysed using STATA version 16 and NVIVO version 12. Descriptive statistics were presented using frequency tables and figures. Binary logistic regression was done to determine the association between the independent and dependent variables (AOR, 95%CI; $p<0.05$). Diarrhoea prevalence here was higher (22.5%) than the national one (15%) and that 34% of the adolescent mothers had poor diarrhoea management practices. Further, number of children under-five in a household, bottle-feeding, and vaccination status were predictors of diarrhoea. Having a handwashing facility within the household also influenced the diarrhoea management practices. The study recommended that adolescent mothers should be sensitized about proper feeding practices, importance of vaccination and supporting sanitation and hygiene in the household level to reduce diarrhoea prevalence child under five. Thus, the results would be utilized to set interventions that support the adolescent mother with more information on proper diarrhoea management practices.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

BPS	Board of Postgraduate Studies
ICCM	Integrated community case management
JOOUST	Jaramogi Oginga Odinga University of Science and Technology
JOOTRH	Jaramogi Oginga Odinga Teaching and Referral Hospital
KDHS	Kenya Demographic Health Survey
MOH	Ministry of Health
NACOSTI	National Commission for Science, Technology, and Innovation
ORS	Oral Rehydration Solution
WHO	World Health Organization
U5	Under five

CHAPTER ONE: INTRODUCTION

1.1. Introduction

Annually, over 4 million diarrhea cases are recorded globally, causing about 2.2 million deaths, mostly in children aged below five years. This implies that 2.5 billion cases of diarrhea occur among children under five worldwide. Thus, ddiarrhoea accounts for 15% that is 1600 deaths of children under five years (Unicef, 2016). However, this incidence has been relatively stable over the past two decades (Unicef & WHO, 2017).

In sub-Saharan Africa (SSA), diarrheal diseases account for over 90% of mortalities in children below five years old. Every child in Africa is estimated to have five diarrhea episodes every year, and about 800,000 children die annually from diarrhea and dehydration (Unicef, 2016). By 2030, it is projected that about 4.4 million children under five years will die from infectious diseases annually, and that 60% of those deaths will occur in SSA (Murray *et al.*, 2014), even though Sustainable Development Goal (SDG) 3 aims at by 2030, all preventable deaths of newborns and children under the age of five will be eliminated (KDHS, 2014).

Nationally, the prevalence of diarrheal diseases in children under the age of five was 15%, a slight decrease from the 17% reported in KDHS 2008 (KDHS, 2014). Kenya is among the top five SSA countries with highest numbers of disability adjusted life years (DALYs = 794,310) despite changes from 2005 (Mulatya & Ochieng, 2020). In addition prevalence of diarrhoea cases in Nyando was at 15.2 % (Njuguna, 2016).

Diarrheal diseases among under-fives in poor communities, especially in developing countries, are major causes of malnutrition, delayed physical development, and early childhood mortality (Dodicho, 2016). Primary prevention involves the improvement of environmental sanitation and water quality, while secondary prevention involves early recognition of dehydration due to diarrhea and quick oral rehydration using oral rehydration salts solution (ORS) or suitable home accessible fluids (Munos *et al.*, 2010; Workie *et al.*, 2018a). Diarrheal disease management in children in resource-limited settings involves interventions like prevention and treatment of dehydration using ORS, provision of adequate nutritional support like early re-feeding during the acute episode, and provision of oral zinc therapy (Mokomane *et al.*, 2018; Unicef & WHO, 2017). Better-quality nutrition, enhanced breastfeeding, improved supplemental feeding, female

education, immunization against measles, and improvement in hygiene and sanitation, have been helped improve the mortality attributed to diarrhea (Black *et al.*, 2019).

Neonatal mortality has been shown to rise with decreasing mother's age; teenagers who give birth before the age of 15 are about five times more likely to die during pregnancy or childbirth than women in their twenties, partly due to physical immaturity (Manzi *et al.*, 2018). The health care seeking behaviours of the adolescents is poor due to barriers such as stigmatization, lack of social and family support, decision making autonomy, lack of financial resources, unfriendly environment and poor attitudes of health care providers towards the adolescents (Lotse, 2016; Pell *et al.*, 2013).

According to (KDHIS, 2022), the proportion of women aged between 15–19 who have ever been pregnant have increased with age, recording a prevalence of 3% and 31% among 15 years and 19 years of age respectively. In Kisumu county, as of the year 2020, the teenage pregnancy rate was recorded at 17% (Kisumu, 2021). In addition, Kisumu County reported 25,392 teen pregnancies between January 2019 to June 2020 (KDHIS, 2020) showing that there is a high number of vulnerable girls in the county. Of the 7 sub-counties in Kisumu, Nyando sub-county reported a high number of teenage pregnancies. Diarrhea is among the leading causes of illness in children below five years, and against a backdrop of less-empowered mothers in an environment that is highly prone to diarrheal diseases, there are high chances that the prevalence of diarrhea is high, against limited capacity to manage the same. Most studies on diarrhea have been done in the general population of mothers but not specifically to the adolescent mothers, and therefore there is limited literature on the management practices of diarrheal in children below five years, of adolescent mothers.

The purpose this was to show the connection between environmental risk factors and management practices of diarrhea among adolescent mothers in Kisumu County, Kenya

1.2. Statement of the Problem

The WHO listed diarrhea as the second leading cause of mortality of children under five years after pneumonia, with approximately 1.7 billion cases and around 525,000 deaths (WHO, 2018). This means an average of 8% of all the deaths in this age group worldwide, and it accounts for over 1,300 deaths of children each day, despite availability of simple, effective treatment (UNICEF, 2019). In Kenya, the prevalence of diarrhea was recently reported to be 14% (KDHIS, 2022) with the rate of deaths of ddiarrhoeal diseases Kenya having reached at 15,420 or 5.85%. (WHO, 2020b) with Nyando Sub-County having a prevalence of 19.1% (Njuguna, 2016). In addition, maternal factors like mother's age and education level have been reported to significantly explain child health outcomes (Njeri & Muriithi, 2013). Maternal age at birth is associated with diarrhea in the baby, since young mothers lack experience in parenting, especially on issues regarding infant feeding and childcare (Gyimah, 2003) limited maternal skills (Van Zyl *et al.*, 2015), inappropriate behaviour of health care workers (Aparicio *et al.*, 2015) and this affects child care hence impact diarrhea management. The year 2018, for example Kenya reported 1,499,146 cases of diarrhea among children aged below five years (DHIS, 2019), where Kisumu County led in under five mortality rate (82 deaths per 1000 live births) and second in diarrhea prevalence among under-fives at 15.5% and 18% (KNBS, 2015) (KNBo, 2013). Together with this, according to the Kisumu health information system, Kisumu recorded 20% teenage pregnancies in 2019 (Kisumu, 2021).

Evidence shows that poor diarrhea management practices such as food restriction, reduced breast-feeding, and the use of inappropriate traditional medicine are used when managing diarrhea at home (Masiha *et al.*, 2015). Consequently, diarrhea results into nutrient loss among children under five hence malnutrition (WHO, 2017b) hence death due to dehydration (Boschi-Pinto *et al.*, 2008). It also results to stunting, and is associated with decreased cognitive development and a rise in the risk of mortality from other infectious diseases like malaria, measles, and pneumonia (Guerrant *et al.*, 2013; Wierzba & Muhib, 2018). These practices have been established by studies done among women above 18 years and despite the vulnerability faced by adolescent mothers, there is little to no literature about the health of the baby born to adolescents regarding diarrhea. With the level of vulnerability faced by adolescents, how then do

they manage diarrhoea mong their children. This research has indeed established the diarrhea management practices and associated environmental risk factors among adolescent mothers.

1.3. Objectives

1.3.1. General Objective

To establish the relationship between environmental risk factors and management practices of diarrhea among adolescent mothers in Kisumu County, Kenya

1.3.2. Specific objectives

1. To determine the environmental risk factors associated with diarrhea management among adolescent mothers of children under five years in Nyando sub-county
2. To identify the management practices of diarrheal diseases among adolescent mothers with under-five children of Nyando sub-county
3. To examine the association between environmental risk factors and management practices of diarrhea among adolescent mothers with under five children in Nyando sub-county

1.4 Research questions

1. What are the environmental risk factors associated with diarrhea disease management among adolescent mothers with under five children in Nyando sub-county?
2. Which management practices do adolescent mothers employ to manage diarrheal disease under-five children of Nyando sub-county?
3. What is the association between environmental risk factors and management practices of diarrhea among adolescent mothers with under five children in Nyando sub-county

1.5. Significance

The findings from this study will help identify the management practices and the risk factors associated to diarrhea among children born to adolescents, hence identify gaps that can be highlighted during the creation of interventions towards childcare among adolescent mothers. It shall therefore help inform the Ministry of Health (National and Kisumu County governments) on the relationship between adolescent mothers' vulnerability and the risk of diarrhea among their children. The study will further inform the redesigning of policy and guidelines to help in

identifying the best management practices and strategies in the prevention of diarrhea among adolescents' children aged under five years.

1.6. Scope of the study

The study used mixed-methods approach, which employed both qualitative and quantitative methods focusing on the management practices of diarrhoea and their risk factors among adolescent mothers of children aged below five years. The study was conducted between April 2022 and May 2022 at Kobura ward, Nyando Sub- County, Kisumu County among 284 study participants. The study adopted the use of an interviewer administered questionnaire and a focus group discussion (FGD) guide. Data analysis was done using reporting and discussion was done between June 2022 and August 2022. The different variables included in the study are the demographic characteristics of the mother, characteristics of the child, household, and environmental factors.

1.7. Justification

Previous research on diarrhea has mainly focused on women of reproductive age, mostly above the age of 18 years and not exclusively on the adolescent mothers and their children. Teen mothers often lack proper maturity and skills necessary for according appropriate care to the child (ACF, 2015; Whitman *et al.*, 1987). Harmful practices in diarrhea management prevalent includes restrictions to food, fluids as and breastfeeding (Carter *et al.*, 2015).

Despite the stipulation of the best diarrhea management practices, diarrhea continues to occur to children under five. For example in 2004 WHO/UNICEF recommended critical therapies like ORS and other homemade fluids to prevent and treat dehydration, breastfeeding, continuous feeding, use of antibiotics selectively and zinc supplementation for approximately 10–14 days (WHO & Unicef, 2004). Adolescent mothers face many challenges, one of them challenges being lack of maternal skills.

A number of models for intervention and support for adolescent parents exist. Predominantly, these programs have focused on adolescent mothers, hinging on issues such as back to school, prevention of subsequent pregnancy and financial stability with less concern being given on the health of the adolescent child, and this study sought to determine the management practices for diarrhea among the adolescent mothers of under five children, considering the vulnerability of

the adolescent mother and propose possible interventions that can be put across to ensure that the health of the adolescent child improves.

1.8. Assumptions

All adolescent mothers were assumed to be responsible for taking care of their children and would therefore be able to know the diarrhoea management practices and the associated environmental risk factors among the study participants.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

(WHO, 2017a) defines diarrhea as the ways in which an individual experience at least three loose or liquid stools within a day, mainly as a result of high fluid content of stool, or an unusual increase in daily stool fluidity, rate of recurrence, and higher volume than what is considered normal for an individual (WHO, 2017a). Diarrhea is ranked number two to cause of death among children under five and accounts for 525,000 deaths annually, approximately 80% of the deaths happen in Asia and Africa (Wardlaw *et al.*, 2010; WHO, 2013). Diarrhea accounts to about 8% of all deaths in children below age 5 globally, translating to about 1,300 children dying every day, or about 480,000 annually, even though simple effective treatment is available. These deaths occur mostly in children age below 2 years mostly living in South Asia and SSA (Unicef, 2016).

Mortality in children under-five is way higher in developing countries compared to developed countries, at 73.1 against 5.3 deaths per 1000 live births, respectively (Alebel *et al.*, 2018; WHO, 2016). In addition, (Dairo *et al.*, 2017; Raji & Ibrahim, 2011) explain that annually, 2.5 billion cases of diarrhea occur in children aged under five. Although diarrhea prevalence has remained quite stable over the past two decades, it is still high in South Asia and Africa, resulting into more deaths (Dairo *et al.*, 2017; Raji & Ibrahim, 2011).

Diarrhea causes about 8.5% of all deaths in Southeast Asia and about 7.7% of all deaths in Africa. It is estimated that every child in Africa has five episodes of diarrhea per year, and that 800,000 children die from diarrhea and dehydration each year (Dairo *et al.*, 2017). In Ethiopia, findings indicated that that 12% of all children below five years had diarrhea (EDHS, 2016).

Out of these deaths also, approximately 75% of deaths are due to childhood diarrhea, and Kenya ranks number 10 among the most affected countries (Wardlaw *et al.*, 2010), although the national prevalence of under 5 diarrheal diseases slightly reduced from 17% to 15% from 2008 to 2014 (KDHS, 2014). Notably, of about 1.5 million babies born in Kenya, up to 30,000 die within the first 30 days, and 120,000 die within the first five years, translating to 1 child dying every four minutes each day due to diarrhea (KMPHS, 2010).

2.2. Environmental Risk Factors associated with diarrhea management

Environmental factors like water, sanitation and waste disposal have been associated with diarrhea (Mohammed & Zungu, 2016). Source of water, existence of sanitation facilities, proper solid waste disposal system, and kitchen floor type are critical contributors of high prevalence of diarrheal diseases. Predominantly, diarrhea is commonly associated with unsafe or unprotected water sources such as lakes, rivers, wells, or ponds (Dearden *et al.*, 2017). In addition, hand washing facilities, improved sanitation, and availability of latrine have been identified as other common environmental health risk factors of childhood diarrhea (Mohammed & Zungu, 2016).

A Kenyan study indicated that the factors independently associated with diarrheal diseases included the occupation of parent or guardian, not washing hands properly after handling diapers, drinking untreated water, lack of exclusive breastfeeding, failure of the child to wash hands after using the toilet and before eating (Karambu *et al.*, 2014). In Kenya, approximately 5.6 million people practice open defecation ((WSP., 2012) contaminated environments increases the susceptibility of diarrhea among children as result of their weak immune system.

A study done in Kakamega, western Kenya, found out that improper disposal of children's faecal matter is a significant threat towards childhood diarrhea (AOR 1.29 95% CI 1.03, 1.61) (Mulatya & Ochieng, 2020). Literature also shows that most caregivers have improper disposal of children's faecal matter because it is said to be free from contaminants (Mbugua *et al.*, 2014; Njuguna, 2016).

A study done in Kenya, and another conducted in Zimbabwe did not report significant associations between sources of water, handwashing facilities, sanitation facilities and diarrhea in children (Islam *et al.*, 2020; Kearns, 2020). A study done in Bangladesh however, indicated a positive reduction in diarrhea cases after setting up interventions on sanitation and hygiene improvements (Luby *et al.*, 2018). This study therefore sought to determine the environmental factors that have an influence on diarrhea management among under-five children for adolescent mothers.

2.3 Heath facility related factors

Literature shows that mothers' and caregivers' health-seeking behaviour for childhood illnesses is largely inappropriate, and the available health facilities are underutilized. Disease severity which

can be recognized through danger signs such as fever, thirst and vomiting has been shown to increase seeking care in health facilities (Adane *et al.*, 2017; Sreeramareddy *et al.*, 2012). In Among under-five children with acute diarrheal diseases Ethiopia, 76.9% sought care at government health facility, 18.0% at private health facility, and 5.1% at a traditional healer/informal facility. Those who sought care in government facilities preferred it because of the lower cost of treatment. The key reason given by 86.9% of those who went to private facilities cited good quality of care and treatment. Of those who sought treatment at private and/or government health facilities, 40.3% received home-recommended fluids (HRF) and 39.8% oral rehydration salts (ORS). In health care facilities, only 11.9% people received ORS plus zinc supplementation (Adane *et al.*, 2017).

Diarrhea itself is not lethal, but inappropriate knowledge, negative attitudes, and poor practices among mothers, and their inappropriate approaches towards diarrhea prevention and management leads to severe dehydration and death (Hackett *et al.*, 2015). Diarrheal diseases contributes to approximately 1.3 million deaths annually which occur mostly in the low-and-middle-income countries (Troeger *et al.*, 2017). Nearly 25% of deaths among children under five years living in south-east Asia and Africa are linked to diarrhea. Morbidity related to diarrhea is more rampant in marginalized communities in resource-constrained settings (Bulled *et al.*, 2014).

2.4 Socio-demographic characteristics

Some of the factors that significantly influence the occurrence of diarrhea include, socioeconomic status of the mother, income, number of under-five children, methods of complementary feeding, types of water storage equipment, mother's poor hand washing practices, lack of hand washing facilities, duration of breastfeeding and improper waste disposal practices (Anteneh *et al.*, 2017; Regassa & Lemma, 2016). Other factors which influence diarrhea prevalence are child's age, maternal education, hygiene of feeding practices, breastfeeding status, malnutrition, personal hygiene, environmental sanitation, water quality and availability, and latrine use (Anteneh *et al.*, 2017; Azage *et al.*, 2016).

A study conducted in Nigeria indicated that mothers with higher education had better knowledge on home management of under-five diarrhea. Similarly, being aged 25 years and over was found

to be strongly associated with better knowledge of mothers on home management of diarrhea in children when compared to mothers with lower education (Dodicho, 2016).

Child age has been associated with childhood diarrhea, the risk for diarrhea being highest at the ages of 6-11 months, and at least at 0-5months, and generally higher compared to children aged above 47 months (Azage *et al.*, 2016; A. Gupta *et al.*, 2015). Emaciated children are susceptible to diseases such as diarrhea (Njuguna & Muruka, 2011). Repeated spells of diarrhea often cause underweight in children, due to reduced appetite and poor nutrient absorption (Wardlaw *et al.*, 2010).

A study done in Bankura indicated that diarrhea prevalence was at 20.3% among exclusively breastfed children and 31.6% among less than 6 months breastfed children (Alshehri *et al.*, 2004). Due to milk contamination, studies have shown that bottle-fed children are more susceptible to diarrhea than breastfed children (Alshehri *et al.*, 2004; Godana & Mengistie, 2013b). Mixed-fed infants aged 0 to 11 months have an elevated risk of diarrhea than exclusively breastfed children. As a result, the risks associated with mixed feeding are real, especially in infants under the age of 7 months, and even more so for infants weaned before the age of 6 months. (Ahiadeke, 2000; Avisek Gupta *et al.*, 2015). Studies indicate that female infants are more affected by diarrhea as compared to male infants (Avisek Gupta *et al.*, 2015; Stanly *et al.*, 2009).

Literature reveals a significant association between sex of an index child and maternal practice towards prevention of diarrhea, with mothers of female children having poor practices compared to those with male children, likely due to preferences to sex in different cultures and social values to male (Dodicho, 2016). There is evidence that poor practices such as food restriction, reduced breastfeeding, and use of inappropriate traditional medicine whose effect is unknown in managing diarrhea by caregivers, guided by limited knowledge. (Masiha *et al.*, 2015).

Diarrheal episodes have been found to be associated with mothers' educational status, family type, family size, and sex of child (Dodicho, 2016; Getachew *et al.*, 2018a; Yilgwan & Okolo, 2012). A study in Ethiopia showed that initiation of complementary feeding at 6 months, good hand washing practices, adequate knowledge on childhood diarrhea, wealth, frequency of health extension worker visits, and measles and rotavirus vaccination status were associated with childhood diarrhea (Azage *et al.*, 2016).

2.4. Management practices of diarrheal diseases among adolescent mothers

Reports show that diet, hygiene and sanitation, medications, and supplements, breastfeeding, immunization, zinc supplementation, and probiotics are preventive measures for diarrhea (Khalili *et al.*, 2013). Primary caregivers play a key role in diarrhea prevention and management especially through health promotion, and patient care (Dodicho, 2016). Protection of water sources is the number one defense against diarrheal diseases, while better hygiene practices, particularly hand washing with soap and proper disposal of excreta can reduce diarrhea incidence by 35% (Workie *et al.*, 2018b).

Other oral fluids such as salt sugar solution, rice water, soup, and yogurt are also recommended home based fluids (Mekonnen *et al.*, 2021). Optimal child-feeding practices can prevent over 10% of deaths due to diarrhea (Workie *et al.*, 2018b). Findings from the integrated community case management of childhood illness (ICCM) strategy reveals that caregivers should be competent about diarrhea management practices that, home-made fluids like porridge, fresh fruit juices, milk, Oral Rehydration Salts (ORS) and breast milk. During this period the child should be closely monitored for any signs of dehydration, hence referral to a health facility (Dodicho, 2016).

In resource-limited settings, management of diarrheal disease in children consists of approaches like, prevention and treatment of dehydration with ORT, providing adequate nutritional support including early re-feeding during the acute episode and provision of oral zinc therapy (Mokomane *et al.*, 2018; WHO, 2017a). Oral zinc therapy for acute diarrheal disease has shown in several trials the effectiveness in shortening the duration of diarrheal symptoms in children older than 6 months (Black *et al.*, 2019; Lazzerini & Wanzira, 2016; Mokomane *et al.*, 2018).

Vaccination, against rotavirus is an effective means control against child morbidity and mortality due to diarrhea. When compared to fully immunized children, partially immunized children have a higher risk of diarrhea. This is due to immunization's protective effect, particularly in the case of measles immunization and therefore improving immunization will help reduce diarrheal burden among children (Avisek Gupta *et al.*, 2015; Mokomane *et al.*, 2018). Antibiotics and other medications have been identified as being only appropriate for the treatment of cholera or dysentery in children. Furthermore, antidiarrheal drugs and some antiemetics have no benefit in

diarrhea treatment and may result in serious, even life-threatening side effects in children (WHO, 2005).

In sub-Saharan Africa, approximately one in every three children experiencing diarrhea receive ORS, while the proportion of those that receive zinc is under 5 % (UNICEF, 2015). Whereas appropriate diarrhea treatment is easy and can be implemented at home, it is recommended seek care from suitable providers (Carvajal-Vélez *et al.*, 2016). Harmful practices such as restricting breast milk, fluids, and/or food, as well as using incorrect modern medicines during diarrheal episodes, have been linked to negative outcomes and contradict WHO treatment guidelines. Fluid restriction and feeding restrictions during diarrhea can raise the risk of dehydration, reduce nutrient intake, and potentially impair growth and development in children (WHO, 2005).

A systematic review on harmful practices in childhood diarrhea management found out that harmful practices such as restriction of food and fluids, as well as breastfeeding were common. An analysis conducted in six African countries established a high prevalence of fluid restriction during diarrhea episodes. It also found an association between higher rates of fluid limitation and seeking care outside of the home, especially care seeking in non-government health providers in childhood diarrhea management there was a high level of harmful practices (Perin *et al.*, 2015). However, the practices are incorrect. Due to the inaccessibility of health facilities, rural mothers preferred home management of diarrhea. In Africa, harmful practices such as food restriction (30-60%) and fluid restriction (11%-80%) were common. This malpractice has a negative impact on the health and development of children. (Carvajal-Vélez *et al.*, 2016)

The best diarrhea management practices have been defined in the 2004 WHO/UNICEF recommendations which recommend critical therapies like prevention and treatment of dehydration using ORS and other homemade fluids, breastfeeding, continuous feeding, use of antibiotics selectively and zinc supplementation for approximately 10–14 days (WHO & Unicef, 2004). Moreover, the commonly recommended management of diarrhea is the use of oral rehydration therapy (Taghavi *et al.*, 2014). Home-based fluids such as rice water, yogurt, soup, salt sugar solution, and clean water are also recommended. As part of the home management of diarrhea, low osmolarity oral rehydration salt (ORS) and zinc are also included. Oral rehydration therapy should be administered on time (Taghavi *et al.*, 2014) and Zinc tablets have proven to be a less expensive and more effective method of reducing diarrheal disease deaths (Kalu *et al.*,

2016; Kostermans *et al.*, 2014). This study therefore looks at determining the diarrhea management practices among adolescent mothers.

2.5. Environmental risk factors and management practices of diarrheal disease

Literature shows that babies of adolescent mothers face a substantially higher risk of dying than those of older women (Presler-Marshall & Jones, 2012; WHO, 2014). Teen pregnancy and childbirth is presently a common issue, which drives physical and psychological vulnerability of the adolescents. Young mothers usually experience diverse and severe health problems and associated complications (WHO, 2020a). Adolescent mothers often do not get support and care from their parents, more likely increasing their prenatal health risks. These health risks may badly affect the adolescent mothers and they may need to use medications which may eventually disrupt the baby's growth (Akter, 2019).

Adolescent pregnancy poses risks which the victims have little or no control over critical social, health, and economic outcomes, and as a result, they are socially isolated without sufficient knowledge and skills to effectively navigate the challenges (Odebode & Kolapo, 2016). Girls have varying vulnerability and likelihood of becoming pregnant. For example, girls from poor socioeconomic settings, poorly educated or living in rural areas are at greater risk of becoming pregnant than those who are wealthier, well-educated or urban in high-income countries (Beguy *et al.*, 2014). Globally, 95% of the world's births to adolescents (girls aged 15 - 19) take place in low and middle-income countries. Annually, 3 million girls' resorts to unsafe abortions putting their health and lives at risk. Girls, with less opportunities in life, have limited to no access to sexual and reproductive health care and are at a higher risk of becoming pregnant (Regmi *et al.*, 2008).

Adolescent pregnancy affects the girl child's education and their ability to generate income . Due to pregnancy, girls are forced to drop out of school, and it is hard for teenage mothers to continue with their education. They are therefore less likely to have a job or to be economically independent, thus are at a risk of living in poverty, and experience domestic violence (WHO, 2020a). The adolescent mothers may also experience postpartum depression, and this may interfere with care given to the newborn baby and its development. The adolescent mothers are also likely to be deprived standard health care access. Mostly the teen mothers do not get proper

care or even support from their family members despite their financial crisis,giving birth at a young age and being responsible parents(Akter, 2019).

Gyimah (2003)reported that maternal age at birth is associated with diarrhea in the baby, since young mothers do not have experience in parenting, especially on issues relating to infant feeding and childcare. Due to these factors affecting the mother, the health of the child is at risk of different diseases, hence the study aimed at examining the risks associated with the management practices of diarrhea increase and its management in children below five of adolescent mothers.

2.6. Conceptual Framework

The ABM on access to medical was adopted. Based on the three main categories of variables as identified in the Andersen's framework, the *predisposing characteristics* included age of the mother, education level, occupation, sex of the child, number of under-five children in a household; *the enabling factors* included distance to the health facility; type of health facility, access to clean water, and *the need characteristics* included availability of financial resources. The results reported here included adjustment for the following variables or potential confounders: mother's age, mother's occupation, child gender, mother's marital status and education, number of children under five living in household.

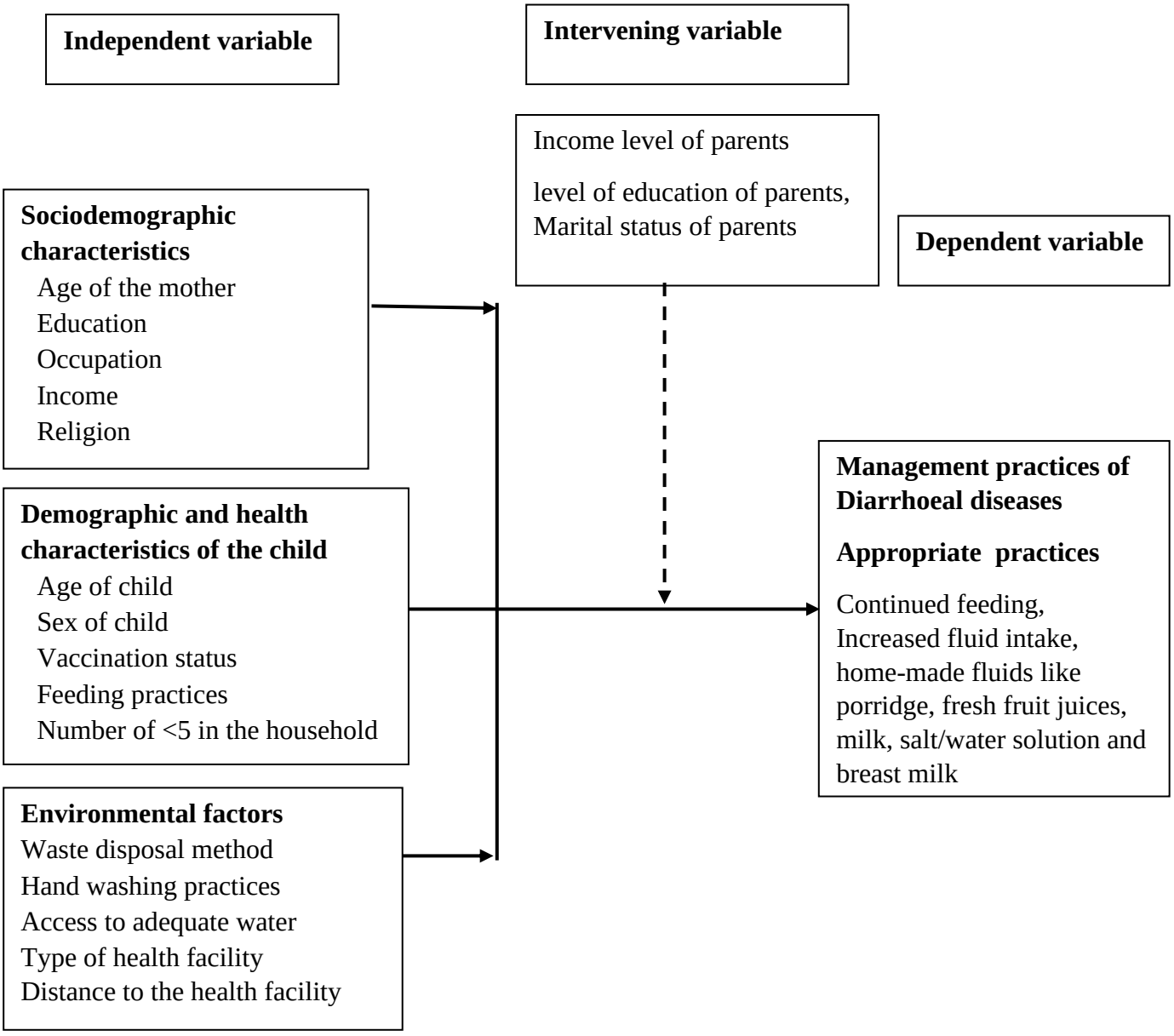

Figure 0.1: Conceptual Framework

Source: Modified from Anderson Behavioural Model (1995)

CHAPTER THREE: MATERIALS AND METHODS

3.1. Study Area

Nyando sub-county is located within Kisumu County. Its geographical positioning is at GPS coordinates: latitude -.2833, longitude 35.1167 with an approximate population of 299930, and it is approximately 163 KM^2. It consists of 5 wards, namely, Kobura ward, Ahero ward, Awasi/Onjiko ward, Kabonyo Kanyagwal and East Kano Wawidhi ward. Nyando Sub- County is one of the sub-counties in Kisumu that recorded the high numbers of teen pregnancies. According to the 2019 census report, Nyando has a total population of 10,080 girls between the age of 15-19 years.

Of the 5 wards, Kobura ward, has a teen pregnancy prevalence of 18% (KDHIS, 2014) as well as other environmental factors which contributes to diarrhea. The flooding episodes that occur during the rain seasons, there is increased the chances of ground water contamination which is the main source of water in this area. Kobura ward has a total of 7 health facilities, with 9 community units and 110 community health workers, with their main source of water being borehole.

3.2. Research Design

This study used a cross-sectional design. A mixture of methods incorporating both qualitative and quantitative data collection methods was employed. Both approaches complemented each other in determining the risk factors associated to the management of diarrhea among adolescent mothers.

The quantitative data collection was used to determine the management practices and the factors affecting diarrheal disease management among under five children. Qualitative data collection methods were used to gather in-depth information which facilitated a deeper understanding of the mothers' characteristics which might influence diarrhea management practices.

3.3. Study population

The study targeted adolescent mothers aged 15-19 years and with children below five years. All sampled adolescents were interviewed.

3.4. Inclusion and Exclusion Criteria

Inclusion: adolescent mothers between 15-17 years who assented, and their parents consented for them to participate in the study. The study included adolescent mothers aged 18-19 years with children below five years who consented to participate in the study and those who had been residents of Kobura Ward for more than three months prior to data collection time.

Exclusion: adolescents between 15-17 years whose parents did not consent or who did not assent. The study excluded any adolescents mother aged 18-19 years with child below five years who did not consent to participate in the study. Any adolescent within the selected criteria who mentioned that she had not been taking care of her own child were also be excluded in the study.

3.5. Sample size and Determination

The Cochrane's formula below was used to calculate sample size of adolescent mothers to participate in the study.

$n=Z^2PQ/ I^2$

Where: n= Sample size [where population> 10,000]

Z= Normal standard at deviation at 95% CI (1.96)

P= Proportion of pregnancies that are attributed to adolescents (18%)

Q = (1-P)

I= Allowable error margin (5%)

Substituting: $n=Z^2PQ/ I^2$

$n=1.96^2\times 0.18\ [1 - 0.18]/ [0.05]^2 = 267$

Nonresponse rate 10% of 267 = 27

Therefore, the study population was 294 adolescent mothers.

3.6. Sampling Procedure

The study purposively selected Nyando Sub-County in Kisumu County-Kenya since of the 7 sub-counties in Kisumu, Nyando sub-county reported a high number of teenage pregnancies. Kobura ward was selected using purposively because its teenage pregnancy prevalence was at 18% as compared to the Kisumu County data at 20%. The study used proportionate sampling with the help of two community health volunteers to identify households with adolescent

mothers with under 5 children. Kobura ward has 9 community units, the study population was divided as shown in the table below among the community units to ensure representativeness.

Table 3.1: Sample size breakdown

Number of adolescent mothers per CU	Calculation	Sample size
Kochieng B=40	40/454*294	25
Lela North = 31	31/454*294	20
Lela South = 11	11/454*294	7
Okana = 40	40/454*294	25
Kamayoga = 33	33/454*294	21
Kotieno = 22	22/454*294	14
Nyamware North = 117	117/454*294	76
Kochieng A = 88	88/454*294	57
Masogo = 72	72/454*294	49
Total=454		**294**

Source: Revised as per Cochrane's formula

3.6.1. Description of quantitative sampling approaches

Systematic random sampling was applied to pick respondents in the community within the community units. This is a probability sampling technique used where sampling interval was calculated using the formula i=N/n (454/194=1.5 =2). from the sample each community unit (CU), an interview was done after each second household. This sampling technique was chosen because it gave each participant an equal chance to participate, and it posed minimal bias.

3.6.2. Description of qualitative sampling approaches

Purposive sampling was used in selecting participants for the qualitative methods, which were focus group discussion (FGD). For the focus group discussions, 10% of the respondents who had been interviewed were requested to participate. These were group leaders, within the community or who had been deemed eloquent by the interviewer during the survey. This helped explore the mother related characteristics of the adolescent mothers. It also obtained in depth understanding

of the motherhood aspect associated with the management of diarrheal disease in their children who are aged under five years.

Three FGDs were conducted among the adolescent mothers. These FGDs consisted of 6 - 8 participants. These participants were selected purposively based on eloquence during the quantitative survey and willingness to participate in the FGD after the quantitative interviews. A total of 3 FGDs (6 participants, 7 participants and 8 participants) were conducted in both Luo and English the languages that were deemed comfortable to the adolescents. One note taker and a moderator were present in each group discussion. On the third group, the information had reached a saturation level and there being nothing new coming up from the discussions no more group discussions were done.

This study utilized an interviewer-administered semi-structured questionnaire which to collect data on socio-demographic characteristics, factors affecting diarrhea management, mother and child characteristics, and management practices of diarrhea.

3.7. Recruitment and training of enumerators

Six enumerators were recruited to ensure timely data collection is achieved. Eligibility was open to individuals' experience in data collection and preferably those who have worked with adolescents before. A training including a mini-piloting process was undertaken within a week. Daily feedback was given for data collected each day and they were advised on corrective measures before the start of the next day's activities.

3.7. Validity and Reliability.

3.7.1. Validity

The study used similar studies done elsewhere to guide in designing the research tools. The questionnaire was designed to answer the research questions. Expertise perspective was sought from the two supervisors and their insights during the designing research tools was taken into consideration for validity enhancement. The questionnaire was examined every day to ensure that the required information has been provided.

3.7.2. Reliability

The researcher assistants were chosen and trained to reduce errors. The research tools were tested beforehand on 10% of the sample size. All the tools were pretested using 10% of the sample population in Ahero ward in Nyando sub-county, which were not sampled in the main study. The tools were validated and adjustments made where necessary before the real study takes place. Cronbach's alpha was used to assess the internal consistency of the questionnaire using SPSS version 27, $\alpha \geq 0.8$ being considered reliable (the study achieved $\alpha = 0.84$).

To test for instrument reliability, 29 (10%) questionnaires were pretested at Ahero ward, Kakola Ahero CU, which is in Nyando sub-county, and the population has similar characteristics like that of Kobura ward as they border each other. Internal consistency of the tool items was determined by determining the Cronbach's alpha. Alpha is described as indicated above and the closer the value is to one the stronger the reliability. The overall Cronbach's alpha was 0.84 which lies under a good validity and reliability value. This allowed us to continue with data collection.

3.8. Data collection procedure

3.8.1. Structured questionnaires

The structured questionnaire was subdivided into six sections: socio-demographic characteristics, demographic characteristics of child, environmental factors, health facility related factors and diarrheal disease management practices.

3.8.2. Focus Group Discussion

The researcher conducted group discussions in English/dholuo with the study participants. These discussions took approximately one hour. Discussions were conducted in a quite location. The focus group discussions were tape – recorded and notes taken after obtaining consent of all study participants, this helped find more information on the motherhood factors affecting diarrhea.

3.9. Data Analysis

All filled questionnaires were checked for completeness, and data cleaned, coded, entered, and analyzed using STATA v.17. Socio-demographic characteristics (categorical variables) such as gender, level of education, sex of child, marital status, religion, and occupation were computed

and presented in tables and bar charts. Continuous variables such as age, household size, and number of days that the child had diarrhea were reported with their mean and standard deviation. Diarrhoeal management practices, which was the primary outcome variable for the study, was measured on a dichotomous scale, as either positive or negative. The independent Variables were socio-demographic and health characteristics of the child, knowledge and attitude and environmental factors.

To assess the relationship between the dependent variable and the independent variable, a binary logistic regressions model was used. Variables with p-value <0.05 at the bivariate logistic regression were said to be significant and were also investigated on a multivariable analysis, and thus adjusting for confounding. Variables yielding significant results with a p-value of less than 0.05 were said to be factors associated with diarrhea management practices. Adjusted odds ratio with 95% CI was used to report the significant results.

In investigating the relationship between risk factors and their contribution to management practices, a numerical variable for management practices was generated. This variable was generated by encoding the variables for management practices as either 1 for poor management and 2 for good management and finding their means to create a one general management variable. The variable generated was further categorized where participants with a mean greater than 1.5 were said to have a better management practice, while those with less than 1.5 had poor management practices.

This final categorical variable was used in a binary logistic regression model to investigate the relationship between risk factors (as independent variable) and management of diarrhea (as the dependent variable).

For the qualitative data, collection was achieved through voice recordings for the FGDs. Transcription and translation of the information collected followed thereafter and coded using NVIVO 12 software. The information was then systematically categorized into subsequent themes and sub-themes. The data was categorized according to repetitions (Ryan & Bernard, 2003) and recurrent themes (Green & Thorogood, 2018)

3.10 Triangulation of qualitative and quantitative findings

This study used the convergence triangulation model (Creswell et al., 2011), where both quantitative and qualitative data was collected and analyzed during the same phase of research, and then the results merged into an overall interpretation (Creswell & Clark, 2017).

3.11. Ethical Considerations

This study got approval from the Board of Postgraduate Studies, JOOUST. Ethical clearance was obtained from Jaramogi Oginga Odinga Teaching and Referral Hospital Ethics Review committee (JOOTRH ERC) and NACOSTI. Permission to collect data was obtained from the Health Department of Kisumu County, Nyando sub-county, and ward community health strategy officer. Community entry was done through the community health assistants and CHVs. This ensured that the study is conducted within the required ethical standards and that oversight was duly exercised over the conduct of the researchers and the entire research process to protect the participants from any harm.

Recruitment of participants was voluntary. Written informed consent for parents of adolescent mothers aged 15 -17 years and assent was obtained from each study participants before enrolment into the study. Those aged between 18 – 19 years also provided written informed consent. This was achieved through a letter detailing the study objectives, duration, visit procedures, participant rights, study procedures and methods. Possible risks and advantages of the study were given to the participants and methods used to protect their privacy shall be discussed. Voluntary withdrawal from the study was also explained to the study participants. Consent was considered if the study participants sign the consent/assent forms to participate in the study.

3.12. Limitations to the study

Due to other adolescent related programs that have been conducted in the area, the return to school interventions seemed to have made an impact since most some of the mothers were said to be available during the weekends since they were in school. These participants were noted not to be actively taking care of their babies and were hence excluded from the study. The study area is vast and has bad road network which prolonged the initial planned two weeks data collection period to three and half weeks and this had cost implications. The study focused on diarrhoea

management practices among adolescent mothers who had babies under five years and not the larger mother's population.

The study however used proportionate sampling to ensure that there was reduced bias and that this ensure a representation of the study participants hence the findings can be generalized to the adolescent population within the ward.

CHAPTER FOUR: RESULTS

4.1. Introduction

This chapter presents the analysis of the data from the study. The study sought to examine the diarrhoea management practices and the associated risk factors among adolescent mothers with fewer than five children. Data analysis was done as by objectives.

4.2. Response Rate

A total of 294 questionnaires were administered to respondents. Of those, a total of 285 questionnaires were returned to the researcher giving a response rate of 96.9%. Since the questionnaires that were returned were more than 267 (the sample size before adjusting for non-response), this sample was considered acceptable.

Table 4.1: Response Rate

Statement	**Frequency**	**Percent**
Respondents who participated in the study	285	96.9
Those who did not participate in the study	9	3.06
Total	**294**	**100.0**

The results showed that out of the 285 adolescent mothers, 94 (33.0%) had secondary education with another 64 (22.5%) having partial secondary education, and 14 (4.9%) had tertiary level education. This implies that more than 50% of the participants had a minimum of basic secondary education. In terms of occupation of the adolescent mother, 44 (15.4%) adolescent mothers were casual laborers.

4.3. Demographic characteristics of the adolescent mother

The demographic characteristics of the respondents were summarized as indicated in Table 4.2:

Table 4.2: Demographic characteristics of the respondents

Variable	Frequency (n=285)	Percent (%)
Education		
None	1	0.4
Partial Primary	31	10.9
Primary	81	28.4
Partial Secondary	64	22.5
Secondary	94	33.0
Tertiary	14	4.9
Occupation		
Casual Laborer	44	15.4
Formal employment	4	1.4
Self employed	8	2.8
Unemployed	229	80.4

Source: Primary Data, 2022

4.3.1. Health characteristics of the participants' child

The health characteristics of the indexed child were taken and presented in Table 4.3 below:In terms of health, 133 (46.7%) of the children had been fully vaccinated, 122 (42.8%) had been partially vaccinated while 30 (10.5%) had never been vaccinated. The results show that 215 (n=75.4%) of the children had received DPT Vaccine, 188 (66.0%) had received measles vaccine, 93 (32.6%) had been vaccinated against typhoid, 83 (29.1%) had received rotavirus vaccine. It was notable that within the past year, half of the indexed children (n=144, 50.5%) had had diarrhea. The study shows that 173 (60.70%) of the children's parents were alive while 112 (39.30%) of their parents were not alive. It was also noticed that 163 (57.19%) of the children did stay with their parents whereas 122 (42.81%0) did not stay with their parents. The study indicated that 126 (44.21%) of the children had their parents living together, 37 (12.98%) children had their parents not living together and 122 (42.81%) children chose not to answer that question. The study also revealed that 64 children (22.5%) had had diarrhoea in the past two weeks. The child had diarrhoea at an average of 2 years (Mean= 2.35, SD= 1.21).

Table 4.3: Health characteristics of the participants' child

Variable	Frequency (n=285)	Percent (%)
Vaccination status of the child		
Fully Vaccinated	133	46.7
Not fully vaccinated	122	42.8
Not vaccinated	30	10.5
Has the child received DPT Vaccine		
Yes	215	75.4
No	70	24.6
Has the child received Measles vaccine		
Yes	188	66.0
No	97	34.0
Has the child been vaccinated against typhoid		
Yes	93	32.63%
No	143	50.18%
Don't know	49	17.19%
Has the child received rotavirus vaccine		
Don't know	83	29.12%
No	120	42.11%
Yes	82	28.77%
Child had diarrhoea in the past two weeks		
Yes	64	22.5
No	221	77.5

Source: Primary Data, 2022

4.4. Environmental Risk Factors associated with diarrhea disease management among adolescent mothers with child under five.

For this section, the respondents were asked to provide environmental risk factors associated with diarrhea disease management among adolescent mothers with children under five as details in the following subheadings:

4.4.1 Source of water

Most of the respondents obtain their water form borehole/well (n=246, 86.3%). Other sources of water include harvested rainwater (n=30, 10.5%), tap water (n=29, 10.2%), handpump (n=23, 8.1%), tanker (n=21, 7.4%), river (2.1%) and two (0.7%) respondents said that they had no source of water as indicated in Fig. 2 below:

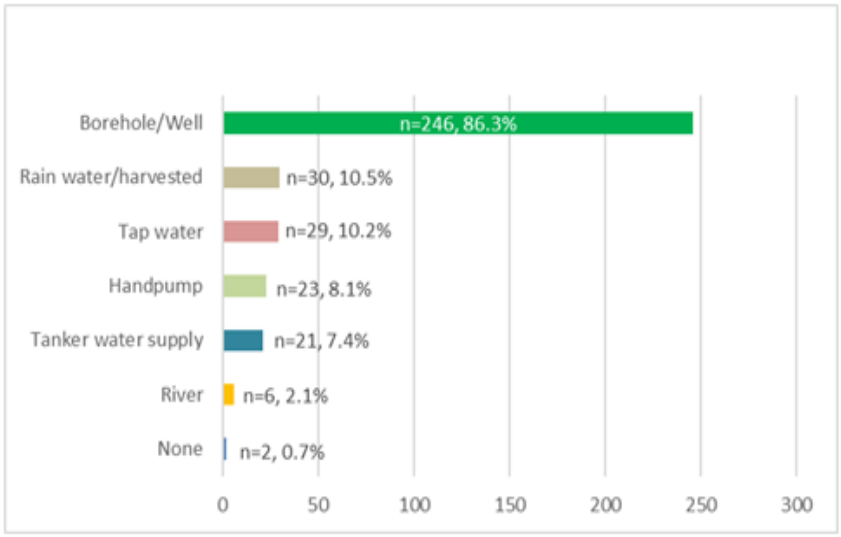

Figure 4.1: Sources of water

Source: Primary Data, 2022

4.4.2 Possession of a toilet at the household

The participants were requested to state whether they have a toilet and a handwash facility as indicated in Figure 3 below: Results in Fig. 4.2 below show that 248 (87%) adolescent mothers had a toilet, 28 (10%) shared their toilet and 9 adolescent mothers (3%) did not have a toilet.

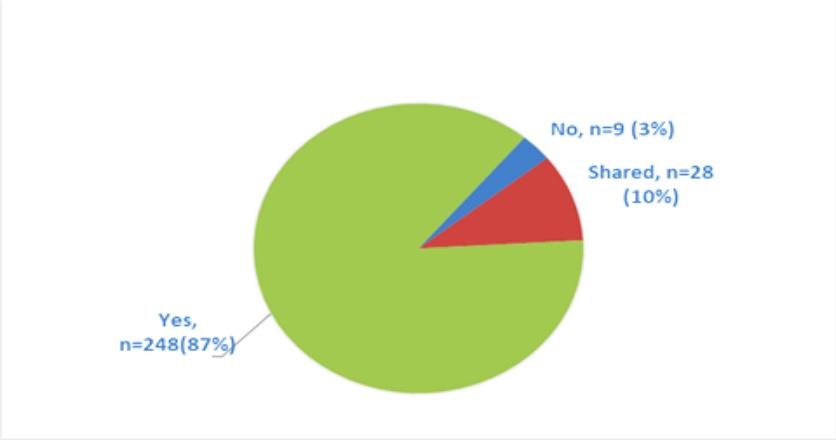

Figure 4.2: Possession of a toilet at the household

Source: Primary Data, 2022

4.4.3 Possession of a hand-washing facility at the household

With regards to a having a handwash facility, 158 adolescent mothers (n=55.4%) said that they had a handwashing facility, 4 (1.4%) adolescent mothers had a handwash facility while 123 (43.2%) said that they did not have a handwash facility as indicated in Fig. 4.3 below:

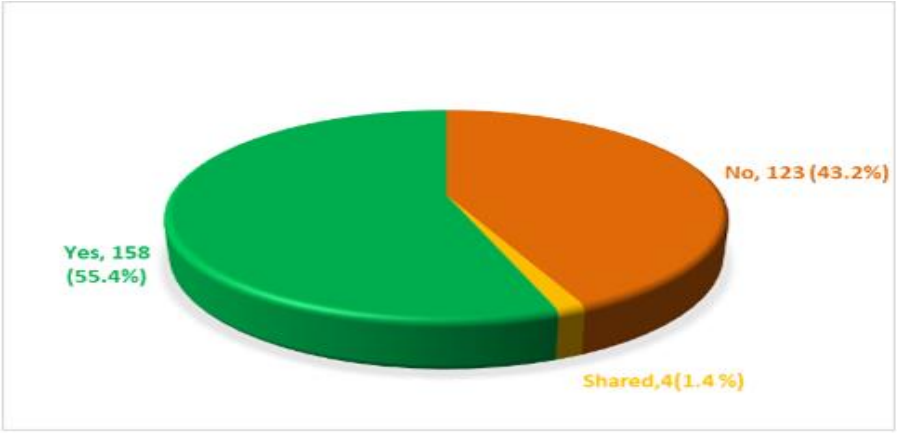

Figure 4.3: Possession of a handwashing facility at the household

Source: Primary Data, 2022

4.4.4 Environmental Risk Factors

Some of the environmental factors that were regarded to preventive strategies would lead to inappropriate diarrhoea management hence increase diarrhoea included clean environment through cleaning of the compound, lack of handwashing facilities, uncovering food, and failure to wash hands after visiting the toilet. Children were also mentioned to pick unclean objects, soil and animal faeces and eating which was regarded as a cause of diarrhoea among under-fives within the study area.

> *"Diarrhoea is caused by a dirty environment so we should look at our environment. Sometime the child is crawling, and he picks something and puts it in his mouth without your knowledge. You then get shocked that the child has diarrhoea. So, we should look after the environment. We should now ensure that the toilets are clean even if they are those made of mud. You should ensure you sweep it in the morning then pour ash inside. Water should be at the entrance of the toilet even if you don't have water, you can use ash. Washing hands is very important, we should therefore ensure we wash our hands before we give the child anything. FGD1K*

> *"I know it is caused by dirtiness. If a child plays with dirty things and he puts them in his mouth. When he eats before wash hands, going to the toilet and you fail to wash your hands then you come and eat, you can get diarrhoea" FGD1K.*

> *"I think diarrhoea can also be caused by improper hygiene where you find that the mother gives the child food and leaves it there uncovered. So, you get those flies swarm the food, or fly over it. If it was porridge in a cup the fly settles on the porridge and leaves dirt, there. The mother then comes and gives the child that porridge. Or you get that the mother gives the child water that has not been boiled and probably that water was fetched from a source that is not good enough. So those are the things I think can cause diarrhoea in a child". FGD3N.*

Some of the factors regarded as important in management and prevention of diarrhoea included clean environment, handwashing, boiling/treating drinking water and personal hygienic practices.

> *"Diarrhoea can be managed by cleaning our environment, cutting long fingernails, cleaning their hands properly. We are supposed to wash our hands before feeding the baby if it is a child who is eating and if he is not yet eating, we are supposed to be very keen on what they put in their mouths, and we should not leave then in a dirty environment. We must clean our environment and we should have water in every place. When we are entering the house, we are supposed to wash our hands before feeding the baby. After changing the diapers, we must wash our hands with water and soap then dry it with a toilet". FGD3K*

"When you want to use water because you know water also causes diarrhoea. So, you can add water treating chemicals or you can use boiled water" FGD2O.

4.5. Management practices of diarrhoeal disease

The participants were also asked yes-no questions to investigate how they managed diarrhoea.

The results indicate that the participants had a knowledge about method of ORS (n=204; 71.6%) and out of the total 285 participants, 165 (57.9%) said that they ORS in diarrhoea management. Commonly used management practices were; Washing hands after latrine (n=282, 98.9%), handwashing after passing stool (n=279, 97.9%), washing hands after changing diapers (n=263, 92.3%), reminding the children to handwash after meals (n=259, 90.9%), not using formula milk to feed the child (n=251, 88.1%), washing hands after bathing children (n=215, 75.4%) and use of chemicals to kill water germs (n=201, 70.5%).

Other practices used by some of the participants were; boiling drinking water (n=171, 60.0%) not giving the child cow milk (n=164, 57.5%), not using a bottle feeder to feed the child (n=181, 63.5), filtering water by use of muslin cloth (n=148, 51.9%), handwashing after touching the child (n=138, 48.4%) and boiling feeder before every meal (n=114, 40.0).

Table 4.4: Management practices of diarrhoeal diseases

Management of Diarrhoea (Total n=285)	**Yes**		**No**	
	N=285	**%**	**N=285**	**%**
Knowledge about method of ORS (Oral Rehydration Salts)	204	71.6	81	28.4
Banana helps to reduce electrolyte imbalance in diarrhoea	51	17.9	234	82.1
Yoghurt is a probiotic in diarrhoea	45	15.8	240	84.2
Wash hands after latrine	282	98.9	3	1.1
Do you breastfeed your child	219	76.8	66	23.2
Do you bottle feed your child	104	36.5	181	63.5
Child given cow milk	121	42.5	164	57.5
Use formula milk to feed your child	34	11.9	251	88.1
Boil drinking water	171	60.0	114	40.0
Boil bottle feeders	116	40.7	169	59.3
Boil feeder before every meal	114	40.0	171	60.0
Abstain from food during diarrhoea	32	11.2	253	88.8
Do you filter water by use of muslin cloth	148	51.9	137	48.1
Use chemicals for killing water germs	201	70.5	84	29.5
Use banana in diarrhoea management	44	15.4	241	84.6
Use yoghurt in managing diarrhoea	29	10.2	256	89.8

Handwash after passing stool	279	97.9	6	2.1
Use in ORS in diarrhoea management	165	57.9	120	42.1
Remind children to handwash after meals	259	90.9	26	9.1
Do you wash hands after bathing children	215	75.4	70	24.6
Do you wash hands after changing diapers	263	92.3	22	7.7
Handwash after touching children	138	48.4%	147	51.6%

Source: Primary Data, 2022

Further, banana in diarrhoea management (n=44, 15.4) since most of the participants (n=234, 82.1%) did not believe that banana helps to reduce electrolyte imbalance in diarrhoea. Additionally fewer participants (n=29, 10.2%) used yoghurt in managing diarrhoea, however, most did not think that yoghurt is a probiotic in diarrhoea (n=240, 84.2%) and a few participants resorted to abstaining from food during diarrhoea (n=32, 11.2%).

4.5.1 Preparation of ORS (Oral Rehydration Salts)

Further, when asked about preparation of ORS (Oral Rehydration Salts) respondents gave the following responses as indicated in Figure 4.4: Results in Fig. 4.4 below indicate that 191 respondents (67.0%) said that ORS is prepared by mixing ORS powder with water, 93 respondents (32.6%) said that ORS is prepared by mixing ORS powder with milk/juice while only one respondent (0.4%) said that she did not know how ORS is prepared. This implies that a good number had knowledge on preparation of ORS.

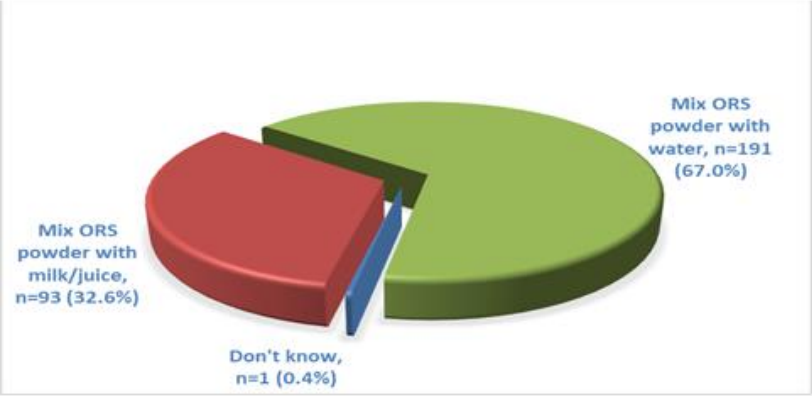

Figure 4.4: Preparation of ORS

Source: Primary Data, 2022

4.5.2 Ways of Preventing Diarrhoea

From the results in Fig. 4.5 below reveal that, 216 participants (75.8%) said that diarrhoea can be prevented by boiling drinking water. Also 115 participants (4.04%) said that using latrines can help prevent diarrhoea. Other methods given were exclusive breastfeeding (n=94, 33.0%), maintain cleanliness (n=30, 10.5%), proper cooking of food (n=3, 1.1%), vaccination (n=2, 0.7%). Six participants (2.1%) did not know ways of preventing diarrhoea.

The participants were also in addition required to state ways of preventing diarrhoea and the results are as shown in figure 4.5.

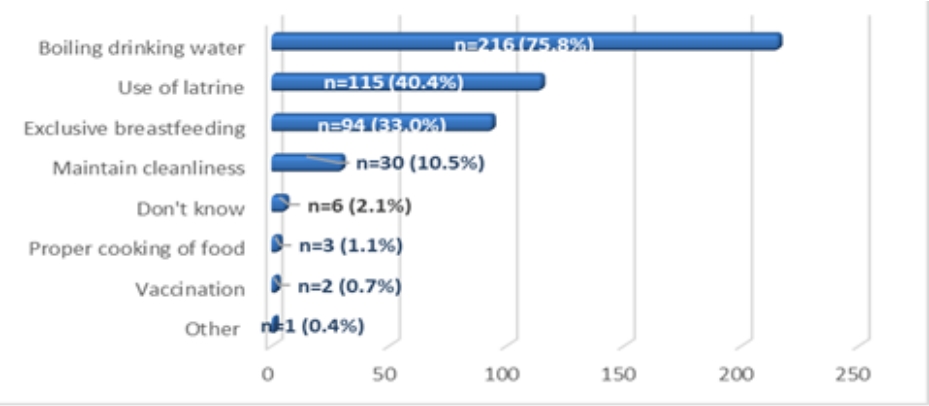

Figure 4.5: Ways of preventing diarrhoea.

Source: Primary Data, 2022

Findings from the FGDs illustrated that some adolescent mothers had inappropriate diarrhoea management practices. These adolescent mothers practiced continued feeding and breastfeeding during the diarrhea episodes:

> *"Yeah, it changes and when it does, I maintain the breast feeding. No matter how you try, when a child starts to diarrhoea, he diarrhoeas. So, I just maintain giving him ORS and breast feeding him plus giving him his food" FGD1K.*
>
> *"And if it is a child that does not eat, and it is only that breast milk then you maintain with that breast milk because that is what contains everything when he is below the eating age. So, you will maintain the breast feeding for him" FGD1K.*
>
> *"The feeding cannot change you just give him food like normal, the way you usually give him. Because he is the one who will eat it and if he has had enough, he will leave it" FGD2N.*

Some of the adolescent mothers also curtailed food during the diarrhoea episodes. The use of yoghurt as a probiotic during diarrhoea was also unknown. The use of conventional methods in the management of diarrhoea was also mentioned to be practiced among the adolescent mothers.

> *"You can reduce some of the foods that you give to the child. You can start by giving him rice soup, it can prevent diarrhea, but you continue giving him banana that has been boiled and mashed and diarrhoea is still persistent breast feeding is the best", FGD1K.*

> *"I have just heard rumours though I personally I have not used the said method like yoghurt and banana when mixed and you give to the child can help in the mitigation against diarrhoea in children", FGD2O.*

> *"There is a traditional medicine herb that you look for apart from the ORS, you pluck it, then you break it by crashing or blending it into small pieces, then you mix with water which you then sieve and then you take few medicinal herbs and place around the buttocks and anus of the child", FGD3O.*

> *"I have not tried that (cross talk) there is another method in the management of diarrhoea like the medicine used when one contacts measles and there is too much diarrhoea then that medicine can be used. The leaf herbs obtained are prepared with water and the rest are put in the anus and buttocks of the child which can lead to reduction in diarrhoea". FGD3O*

Results from the FGDs indicated that some of the adolescent mothers changed the feeding practices during the diarrhea episodes.

> *"Your feeding practices can change because if you give the child yoghurt and he diarrhoeas then you will have to leave yoghurt. If you give him banana and you see that he still experiencing diarrhea, you will have to leave it alone" FGD3N.*

> *"The feeding habits definitely will change since the child will lack appetite will not eat anything be it food even if you force the child nothing will be eaten yeah" FGD2O.*

4.6. Association between demographic characteristics of the adolescent mother and diarrhea management practices

While holding occupation constant, households with three children under the age of 5 years were 3.6 times likely to have good diarrhoea management practices compared to households with one child under the age of 5 (OR=3.694, 95% C.I [1.214,11.234], p=0.021). The model was a good fit as shown by the goodness of fit statistic; (LR Chi2 (DF=8) = 15.23, p-value= 0.019) implying that the at least one of the variables in the model had a coefficient not equal to zero and thus significant. The results as indicated in Table 4.5 affirm that number of children under 5 years in the household and occupation of the adolescent mother were linked to diarrhoea management practices.

Table 4.5: Regression between demographic characteristics and management practices

	Management of diarrhoea		**Binary Logistic Regression**		
	Good	**Poor**	**OR**	**95% C. I**	**p-value**
Number of children under 5					
None	2 (50.00)	2 (50.00)	0.706	[0.097,5.156]	0.732
One	99 (61.88)	61 (38.12)	REF		
Two	52 (67.53)	25 (32.47)	1.200	[0.667,2.160]	0.542
Three	27 (87.1)	4 (12.9)	3.694	[1.214,11.234]	**0.021**
Four	6 (85.71)	1 (14.29)	2.826	[0.308,25.921]	0.358
Above 5	2 (33.33)	4 (66.67)	0.228	[0.037,1.382]	0.228
Occupation of the adolescent mother					
Casual labourer	34 (77.27)	10 (22.73)	2.260	[1.014,5.038]	**0.046**
Formal employment	4 (100.00)	0 (0.00)	1		
Self employed	8 (100.00)	0 (0.00)	1		
Unemployed	142 (62.01)	87 (37.99)			
Chi-square goodness of fit statistic: LR Chi2(8) = 15.23					
Goodness of fit p-value: ***0.019***					

4.7. Association between health characteristics of the child and diarrhoea management practices

The results from the chi-square test of independence as presented in Table 7 indicate that vaccination status ($\chi^2(2) = 9.795$, p=0.007), typhoid vaccination ($\chi^2(2) = 10.814$, p=0.004), rotavirus vaccination ($\chi^2(2) = 6.624$, p=0.036), Measles vaccination ($\chi^2(1) = 5.621$, p=0.018) and DPT vaccination ($\chi^2(1) = 12.507$, p=0.000) were all associated with diarrhoea management practices. The variables were them used in a multivariable logistic regression model to check their relationship with diarrhoea management.

Table 4.6: Relationship between health characteristics of the indexed child and diarrhoea management practices

	Management of diarrhoea		**Chi-square test of independence**	
	Good	**Poor**	**χ^2(n-1)**	**p-value**
Vaccination status				
Fully Vaccinated	100 (75.19)	33 (24.81)	9.795	**0.007**
Not fully vaccinated	72 (59.02)	50 (40.98)		
Not vaccinated	16 (53.33)	14 (46.67)		
Baby vaccinated against typhoid				
Yes	71 (76.34)	22 (23.66)	10.814	**0.004**
No	93 (65.03)	50 (34.97)		
Don't know	24 (48.98)	25 (51.02)		
Baby vaccinated against rotavirus				
Yes	62 (75.61)	20 (24.39)	6.624	**0.036**
No	79 (65.83)	41 (34.17)		
Don't know	47 (56.53)	36 (43.37)		
Sex of the child				
Female	109 (68.55)	50 (31.45)	1.073	0.300
Male	79 (62.7)	47 (37.3)		
Received Measles vaccine				
Yes	55 (29.26)	133 (70.74)	5.621	**0.018**
No	42 (43.3)	55 (56.7)		
Received DPT vaccine				
Yes	154 (71.63)	61 (28.37)	12.507	**0.000**
No	34 (48.57)	36 (51.43)		

Table 4.7 below indicates that only DPT vaccine was significant when all other variables were held constant. Adolescent mothers whose children had not taken the DPT vaccine had less odds of having good diarrhoea management (OR=0.481, 95% C.I [0.243, 0.950], p=0.035), implying that those who took their children for DPT vaccination had better diarrhoea management practices.

Table 4.7: demographic characteristics of the adolescent mother and diarrhoea management practices

	Management of diarrhoea		Multivariate binary Logistic Regression		
	Good	**Poor**	**OR**	**95% C. I**	**p-value**
Vaccination status					
Fully Vaccinated	100 (75.19)	33 (24.81)	**REF**		
Not fully vaccinated	72 (59.02)	50 (40.98)	0.933	[0.347,1.463]	0.356
Not vaccinated	16 (53.33)	14 (46.67)	0.713	[0.326,2.662]	0.897
Baby vaccinated against typhoid					
Yes	71 (76.34)	22 (23.66)	**REF**		
No	93 (65.03)	50 (34.97)	0.872	[0.410,1.855]	0.724
Don't know	24 (48.98)	25 (51.02)	0.464	[0.189,1.142]	0.095
Baby vaccinated against rotavirus					
Yes	62 (75.61)	20 (24.39)	REF		
No	79 (65.83)	41 (34.17)	0.975	[0.431,2.201]	0.952
Don't know	47 (56.53)	36 (43.37)	0.853	[0.368,1.978]	0.713
Received Measles vaccine					
Yes	55 (29.26)	133(70.74)	**REF**		
No	42 (43.3)	55 (56.7)	0.893	[0.451,1.768]	0.746
Received DPT vaccine					
Yes	154 (71.63)	61 (28.37)	**REF**		
No	34 (48.57)	36 (51.43)	0.481	[0.243,0.950]	**0.035**

Chi-square Goodness of fit statistic: LR Chi2(8) = 20.60
Goodness of fit p-value: ***0.008***

4.8. Household and Environmental factors affecting diarrhea management.

Results in table 4.8 shows that having a handwash facility ($\chi^2(2) = 15.396$, p=0.000), and use of rainwater ($\chi^2(2) = 4.505$, p=0.034), were associated with diarrhoea management

Table 4.8: Association between household factors and diarrhoea management practices

	Management of diarrhoea		Chi-square test for independence	
	Good	**Poor**	**χ^2(n-1)**	**p-value**
Do you have a toilet				
Yes	165(66.53)	83(33.47)	0.381	0.826
No	6 (66.67)	3 (33.33)		
Shared	17 (60.71)	11(39.29)		
Do you have a handwash facility				
Yes	119(75.32)	39(24.68)	15.396	**0.000**
No	68 (55.28)	55(44.72)		
Shared	1 (25.0)	3 (75.0)		
Distance to hospital				
Less than 5 kms	120(67.36)	63(32.64)		
5 to 10 km	52 (61.18)	33(38.82)	2.357	0.502
10 to 15 km	5 (83.33)	1(16.67)		
More than 15 Km	1 (100.00)	0 (0.00)		
Use borehole water				
Yes	157 (63.82)	89 (36.18)	3.680	0.055
No	31 (79.49)	8 (20.51)		
Use rainwater				
Yes	25 (83.33)	5 (16.67)	4.505	**0.034**
No	163 (63.92)	92 (36.08)		
Use tap water				
Yes	26(76.47)	8 (23.53)	1.898	0.168
No	162 (64.54)	89 (35.46)		

Table 4.9 below indicates that among household and environment factor, possession of a handwash facility was the only factor which was significant when all other variables were held constant. The odds of households without a handwash facility having good diarrhoea management practices were less compared to those households with a handwash facility when other variables were held constant (OR=0.405, 95% C.I [0.262, 0.735], p=0.002), implying that having a handwash facility in the home alone improved diarrhoea management practices.

Table 4.9: Environmental factors and diarrhoea management practices

	Management of diarrhoea		Multivariate binary Logistic Regression		
	Good	**Poor**	**OR**	**95% C.I**	**p-value**
Do you have a handwash facility					
Yes	119(75.32)	39(24.68)	REF		
No	68 (55.28)	55(44.72)	0.405	[0.262, 0.735]	**0.002**
Shared	1 (25.0)	3 (75.0)	0.109	[0.012, 1.200]	0.071
Use rainwater					
Yes	25 (83.33)	5 (16.67)	REF		
No	163 (63.92)	92 (36.08)	0.354	[0.174,1.331]	0.159
Chi-square Goodness of fit statistic: LR Chi2(8) = 17.53					
Goodness of fit p-value: ***0.0006***					

CHAPTER FIVE: DISCUSSION

5.1. Introduction

This chapter will highlight the comparison of results from the current study with existing literature. The sections discussed the findings as per the study objectives.

5.2. Discussion

5.2.1. Environmental Risk Factors of Diarrhea Management among Adolescent Mothers with Child Under- Five

Results from this study showed that a greater number of the participants said that diarrhea can be prevented by boiling drinking water. Other diarrhea prevention strategies in the management of diarrhea mentioned were exclusive breastfeeding, maintain cleanliness, proper cooking of food and vaccination. This may be explained by reduced contamination through hygienic practices and exclusive breastfeeding together with vaccination which ensures strong immunity among under-five children. This concurs with a study done in Iran which reported that hygiene and sanitation, diet, medications, and supplements, breastfeeding, immunization, supplemental zinc, and probiotics are various preventive measures of diarrhea (Khalili *et al.*, 2013).

Water treatment process through boiling and treatment with chemicals to make it safe for drinking, and hygienic practices such as use of latrines, hand washing with soap or ash after using the latrine, changing the baby's diapers, and before feeding were mentioned to be some of the strategies in diarrhoea prevention and management among the under-fives within the study area. These are some of the personal and behavioural hygienic practices that reduces contamination of the environment as well as other surfaces that could harbour the diarrhoea causing micro-organisms. This reflects the findings of a study done in Diredawa, Eastern Ethiopia, where several interventions like ensuring safe drinking water and improved hygiene practices, particularly hand washing with soap and proper disposal of excreta reduced childhood diarrhea incidence by 35% (Workie *et al.*, 2018b).

Some environmental factors that were regarded to cause diarrhea included unhygienic environment, lack of handwashing facilities, uncovering food, and failure to wash hands after visiting the toilet. Children were mentioned to pick unclean objects, soil and animal feces and eating which was regarded as a cause of diarrhea among under-fives within the study area.

These practices could lead to infection of the baby with diarrhea due to contamination and therefore having hygienic practices both personal and environmental are factors that could impact the diarrhea management practices due to continued re-infection. These concurs with findings from several studies which indicated that the interaction of children with exposure to highly contaminated sources, such as soil contaminated with animal faeces or animal manure, increased their risks (Ercumen *et al.*, 2017). It also agrees with results from rural Bangladesh which where children's hands were contacted soil potentially contaminated with faeces in 5% of eating events (Kwong *et al.*, 2016). It is also similar to a Tanzanian study in which children putting contaminated hands in their mouths accounted for 97% of total ingested faecal matter, while only 3% resulted from direct consumption of contaminated drinking water (Mattioli *et al.*, 2015).

A greater percentage of the participants indicated that vaccination helps in preventing diarrhea disease. This can be due to the protective effect of immunization and therefore reduce the chances of contracting diarrhea. This could also imply that mothers use the knowledge on diarrhea management acquired from the health education sessions conducted during the post-natal visits regarding childhood illnesses. This agrees with literature that vaccination, especially against rotavirus, is an effective way of preventing significant diarrheal disease morbidity and mortality in children. When compared to fully immunized children, partially immunized children have a higher risk of diarrhea (Avisek Gupta *et al.*, 2015; Mokomane *et al.*, 2018).

Behavioural characteristics including failure to wash hands when handling food, or when feeding/breastfeeding, improper food preparation and failure to keep the utensils clean were mentioned as risk factors to diarrhoea management of diarrhoea. The behaviour of the child was also attributed to cause diarrhoea, such as child eating dirt, bottle feeding and early weaning practices. The consumption of dirt and contamination of bottle feeders leading to infection could be the reason the two are attributed to diarrhea. This agrees with a study conducted in Kenya which indicated that the factors that were independently associated with diarrheal diseases as child drinking untreated water, lack of exclusive breastfeeding, failure of the child to wash hands before eating and after visiting toilet (Karambu *et al.*, 2014).

5.2.2. Management Practices of Diarrheal Diseases Among Adolescent Mothers with Child Under-Five

This study reports that 22.5% of the under five children born to adolescents within the study area had had diarrhea in the past two weeks before the survey. The diarrhea prevalence in the study site was therefore higher than the national diarrhea prevalence as indicated on the KDHS report of 2014 which stated that the national prevalence of diarrheal diseases in children under the age of five was 15%, a slight decrease from the 17% reported in the KDHS 2008. (KDHS, 2014).

According to the results from the study, some participants resorted to abstaining from food during diarrhea as the babies did not have appetite. This could be an indication of lack of knowledge on the diarrhoea management home-based practices and instead the inappropriate diarrhoea management practices such as food restriction.

The use of non-conventional methods might also indicate a challenge in health seeking behaviour due to lack of finances or distance to the health facilities. As a result, these findings indicates that participants' practices were not in line with literature which indicates that fluids such as soup, rice water, yogurt, and salt sugar solution, are the recommended home-based fluids (Getachew *et al.*, 2018b; Kebede Fufa *et al.*, 2019). Optimal child feeding practices can prevent over 10% of mortality from diarrhea (Workie *et al.*, 2018b). The findings from this study shows a gap in line with the integrated community case management of childhood illness (ICCM) strategy which stipulates that caregivers at home should have adequate knowledge about the causes of and management strategies for diarrhea, using appropriate remedies, and referred accordingly to a health facility upon close monitoring (Dodicho, 2016). This could be an indicator that adolescents lack adequate knowledge on the use of appropriate home-made fluids.

The use of non-conventional methods such as herbs in diarrhoea management was also mentioned by the adolescent mothers. This management practice could be prevalent because of either lack of finances to purchase drugs at the hospital or to access the hospital due to the distance. The use of herbs is one of the inappropriate diarrhoea management practices identified in literature. This concurs with a study done by Masiha *et al.* (2015) which indicated that caregivers used inappropriate traditional medicine whose effect unknown in managing diarrhea at home.

The participants reported continued feeding to be difficult due to the loss of appetite during diarrhoea episodes, even though continued feeding is recommended as a good diarrhoea management practice. Curtailment in feeding could lead to dehydration and contribute to malnutrition. This concurs, with findings by WHO (2005) which indicated that harmful practices like restriction of breast milk, fluids and/or food and use of incorrect modern medicines during diarrheal episodes have also been linked to negative outcomes, and contradict WHO treatment guidelines.

Most of the participants indicated that they sought healthcare from a health facility both public and private whereas others went to pharmacies and after the condition had worsened. This could be explained by lack of finances to travel to the nearest health facilities as well as purchase of prescriptions in case the facility did not have the prescribed medication in stock. This concurs with as study conducted in Norwest, Ethiopia which indicated that majority of the caregivers seek healthcare from hospitals in case of a childhood diarrhoea episode (Desta *et al.*, 2017).

5.2.3. Relationship between environmental risk factors and management practices among adolescent mothers with child under five

Results from a univariate analysis in this study indicated that the sex of the child, level of education of the mother and occupation of the mother were not significant predictors of diarrheal management practices among the participants. This could be due to lack of huge contrast on the number sex of the study participants, the level of education as well as the occupation of participants. In addition, the lack of significant association between sex and diarrhoea management practices, could imply that there is a change in culture where male children have been more preferred than female children. These findings therefore disagree with those of a study by Dodicho (2016) which reported a significant difference between the sex of an index child and maternal practices towards prevention of diarrhea. Mothers of female children have been shown to have poor practices. The findings also disagree with the findings that socioeconomic status of the mother, monthly income were some of the factors that significantly influenced the occurrence of diarrhea (Anteneh *et al.*, 2017; Regassa & Lemma, 2016) .

The findings in this study could be explained by similar findings which reported the existence of an inherent biological risk associated with young maternal age, which is not mitigated by

adjusting for biodemographic, socio-economic, and health systems variables (Sharma *et al.*, 2008)

A multivariate analysis conducted in this study indicated that, DPT vaccination, typhoid vaccination, rotavirus vaccination and number of under 5 children in the household were all significant predictors for diarrhea management practices. Caregivers of children who had not received various vaccines were less likely to have good diarrhea management practices. These vaccines were DPT vaccine (OR=0.374, p=0.001), typhoid vaccine (OR= 0.297, p=0.001) and rotavirus vaccine (OR= 0.42, p=0.011). This can be explained by the protection created through immunization, hence improving the immune system as preventive strategy in the management of diarrhea. This concurs with literature that rotavirus vaccination has emerged as a key effective means of preventing significant morbidity and mortality from childhood diarrheal disease. When compared to fully immunized children, partially immunized children have a higher risk of diarrhea (Avisek Gupta *et al.*, 2015; Mokomane *et al.*, 2018). It could also be due to the difference in level of awareness on diarrhoea management, the accessibility of the health facility and supplies. The findings therefore concur with a study conducted in Ethiopia which indicated that measles and rotavirus vaccination status were significantly associated with diarrhea in children (Azage *et al.*, 2016).

Participants who had three children aged under five were more likely to have good diarrhea management practices than participants with one child under the age of 5 (OR=4.159, 95% C.I [1.388,12.463], p=0.011). This could mean, when a household has many under-five children, the caretakers tend to be more careful with hygienic practices and better knowledge in diarrhea management, through consulting one another or even helping one another. This difference could also be because of the level of awareness as household members seek postnatal services from the health facilities. This finding is consistent with findings from Ethiopia by Anteneh and Kumie (2010) which found out that a bigger family size was associated with diarrhea morbidity. However, it contradicts findings from Derashe District in Southern Ethiopia where family size was not significantly associated with diarrhea disease(Godana & Mengistie, 2013a). The findings disagree with the findings that the number of under-five children in a household was a significant factor that influenced the occurrence of diarrhea management (Anteneh *et al.*, 2017; Regassa &

Lemma, 2016). The difference might as well be because of family socioeconomic status or living condition or even failure to take care of many children.

While controlling for the household having a handwash facility as well as the occupation of the mother, it was found out that those who had not been vaccinated had less odds of having good management skills compared to those whose children had been fully vaccinated (AOR=0.409, p=0.038). The results also indicated that those who had did not have a handwash facility were less likely to have good diarrhea management practices compared to those with a handwash facility (OR=0.405, p=0.000). The findings agree with a study that a study done by Mohammed and Zungu (2016) which indicated that, hand washing facilities, improved sanitation, and availability of latrine have been identified as other common environmental health risk factors of childhood diarrhea. These findings also agree with findings from Ethiopia which indicated that initiation of complementary feeding at 6 months, hand washing practice (at least three critical hands washing times), comprehensive knowledge on childhood diarrhea, and measles and rotavirus vaccination were significantly associated with childhood diarrhea (Azage *et al.*, 2016).

Similarly, households which did not use rainwater were less likely to have good diarrhea management practices relative to households which used rainwater (p=0.041). This could be to reduce contamination of the water through ground water pollution or even the contamination of the containers. This concurs with findings from Derashe district, Southern Ethiopia (Godana & Mengistie, 2013a) which reported that the use of unprotected water sources was significantly associated with diarrheal disease (Tigabu *et al.*, 2010) This effect might be due to some other environmental factors or the socio-economic status or level of awareness on diarrhoea management. Similarly, there was a significant relationship between having a handwash facility in the home and appropriate diarrhea management (COR=0.806, p=0.0458). This might imply that those that had a handwashing facility utilized it hence adhering to handwashing as a diarrhea prevention strategy in diarrhea management. The finding agrees with that from Bangladesh which indicated a positive reduction in diarrhea cases after setting up interventions on sanitation and hygiene improvements (Luby *et al.*, 2018). The finding however contradicts with a study done in Kenya, and another conducted in Zimbabwe which reported no significant association between waters sources, handwashing facilities, sanitation facilities and diarrhea in children and

that revealed that traditional household WASH interventions were unlikely to reduce diarrhea (Islam *et al.*, 2020; Kearns, 2020).

According to the findings, conventional methods of diarrhoea are practiced by the adolescents. Knowledge on homemade fluids which are recommended in home management diarrhoea was generally low. Environmental factors such as handwashing was related to diarrhoea management.

CHAPTER SIX CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study showed that the diarrhoea prevalence within the study area was higher than the national one and a third of the adolescent mothers practiced inappropriate diarrhoea management practices. These poor diarrhoea management practices included restriction of breast milk, fluids and/or food and use of traditional medicines. Some adolescents (66%) practiced appropriate diarrhoea management practices such as continue feeding, breastfeeding and use of homemade fluids such as use of ORS and salt and sugar solution. The study found out that those who had not been vaccinated had less odds of having good management skills compared to those whose children had been fully vaccinated. Also, clean environment, handwashing, boiling/treating drinking water and personal hygienic practices. Having a handwashing facility and use of rainwater within the household also influenced the diarrhoea management practices. The use of borehole water and use of tap water were not associated with diarrhea management practices.

The study is deemed relevant and timely since diarrhoea is known as a contributory factor of mortality among under-fives and Kenya as a country is undergoing through the challenge of adolescent pregnancy. The prevalence of diarrhoea was higher than the national one within the study area and the knowledge on diarrhoea having been indicated to be low, the findings are expected to aid stakeholders in educating adolescent mothers on the management of diarrheal disease with under five children. It is also expected that the findings of this study will enhance the efforts towards the reduction of childhood mortality.

6.2 Recommendations

1. The MOH should also ensure that activities such as health educational campaigns by the community health workers are vast and reach all the mothers including adolescent as this could improve the diarrhoea management practices of the adolescent mother and monitor as well as evaluate for impact and results

2. Should ensure the strengthening of the iCCM as this improves home management of diarrhoea through addressing the environmental and other factors that impact diarrhoea management practices in a population and this would empower the adolescent mother.
3. Organizing community support interventions for adolescent mothers and educate them on diarrheal management and the associated factors.

6.3 Suggestion for further research

1. Explore the factors affecting both mothers' knowledge levels about diarrhoea and their preferences to use traditional methods among adolescent mothers.
2. Determining positive and negative traditional practice preferences and ways of adopting the positive diarrhoea management practices among adolescent mothers

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2. APPENDICES

3. Appendix I: Parent Consent form for girls aged 15-17 years

Study Title: Management practices of diarrhoeal diseases and the associated risk factors among children of adolescent mothers in Nyando sub county, Kisumu, Kenya

Principal Investigator: Justinah Kavata Maluni

Consent Form-Adolescent girls (15-17 years)-HH survey

Interviewer: First obtain parent or guardian consent before obtaining the minor's assent

Introduction

Greetings. My name is _____. I am here on behalf of Ms. Justinah Maluni a master's student in JOOUST.

Purpose of the study

The study would like to find out more about management practices of diarrhoeal diseases among adolescent mothers. Information from this study will be used to further improve diarrhoea management practices among adolescent mothers in this area.

Why you are being asked to join the study

You are being requested o allow your adolescent aged 15-17 years to participate in this study. She is believed to be one among those who could help us understand how to diarrhoea management in your community. You may choose not to give us permission to talk to her, or to not let her any of the questions you are not comfortable with. If you choose not to participate, it will not affect your access to all the services you receive in the community or at the health facility. The study hopes to involve other adolescent mothers like her.

Procedures

If you agree her to join this study, she will be asked to participate in a discussion that will last approximately 25-30 minutes with me. As a parent, we may also request to interview you.

Risks

There is some minimal risk or discomfort expected from participating in this study, as she may find it a bit uncomfortable answering some of the questions, or talking about the health of her child. However, she may choose what she wants to share and avoid answering any questions if

she doesn't feel like addressing. The answers will be kept private and will not be shared them with you as the parent/guardian.

Benefits

There are no direct benefits, but we hope to learn something about diarrhoea practices

Payment

You will not receive any payment for allowing your child to participate in this study.

Voluntary participation

You do not have to allow her to join this study, but this decision is voluntary, including when you change your mind.

Do you have any questions?

If you allow your adolescent girl to be in this study, please sign below.

You will get a copy of this form to keep for yourself.

_____ _____

(Signature or thumbprint of parent/guardian) (Date)

_____ _____

(Signature of Person Obtaining Assent) (Date)

4. Appendix II. Assent Form for adolescent mothers ages 15 – 17 years

Study Title: Management practices of diarrhoeal diseases and the associated risk factors among children of adolescent mothers in Nyando sub county, Kisumu, Kenya

Principal Investigator: Justinah Maluni

An Assent form – Adolescent (15 – 17 years)- HH survey

Introduction

Greetings. My name is _____, I am representing Justinah Kavata Maluni, a MPH student at Jaramogi Odinga Oginga University of Science and Technology.

Purpose of the study

The study would like to find out more about young mothers' management practices of diarrhoeal disease and the associated factors among their under five children. Information from this study will be used for further improvement on the diarrhoea management practices among adolescent mothers in this community.

Why your participation is important

You are being asked to take part in this study because you are among adolescent mothers 15-17 years living in your community, since we believe you are among those who can help us understand how to improve diarrhoea management practices in this community. You may choose not to participate, or not to answer any of the questions that you are not comfortable about. If you decline to participate in the study, you will continue receiving all the services in the community or at the health facility, and there will be no penalty. The study hopes to include many other young mothers like you.

Procedures

Your parent(s) has been talked to, and they have given us permission for you to participate in the study. If you agree to take part this study, you will be asked to take an interview lasting about 30 minutes.

Risks

There no significant risk expected from your taking part in this study. You may however find some of the questions uncomfortable. While it advised you can opt not answer, we would really appreciate if you tried answering all questions.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. I will ask when you last your child had diarrhoea. You may skip any questions you want or take time thinking about your responses. Answers from this survey will be kept private and will not share them with your parent/guardian.

Benefits

This study will provide any directs benefits to you as a participant, but will boost our understanding of management of diarrhoea in children in the local context.

Payment

There are no payments for taking part in this study.

Voluntary participation

Participation in this study is voluntary and you do not have to join this study. You can agree now, and then change your mind later.

If you accept to be in this study, please sign below.

You will get a copy of this form to keep.

If you have any questions or concerns about this study, you may contact the Study investigator: Justinah Maluni; 0751807074.

_____ _____

(Signature or thumbprint of participant) (Date)

_____ _____

(Signature of Person Obtaining Consent) (Date)

5. Appendix III. Consent Form for adolescent mothers ages 18 – 19 years

Study Title: Management practices of diarrhoeal diseases and the associated risk factors among children of adolescent mothers in Nyando sub county, Kisumu, Kenya

Principal Investigator: Justinah Maluni

Adult Consent form – Adolescent (18 – 19 years)- HH survey

Introduction

Greetings. My name is _____, I am representing Justinah Maluni, a MPH student at Jaramogi Odinga Oginga University of Science and Technology.

Purpose of the study

The study would like to find out more about young mothers' management practices of diarrhoeal disease and the associated factors among their under five children. Information from this study will be used for further improvement on the diarrhoea management practices among adolescent mothers in this community.

Why you are being asked to join the study

You are being asked to take part in this study because you are among adolescent mothers 18-19 years residing in your community. You are believed to be one among those who could help us understand how to improve diarrhoea management practices in your community. You may choose not to answer any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. The study hopes to include **young mothers** like you in this survey.

Procedures

If you agree to join this study, you will be asked to take part in an interview that will last approximately 30-45 minutes. You might also be requested to participate in a group discussion later on with other young mothers at the end of this interview.

Risks

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about the health of your child in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions you will be asked may make you uncomfortable. You will be asked when you last your child had diarrhoea. You may skip any questions you want or take time thinking about your responses. Answers from this survey will be kept private and will not share them with your parent/guardian.

Benefits

This study will not help you, but we hope to learn something about management of diarrhoea in children and improve delivery of these services in the health facilities.

Payment:

There are no benefits or payments in taking part in this study. However, it gives you an opportunity to share your relevant experiences with us, which will contribute to improving diarrhoea management practices among adolescent mothers

Voluntary participation

Participation in this study is voluntary and you do not have to join this study. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind. If you want to be in this study, please sign your name. You will get a copy of this form to keep.

If you have any questions or concerns about this study, you may contact the Study investigator: Justinah Maluni; 0751807074

_____ _____

(Signature or thumbprint) (Date)

_____ _____

(Signature of Person Obtaining Consent) (Date)

Appendix IV: Questionnaire for Adolescent Mothers (15-19 years)

Questionnaire

Question	**Response**
1. Participant Number:	_____
2. Community Unit Name:	_____
3. Participant Name: (Optional)	_____
4. How old are you?	_____

A. Demographic Profile of Respondents:

1. What is your education level?

- □ No formal education
- □ Illiterate
- □ Partial primary
- □ Primary
- □ Partial secondary
- □ Secondary
- □ College – certificate
- □ Diploma
- □ Other

2. What is your occupation:

- □ Formal Employment
- □ Unemployed/stay at home mum
- □ Casual labourer/informal employment
- □ Self-employed

3. Total Number of children: _____

4. How old is your child(ren)_____?

5. What is the sex of your child? _____

6. What is the vaccination status of your child?	Fully Vaccinated
	Not fully vaccinated
Immunization Indicators	Received DPT3 (Yes, NO)
	Received Measles 1 at 9 months (Yes, NO)
7. What is the distance to the nearest hospital?	<5km
	5 to 10 Km
	10 to 15 km
	15KM>
8. Number of children under 5 years in the household:	_____
9. Are both parents alive?	□ yes
	□ No
10. Do you stay with your parents?	□ yes
	□ No
11. If yes, do your parents live together?	□ yes
	□ No
12. Occupation of the mother?	Employed
	Self-employed
	Unemployed
	Casual labourer

13. Occupation of the father?

Formal Employment

Self-employed

Unemployed

Casual labourer/informal employment

B. Housing & Sanitation Conditions:

14. Source of Water supply:

- □ Boring water / Well water
- □ Tanker supply water
- □ Tap water inside
- □ Hand pump
- □ None

15. Do you have a toilet in the household?

- □ yes
- □□

Shares with a neighbor

16. Do you have a handwashing facility in the household?

C. Diarrhoea Episodes in Children:

17. Since last one year does your child suffer from diarrhoea.

- □ Yes
- □ No

18. Since the last 2 weeks, has the baby suffered from diarrhoea?

- □ Yes
- □ No

19. If yes, what was the age of children when he had diarrhoea?

- □ Less than 6 months

- 6 to 11 months
- 12 to 17 months
- 18 to 23 months

D. Knowledge about Diarrhoeal diseases:

20. What is diarrhoea?

Loose stool >=2 times a day	Yes
	No
Loose stools >=3 times a day	Yes
	No
Passage of normal stools >3 times a day	Yes
	No

21. What causes diarrhoea?

Teeth eruption	Yes
	No
Intake of contaminated food and water	Yes
	No
Indigestion	Yes
	No
Overeating	Yes
	No

22. Do you think the diarrhoeal diseases can be transmitted from because of drinking?

contaminated water? ☐ Yes

☐ No

23. Do you think the diarrhoeal diseases can be transmitted from because of eating unhygienic food? ☐ Yes

☐ No

11. Do you think diarrhoeal diseases can be spread by eating with dirty hands? ☐ Yes

☐ No

12. Do you think filter machine or filtering water by placing cloth help in reducing the incidence of diarrhoeal diseases? ☐ Yes

☐ No

13. Do you think diarrhoea can be prevented in infants and children via?

Exclusive breastfeeding ☐ Yes

☐ No

Boiling drinking water Yes

No

Use of latrine Yes

No

14. Do you know use of any chemical can disinfect the water contaminants? ☐ Yes

☐ No

15. Do you think that bottle feeding can be a factor for diarrhoea morbidity among children under 5 years of age?

- □ Yes
- □ No

16. Do you think that vaccination can help in the prevention of diarrhoeal diseases?

- □ Yes
- □ No

17. Do you know about method of ORS (Oral Rehydration Solution) preparation?

- □ Yes
- □ No

18. Do you think that use of banana is useful in reducing the electrolyte imbalance in diarrhoea?

- □ Yes
- □ No

19. Do you think that use of yogurt is act as probiotic in diarrhoea?

- □ Yes
- □ No

20. Do you think that eating food with dirty hands can cause diarrhoea?

- □ Yes
- □ No

21. Do you think abstinence from food in diarrhoea can prevent further episodes of diarrhoea?

- □ Yes
- □ No

E. Attitude for Diarrhoeal Disease & its Prevention:

14. It is good to keep children hand clean always
- □ Yes
- □ No

15. Need to wash hands with soap after going to latrine
- □ Yes
- □ No

16. Wash hands before eating is a healthy practice for the prevention of diarrhoea
- □ Yes
- □ No

17. Breast feeding is useful for preventing diarrhoeal episodes among children under 2 years
- □ Yes
- □ No

18. Boiled water is useful for preventing diarrhoeal episodes
- □ Yes
- □ No

19. We need to give bottle milk to children in boiled water for preventing diarrhoeal episodes
- □ Yes
- □ No

F. Practices for management of Diarrhoeal Diseases:

20. How do you treat a child with diarrhoea?
- Give more water and ORS
- Decrease water and food intake
- Don't know

21. How is ORS (Oral rehydration solution) prepared?
- Mix ORS powder with water
- Mix ORS powder with milk/juice

Don’t know

22. How much water _____

23. Do you breast fed your children? ☐ Yes

☐ No

29. Do you bottle fed your children? ☐ Yes

☐ No

30. Do you use Cow milk to your children for feeding? ☐ Yes

☐ No

31. Do you use formula milk you your children for feeding? ☐ Yes

☐ No

32. Do you boil water before drink? ☐ Yes

☐ No

33. Do you boil bottle feeders? ☐ Yes

☐ No

34. Do you boil bottle feeders before every feed? ☐ Yes

☐ No

35. Do you abstain all types of food in diarrhoea? ☐ Yes

☐ No

36. Do you filter water by use of muslin cloth? ☐ Yes

	□	No
37. Do you use any chemical e.g., chlorine tablets etc. in tank for killing water germs?	□	Yes
	□	No
38. Do you wash your hands before eating foods?	□	Yes
	□	No
39. How do you wash your hands?	□	Simple tap water
	□	With soap
	□	With sand
	□	With ash
40. Do you use banana in diarrhoea?	□	Yes
	□	No
41. Do you use yogurt in diarrhoea management?	□	Yes
	□	No
42. Do you wash your hands after passing stools?	□	Yes
	□	No
43. Do you use ORS in case of diarrhoea?	□	Yes
	□	No
44. Among different type of ORS which one do you prefer:	□	ORS solution
	□	ORS powder
	□	Rice Based ORS
	□	Homemade Salt and Sugar solution

	☐	Homemade sugar solution
	☐	Juice
	☐	Other _____
45. Has your child been vaccinated against typhoid vaccine?	☐	Yes
	☐	No
	☐	Don't know
46. Has your baby been vaccinated against rotavirus induce diarrhoea?	☐	Yes
	☐	No
	☐	Don't know
47. I always remind the children to wash hands before and after eating	☐	Yes
	☐	No
48. I wash hands after bathing children	☐	Yes
	☐	No
49. I wash my hands after changing diapers	☐	Yes
	☐	No
50. I do not wash hands before touching children	☐	Yes
	☐	No

G. Community Concern:

51. According to your knowledge what are the basic factors for diarrhoea cases in your community?	☐	Lack of access to safe water

	□ Lack of preventive measure by household □ Lack of awareness □ Lack of sanitation □ Lack of resources □ Lack of Government support □ Early weaning practices □ Bottle feeding □ Others
52. How can we reduce the incidence of diarrhoea in your community?	□ By providing clean water □ By providing awareness □ By providing resources □ By providing basic sanitation □ Other
H. Suggestion for Improvement:	□□□□□□□□□□□□□□□□□□□□□□□□□□□□
Health facility factors for diarrhoea management	
1. What are some of the reasons that can make you not to seek care after a diarrhoea episode?	Lack of money Long distance to the health facility Illness is not serious Mother or caregiver is busy High cost of treatment New teething

	Unfriendly health providers
	Long waiting periods
2. Where do you seek care in case of a diarrhoea episode in your child?	Government hospital
	Private hospital
	Pharmacy/chemist
	Traditional doctor
3. Why would you seek care in a private facility?	Provides good treatment
	It is near home
	Healthcare providers are friendly
	Short waiting periods
4. Why would you seek care in a public health facility?	Low cost of treatment
	Near home
	The diarrhoea persisted
	Short waiting periods

6. APPENDIX V: Focus Group Discussion Guide; English version

1. Tell me what you know about diarrhoea? Probe: the frequency
2. What do you think causes diarrhoea? Probe; personal hygiene, environmental hygiene,
3. How do you think diarrhoea can be management? Probe for; feeding practices, ORS, use of fluids.
4. Where do you get information about diarrhoea management? Probe; the role of healthcare workers, community health volunteers, traditional healers and experienced mothers, social media, peers
5. Do you think you have what it takes to manage diarrhoea in your child(ren)?

   If yes, why? If no, why? [Probe; knowledge/maternal experience, financial stability, knowledge on the home management fluids, ORS, Breastfeeding, Rice water]
6. What do you think can be done to improve diarrhoea management practices among adolescent mothers? Probe; support from parents, health education during post-natal visits, the role of the health care workers in the health seeking behaviour of the adolescents

7. APPENDIX VI: Focus Group Discussion Guide; Swahili version

1. Tafadhali nieleze chochote unachojua kuhusu kuhara
2. Unafikiria nini usababisha kuhara (Probe; usafi wa kibinafsi, Usafi wa mazigira)
3. Unafikiria kuhara kwaweza kusimamizwa ki vipi? (Probe; Mazoea ya kulisha, ORS, matumizi ya vitu maji maji)
4. Huwa wapata wapi ujumbe kuhusu usimamizi wa kuhara? (Probe; Jukumu la madaktari/wahuguzi, watoleaji wa afya ya jamii (*CHVs*), waganga wa kienyeji, Akina mama wenye uzoefu, Mitandao ya kijamii)
5. Je wafikiria una kile kinachohitajika kidhibiti kuhara kwa mtoto/Watoto wako? (Probe; maarifa/uzoefu wa uzazi, uthabiti wa kifedha, maarifa juu yam aji maji ya kudhibiti kuhara nyumbani)
6. Nini kinaweza fanyika hili kuhimarisha mbinu za kudhibiti kuhara kwa akina mama vijana? (Probe; Usadizi kutoka kwa wazazi, elimu ya afya kwa kliniki za baada ya kupata mtoto, jukumu la wahuguzi/madaktari katika kuboresha tabia za kutafuta matibabu kwa akina mama vijana

8. APPENDIX VII: Focus Group Discussion Guide; Luo version

1. (Nyisa giming'eyo maluore kod diep)
2. Iparo ni ang'o ma kelo diep (Probe; ler mar ringruok, ler mar aluora)
3. Iparo ni diep inyalo chung e yo mane? (Probe; Ng'iyo gi pidho, ORS, tiyo gi gik mimadho)
4. Iyudo Kanye puonj mar chungo diep? (Probe; Tij daktari, joma ochodre ni wach thieth mar ngima (CHVs), Ajuoke mag nyiluoche, mine man gi tiegruok, mbese)
5. Bende iparo ni in gi gimaduarore chungo diep kuom nyithindi?

   Ka iyie, ere gimo miyo? Ka ooyo, ere gimo miyo? (Probe; rieko mar janyuol, bedo gi pesa, kaka inyalo tiyo gi gik mi madho, ORS, dhodho, pi mchele)
6. Iparo ni yo mane ma wanyalo tiyo go mondo wageng' diep kuom mon ma roweche (mon ma pod tindo)? (Probe; kony ma aa kuom jonyuol, tiegruok mar ngima ei klinik bang' konyruok, tij daktari nyiso nyimine matindo gidhi kar thieth)

9. APPENDIX VIII: Focus Group Discussion Guide; English version

1. Tell me what you know about diarrhoea? Probe: the frequency
2. What do you think causes diarrhoea? Probe; personal hygiene, environmental hygiene,
3. How do you think diarrhoea can be management? Probe for; feeding practices, ORS, use of fluids.
4. Where do you get information about diarrhoea management? Probe; the role of healthcare workers, community health volunteers, traditional healers and experienced mothers, social media, peers
5. Do you think you have what it takes to manage diarrhoea in your child(ren)?

   If yes, why? If no, why? [Probe; knowledge/maternal experience, financial stability, knowledge on the home management fluids, ORS, Breastfeeding, Rice water.
6. What do you think can be done to improve diarrhoea management practices among adolescent mothers? Probe; support from parents, health education during post-natal visits, the role of the health care workers in the health seeking behaviour of the adolescents

10. ETHICS APPROVAL DOCUMENTS

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCwIENCE & TECHNOLOGY

BOARD OF POSTGRADUATE STUDIES
Office of the Director

Tel. 057-2501804
Email: bps@joust.ac.ke

P.O. BOX 210 - 40601
BONDO

Our Ref: HI 52/4046/2020

Date: 26th October 2021

TO WHOM IT MAY CONCERN

RE: JUSTINAH KAVATA MALUNI - 1-1152/4046/2020

The above person is a bonafide postgraduate student of Jaramogi Oginga Odinga University of Science and Technology in the School of Health Sciences pursuing Master of Science in Epidemiology and Biostatistics. She has been authorized by the University to undertake research on the topic: "Management Practices of Diarrheal Disease and the Associated Risk Factors among Children ofAdolescent Mothers in Nyando Sub-County in Kisumu County, Kenya".

Any assistance accorded her shall be appreciated.

Thank you.

Prof. Dennis Ochuodho
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

COUNTY GOVERNMENT OF KISUMU
DEPARTMENT OF HEALTH

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When replying please quote

Ref. No. IERC/JOOTRH/560/21

JARAMOGI OGINGA ODINGA TEACHING &
REFERRAL HOSPITAL
P.O. BOX 849

KISUMU
29th March, 2022
Date..... .....

RE: APPROVAL: STUDY TITLE
MANAGEMENT PRACTICES OF DIARRHEAL DISEASE AND THE ASSOCIATED RISK FACTORS AMONG CHILDREN OF ADOLESCENT MOTHERS IN NYANDO SUB-COUNTY IN KISUMU COUNTY ,KENYA.

REF: IERC/JOOTRH/560/21

To: Justina Kavata

Dear Justina,

RE: STUDY TITLE

This is to inform you that JOOTRH IERC has reviewed and approved your above research proposal. Your application approval number is IERC/JOOTRH/560/21. The approval period is 29th March, 2022 to 29th March, 2023.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by JOOTRH IERC.

iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to JOOTRH IERC within 72 hours of notification iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to JOOTRH IERC within 72 hours

v. Clearance for export of biological specimens must be obtained from relevant institutions.

vi. 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.

vii. Submission of an executive summary report within 90 days upon completion of the study to JOOTRH IERC.

1

viii. In case the study site is JOOTRH, kindly report to Chief Executive Officer before commencement of data collection.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.keand also obtain other clearances needed.

Yours sincerely,

JOOTRH ETHICS & REVIEW COMMITTEE
P. O. Box 849 - 40100
KISUMU

ANTONY AYORA
SECRETARY – ISERC
JOOTRH - KISUMU

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 686383

Date of Issue: 02/April/2022

RESEARCH LICENSE

This is to Certify that Miss.. Justinah Kavata Maluni of Jaramogi Oginga Odinga University of Science and Technology, has been licensed to conduct research in Kisumu on the topic: MANAGEMENT PRACTICES OF DIARRHEAL DISEASE AND THE ASSOCIATED RISK FACTORS AMONG CHILDREN OF ADOLESCENT MOTHERS IN NYANDO SUB-COUNTY IN KISUMU COUNTY, KENYA for the period ending : 02/April/2023.

License No: NACOSTI/P/22/16717

686383

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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REPUBLIC OF KENYA

COUNTY GOVERNMENT OF KISUMU

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E-mail: kisumucdh@gmail.com

Director of Public Health, Preventive/
Promotion and Environmental Health
P.O. Box 721 – 40100,
Kisumu.

DEPARTMENT OF HEALTH & SANITATION

Our Ref: GN 133 VOL. XI/ (229) **Date:** 7th April, 2022

To
SCMOH - Nyando

RE: APPROVAL TO CONDUCT RESEARCH ON *'MANAGEMENT PRACTICES OF DIARRHEAL DISEASES AND THE ASSOCIATED RISK FACTORS AMONG ADOLESCENT MOTHERS IN NYANDO SUB COUNTY'*

The Department has reviewed and approved this research titled '***Management Practices of Diarrheal Diseases and the Associated Risk Factors among Adolescent Mothers in Nyando Sub County'.***

The Principal Investigator for this study will be ***Justinah Kavata - 0714847681***

Kindly accord them all the necessary support.

Regards.

COUNTY DIRECTOR OF HEALTH KISUMU

Fredrick O. Oluoch, HSC
Director - Public Health, Preventive/Promotion and Environmental Health
Kisumu County

REPUBLIC OF KENYA

COUNTY GOVERNMENT OF KISUMU

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Director of Public Health, Preventive Promotion and Environmental Health
P.O. Box 721 – 40100,
Kisumu.

DEPARTMENT OF HEALTH & SANITATION

Our Ref: GN 133 VOL. XI (229)

Date: 7th April, 2022

To
SCMOH - Nyando

RE: APPROVAL TO CONDUCT, RESEARCH ON *'MANAGEMENT PRACTICES OF DIARRHEAL DISEASES AND THE ASSOCIATED RISK FACTORS AMONG ADOLESCENT MOTHERS IN NYANDO SUB COUNTY'*

The Department has reviewed and approved this research titled *'Management Practices of Diarrheal Diseases and the Associated Risk Factors among Adolescent Mothers in Nyando Sub County'.*

The Principal Investigator for this study will be ***Justinah Kavata – 0714847581***

Kindly accord them all the necessary support.

Regards

Fredrick O. Oluoch, HSC
Director - Public Health, Preventive Promotion and Environmental Health
Kisumu County

From the office of Director of Public Health, Preventive Promotion and Environmental Health

Approved to
collect data in
Nyando Subcounty
Dr. J. Billis

Medical Officer of Health
Nyando Sub County
Kisumu County