CAREGIVERS' KNOWLEDGE, PERCEPTIONS AND PRACTICES ON DIARRHEOAL DISEASES AMONG CHILDREN UNDER FIVE YEARS IN TURKANA COUNTY, KENYA.

BY

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A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF PUBLIC HEALTH (EPIDEMIOLOGY AND DISEASE CONTROL) IN THE SCHOOL OF PUBLIC HEALTH OF KENYATTA UNIVERSITY.

APRIL 2018
DECLARATION

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

Signature ........................................ Date...........................................

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Supervisors:

This thesis has been submitted for review with our approval as university supervisors.

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2. Signature ........................................ Date...........................................

Dr. Peterson Warutere
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DEDICATION

I dedicate this thesis work to family and friends, particularly to my loving mother Alice Wanjiru Muiruri.
ACKNOWLEDGEMENT

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# TABLE OF CONTENTS

DECLARATION .............................................................................................................. ii  
DEDICATION ................................................................................................................... iii  
ACKNOWLEDGEMENT .................................................................................................. iv  
TABLE OF CONTENTS ..................................................................................................... v  
LIST OF TABLES .............................................................................................................. ix  
LIST OF FIGURES ........................................................................................................... x  
DEFINITION OF TERMS ................................................................................................. xi  
ABBREVIATIONS AND ACRONYMS ............................................................................ xiii  
ABSTRACT ....................................................................................................................... xiv  

## CHAPTER 1: INTRODUCTION ..................................................................................... 1  
1.1 Background of the study ......................................................................................... 1  
1.2 Statement of the problem ....................................................................................... 4  
1.3 Justification of the study ...................................................................................... 5  
1.4 Research questions ............................................................................................... 5  
1.5 Null Hypotheses ................................................................................................... 6  
1.6 Objectives ............................................................................................................. 6  
   1.6.1 Broad objective .............................................................................................. 6  
   1.6.2 Specific objectives ......................................................................................... 6  
1.7 Significance of the study ...................................................................................... 7  
1.8 Scope and delimitation of the study ...................................................................... 7  
1.9 Conceptual framework ......................................................................................... 8  

## CHAPTER 2: LITERATURE REVIEW ........................................................................ 10  
2.1 Introduction ........................................................................................................... 10  
2.2 Global epidemiology of diarrhoea among children under five years .............. 10  
2.3 Diarrhoea among children under five years in sub-Saharan Africa ............. 12  
2.4 Diarrhoea prevalence among children under five years in Kenya ............... 13  
2.5 Pathogenesis of diarrhoea among children under five ................................. 14  
2.6 Caregivers’ perceptions towards diarrhoea ....................................................... 15  
2.7 Caregivers’ knowledge of diarrhoea ................................................................. 16  
2.8 Caregivers’ practices on diarrhoea ................................................................. 18  
2.9 Summary and gaps in literature review ............................................................ 20
CHAPTER 3: RESEARCH METHODOLOGY ........................................21
3.1 Introduction ..................................................................................21
3.2 Study design...............................................................................21
3.3 Study Variables ...........................................................................21
   3.3.1 Dependent variable ...............................................................21
   3.3.2 Independent variables ............................................................21
3.4 Study Area ..................................................................................22
3.5 Study Population .........................................................................22
3.6 Sample size determination and sampling technique ....................23
   3.6.1 Sample size determination .....................................................23
   3.6.2 Sampling Technique ...............................................................24
   3.6.3 Inclusion criteria ....................................................................27
   3.6.4 Exclusion criteria .....................................................................27
3.7 Data collection tools .................................................................28
3.8 Pre-testing of study tools ..............................................................28
3.9 Validity .......................................................................................28
3.10 Reliability ..................................................................................29
3.11 Data collection procedure ..........................................................29
3.12 Data management and analysis ..................................................30
3.13 Logistical and ethical considerations .........................................31

CHAPTER 4: RESULTS AND DISCUSSION .......................................32
4.1 Introduction ..................................................................................32
4.2 Socio-demographic characteristics of respondents .....................32
4.3 Prevalence of diarrheoa among children under five years in Turkana
   County ............................................................................................34
   4.3.1 Treatment of diarrheoa cases in health facilities ....................34
   4.3.2 Use of ORS in managing diarrheoa .........................................35
   4.3.3 Socio-demographic factors and diarrheoa prevalence among children
       under five years in Turkana County ............................................35
4.4 Caregivers’ perceptions on diarrheoa among children under five years in
   Turkana County .............................................................................37
   4.4.1 Perceptions on diarrheoa management ....................................37
   4.4.2 Caregivers’ perception on causes of diarrheoa .......................39
4.4.3 Caregivers’ perceptions and diarrhoea prevalence among children under five years in Turkana County .................................................................40

4.5 Caregivers’ knowledge on diarrhoea among children under five years in Turkana County .................................................................41
  4.5.2 Caregivers’ knowledge on prevention of diarrhoea ..................42
  4.5.3 Caregivers’ knowledge on treatment of diarrhoea ..................43
  4.5.4 Caregivers’ knowledge and diarrhoea prevalence among children under five years in Turkana County ........................................43

4.6 Caregivers’ practices on diarrhoea among children under five years in Turkana County .................................................................45
  4.6.1 Preferences for diarrhoea management ..............................45
  4.6.2 Types of treatment to manage diarrhoea at home ...............46
  4.6.3 Hygiene practices ......................................................47
  4.6.4 Water use practices .................................................48
  4.6.5 Sanitation practices ...................................................49
  4.6.6 Child feeding practices ..............................................50
  4.6.7 Caregivers’ practices and diarrhoea prevalence among children under five years in Turkana County ........................................50

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS..54

5.1 Introduction ........................................................................54

5.2 Discussion .........................................................................54
  5.2.1 Prevalence of diarrhoea among children under five years in Turkana County 54
  5.2.2 Socio-demographic characteristics and prevalence of diarrhoea among children under five years in Turkana County .................................55
  5.2.3 Caregivers’ perceptions and prevalence of diarrhoea among children under five years in Turkana County ........................................56
  5.2.4 Caregivers’ knowledge and prevalence of diarrhoea among children under five years in Turkana County ........................................57
  5.2.5 Caregivers’ practices and prevalence of diarrhoea among children under five years in Turkana County ........................................58
  5.2.6 Summary of findings ..................................................61

5.3 Conclusions ....................................................................61

5.4 Recommendations ..........................................................63
5.4.1 Recommendations for policy action ................................................................. 63
5.4.2 Further research ............................................................................................... 64

REFERENCES ............................................................................................................. 65

APPENDICES ............................................................................................................. 71

Appendix I: Consent form .......................................................................................... 71
Appendix II: Study Questionnaire .............................................................................. 73
Appendix III: Key Informant Guide ............................................................................ 77
Appendix IV: Kenyatta University Graduate School Approval Letter ..................... 78
Appendix V: Ethical Clearance letter ......................................................................... 79
Appendix VI: Research Permit for Conducting the Study ........................................ 81
Appendix VII: Map of the Study area ......................................................................... 82
Appendix VIII: Top diseases in Turkana County ...................................................... 83
LIST OF TABLES

Table 3.1: Sample size distribution matrix .........................................................27
Table 4.1: Socio-demographic characteristics of respondents (N=340)...............33
Table 4.2: Influence of socio-demographic characteristic on diarrhoea prevalence....36
Table 4.3: Diarrhoea prevalence and caregivers’ perceptions ..............................40
Table 4.4: Diarrhoea prevalence and caregivers’ knowledge ...............................44
Table 4.5: Relationship between caregivers’ practices and diarrhoea prevalence......51
LIST OF FIGURES

Figure 1.1 : Conceptual framework of the study .......................................................... 9
Figure 3.1: Multistage sampling process ................................................................. 26
Figure 4.1: Caregivers’ perception about diarrhoea management .............................. 38
Figure 4.2: Perceived causes of diarrhoea ................................................................. 39
Figure 4.3: Caregivers’ knowledge on causes of diarrhoea ........................................ 42
Figure 4.4: Diarrhoea management preferences ....................................................... 45
Figure 4.5: Type of treatment to manage diarrhoea at home ...................................... 47
Figure 4.6: Hygiene practices ..................................................................................... 48
Figure 4.7: Water use practices .................................................................................. 49
Figure 4.8: Disposal of child’s feces ......................................................................... 50
DEFINITION OF TERMS

Caregivers’ knowledge regarding diarrhoea in children: Refers to caregivers’ adequate, correct understanding of the facts of diarrhoea treatment, barriers to management of diarrhoea, causes of diarrhoea, and prevention of diarrhoea.

Caregivers’ perceptions regarding diarrhoea in children: Refers to caregivers’ subjective perceptions about diarrhoea disease in children. This is in regards to their perceived severity of diarrhoea, perceived causes of diarrhoea, perceived treatment, and perceived ability to manage diarrhoea.

Caregivers’ practices regarding diarrhoea: Refers to caregivers’ actions in taking care of a child in order to prevent the child from contracting diarrhoea. It consists of preferences for diarrhoea management, treatment of diarrhoea, hygiene practices, water use practices, sanitation practices, child feeding & weaning practice.

Children under five years: Refers to children from the age group of 0 to 5 years

Dehydration: A condition that results from excessive loss of body water due to untreated diarrhoea disease.

Diarrhoea prevalence: In this study, it refers to the number of cases of diarrhoea reported new and existing within the two weeks preceding the study

Diarrhoea: It is defined as the passage of frequent watery or loose stools (>3/24 h) caused by a variety of viral, bacterial and parasitic agents.

Laga: Gulley created by soil erosion where rainwater collects and flows downstream.

Oral rehydration salt: Refers to a balanced glucose–electrolyte mixture.

Oral rehydration therapy: Refers to administration of fluids by mouth or via nasogastric tube.

Socio-demographic factors: Refers to individual characteristics such as age of caregivers, marital status, education level, household size, number of children under
five years, the main source of income, type of house, gender of the caregiver, age of children, and religious affiliation
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGI</td>
<td>Acute gastrointestinal illness</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immune-deficiency Syndromes</td>
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<tr>
<td>ASAL</td>
<td>Arid and Semi-Arid Lands</td>
</tr>
<tr>
<td>CB-IMCI</td>
<td>Community based integrated management of childhood illness</td>
</tr>
<tr>
<td>C-IMCI</td>
<td>Community Integrated Management of Childhood Illness</td>
</tr>
<tr>
<td>KDHS</td>
<td>Kenya Demographic and Health Survey</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>ORS</td>
<td>Oral rehydration salts</td>
</tr>
<tr>
<td>ORT</td>
<td>Oral Rehydration Therapy</td>
</tr>
<tr>
<td>PD</td>
<td>Persistent diarrhoea</td>
</tr>
<tr>
<td>ProD</td>
<td>Prolonged episodes of diarrhoea</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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ABSTRACT

Diarrhea disease is the major cause of morbidity and mortality among under-five children, especially in developing countries. In Kenya, it causes 16% of deaths among children under five years, second only to pneumonia. The aim of this study was to assess caregivers’ knowledge, perceptions and practices in the management of diarrhea among children under five years in Turkana County. A cross-sectional study design was employed in the study. Pre-tested questionnaires and Key Informant Interview guide were used to collect data. A multi-stage cluster sampling technique was used to select a total of 340 households, while purposive sampling was used to select 20 key informants who participated in the study. Descriptive statistics and Chi-square test of independence were used to analyze quantitative data with the aid of SPSS. Qualitative data were thematically analyzed by using Nvivo software.

Baseline characteristics reveal that caregivers’ had diverse backgrounds with majority aged 21-25 years (27.1%), married (83.2%) and had primary school (34.7%) as the highest education level. Age of under fives also varied with majority aged 12-24 years (49.6%). Findings showed diarrhea prevalence of 16.5%. On socio-demographic factors, only level of education had a statistically significant relationship with diarrhea prevalence ($p = 0.014$). Caregivers’ perceptions that were significantly associated with diarrhea prevalence included perceptions that diarrhea is not a serious disease to be treated at the hospital ($p < 0.001$), traditional medicine is adequate to treat diarrhea ($p < 0.001$), children should be treated at home before taking them to the hospital ($p < 0.001$), supernatural causes ($p < 0.001$), and growth stage such as teething ($p < 0.001$). Caregiver’s knowledge that was significantly related to diarrhea prevalence included: knowledge that diarrhea can be adequately managed at home ($p = 0.31$), contaminated water or food causes diarrhea ($p < 0.001$), poor hands hygiene causes diarrhea ($p < 0.001$), poor fecal disposal causes diarrhea ($p < 0.001$), poor feeding causes diarrhea ($p < 0.001$) and knowledge on prevention of diarrhea ($p < 0.001$) were significantly related to diarrhea prevalence.

In regard to caregivers’ practices, there was a statistically significant relationship between diarrhea prevalence and use of clean drinking water ($p < 0.001$), hand washing after defecation ($p < 0.001$), hand washing before feeding children ($p < 0.001$), hand washing before food preparation ($p < 0.001$), hand washing after helping children to defecate ($p < 0.001$), ensuring proper hygiene ($p < 0.001$), use of pit latrines to dispose feces ($p < 0.001$), proper disposal of feces ($p < 0.001$), and disposal of child's feces ($p < 0.001$). In conclusion, there is a high burden of diarrhea in Turkana County mainly due to caregivers’ negative and wrong perceptions coupled with caregivers’ inadequate knowledge towards diarrhea and its causes. Recommendation was that there is need for increased health communication, education and information sharing to demystify the disease and promote adoption of appropriate and effective diarrhea management practices.
CHAPTER 1: INTRODUCTION

1.1 Background of the study

Diarrhoea remains a major public health challenge worldwide. Globally, more than 10 million children die every year, of which about 1.5 million die from diarrhoea (Avishek et al., 2015). Despite global success in the reduction of all causes and diarrhoea-specific mortality in the past 30 years, diarrhoea remains the second leading cause of death due to infections among children under five years worldwide (Lanata et al., 2013). According to Park (2011), diarrhoea causes 16% of deaths among children under five years worldwide. Most of these deaths occur in low- and middle-income countries, these deaths are avoidable by the existing interventions. In addition, diarrhoea, pneumonia, and malaria account for 37% of under five deaths worldwide, with only about one-third of children with these illnesses receiving appropriate treatment (Manish et al., 2014).

In developing countries, diarrhoea is a leading cause of child mortality. Ninety % (90%) of diarrheal deaths are attributable to poor sanitation and diarrhoea accounts for 18% of deaths among children under five (Faure, 2013). In Africa, pneumonia (14%) and diarrhoea (17%) cause more childhood deaths than Malaria (16%), HIV/AIDS (4%), and measles (1%) combined (Bbaale, 2011).

Diarrhoea is caused by parasites, bacteria and viruses, especially retrovirus which is the leading cause of diarrhoea, and is responsible for about 40% of all hospital admissions among children under five years worldwide (UNICEF, 2012). Other major bacterial
pathogens include Escherechia coli (*E. Cole*), Shigella, Campylobacter and Salmonella, along with Vibrio cholera (*V. Cholera*) during epidemics (UNICEF, 2012).

In Kenya, diarrhoeal disease is a major cause of morbidity and mortality among under-fives, especially in rural and peri-urban communities in developing countries (Najjemba *et al.*, 2014). According to the 2014 Kenya Demographic and Health Survey (KDHS), diarrhoea accounted for 17% of childhood illnesses (KDHS, 2015). In Kenya, diarrhoeal diseases are estimated to cause 16% of deaths among children under the age of 5 in Kenya with the majority of deaths occurring among the poor who constitute an estimated 80% of the total population currently estimated at 40 million (MOH, 2014).

Diarrhoea statistics for other regions around Turkana County show that in West Pokot and Baringo, Marsabit, diarrhoea among children under five years is 8.4%, 16.0%, and 14.9% respectively. Comparing the region’s statistics of diarrhoea and the national data reveal that 15.2% of children under five years in Kenya have diarrhoea while 14.3% of under-fives in Turkana County have diarrhoea, which is only 0.9% below national average according to the 2014 KDHS (KDHS, 2015). This indicates the high burden of diarrhoeal disease in the county. Efforts on the ground in Turkana County had involved encouraging mothers to seek treatment in health facilities, sensitization of the community to use appropriate diarrhoea treatment methods like use of ORS and creation of awareness about the importance of personal hygiene in the prevention of the disease (Najjemba *et al.*, 2014).
Prolonged episodes of diarrhea (ProD; duration 7–13 days) or persistent diarrhea (PD; duration ≥14 days) are important causes of under nutrition, yet the epidemiology and nutritional impact of ProD are poorly understood (Moore, 2010). More than one-fifth of the world's population lives in extreme poverty, where a lack of safe water and adequate sanitation enables high rates of enteric infections and diarrhea to continue unabated. Although oral rehydration therapy has greatly reduced diarrhea-associated mortality, enteric infections still persist, disrupting intestinal absorptive and barrier functions and resulting in up to 43% of stunted growth, affecting one-fifth of children worldwide and one-third of children in developing countries. Diarrhea in children from impoverished areas during their first 2 years might cause, on average, an 8 cm growth shortfall and 10 IQ point decrement by the time they are 7–9 years old (Guerrant et al., 2013).

Diarrhea and acute respiratory infection (ARI) are leading causes of mortality and morbidity in children under the age of five in developing countries. On the African continent, pneumonia (14%) and diarrhea (17%) cause more childhood deaths than Malaria (16%), HIV/AIDS (4%), and measles (1%) combined (Bbaale, 2011). Diarrhea, as a prominent killer of children aged 0–5 years possess a formidable challenge to health planners. The challenge is further aggravated due to a complex interplay of multiple factors contributing to the occurrence of diarrhea among infants and small children (Pooran et al., 2011). Despite improvements in public health and economic wealth, diarrhea continues to be a leading cause of morbidity, hospitalization and mortality worldwide (Dinleyici et al., 2013).
Individual perceptions, practices and health care seeking behavior for diarrhea varies by context and has important implications for developing appropriate care strategies (Das 

et al., 2016). Hence this study was conducted to determine maternal perceptions and prevention practices on diarrhea management among children aged under five years in Turkana Central Sub-County, Turkana County. The focus on the children under five years in Turkana County was based on the fact that they are the most vulnerable to diarrhea disease due to their low immunity.

1.2 Statement of the problem

Diarrhea is a leading cause of childhood morbidity and mortality in sub-Saharan Africa (O'Reilly et al., 2012). Children aged 0 to 5 years are the most vulnerable to diarrheal disease and a high proportion of the deaths occur in the first 2 years of life (Mengistie et al., 2013). Despite implementation of standard community based diarrhea management program in the Turkana County since 2008 (Najjemba et al., 2014), the burden still remains high in the County. Diarrhea prevalence was estimated at 32.2% among under fives in Turkana County by Nutrition Report(2012) while 2014 KDHS reported a 14.3% prevalence of diarrhea among under fives only (KDHS, 2015). There is a dearth of evidence on underlying factors, especially caregivers’ perceptions and practices accounting for this high burden in Turkana County. The problem in Turkana County is that many children under five years are at risk of diarrhea and consequently death. This study aimed at establishing caregivers’ perceptions and practices associated with the burden of diarrhea disease to provide insight on the problem and contribute towards policies and programmatic interventions for curbing the problem.
1.3 Justification of the study

Diarrhoea is a leading cause of childhood morbidity and mortality in Turkana County. The effectiveness of home management of diarrhoea diseases is achievable only if caregivers have appropriate information on the strategies for diarrhoea therapy. Since diarrhoea is mostly managed at household level by mothers and care-givers there is need to investigate their knowledge, perception and practices in management of diarrhoea. Turkana County was chosen because it is one of the counties with high burden of diarrhoea disease. Traditionally diarrhoea is managed in Turkana County at home by mothers or caregivers who may not recognize its seriousness in time. In such cases, they may fail to take children to a health provider in time, and/or fail to give enough attention to the environment, sanitation and hygiene of their households as noted by Brett (2012). Understanding mothers and caregivers’ perceptions and practices in diarrhoea management will be useful in determining underlying factors for persistently high burden of diarrhoea and providing customized interventions for resolving the underlying causes.

1.4 Research questions

1. What is the prevalence of diarrhoea among children under five years in Turkana County?

2. What are the caregivers’ level of knowledge on diarrhoea among children under five years in Turkana County?

3. What are the caregivers’ perceptions on diarrhoea among children under five years in Turkana County?
4. What are the caregivers’ practices on diarrhea among children under five years in Turkana County?

1.5 Null Hypotheses

1. Caregivers’ knowledge do not influence diarrhea prevalence among children under five years.
2. Caregivers’ perceptions do not influence diarrhea prevalence among children under five years.
3. Caregivers’ practices do not influence diarrhea prevalence among children under five years.
4. Caregivers’ socio-demographic characteristics do not influence diarrhea prevalence among children under five years.

1.6 Objectives

1.6.1 Broad objective
To assess the effect of caregivers’ knowledge, perceptions and practices on diarrhea prevalence among children under five years in Turkana County.

1.6.2 Specific objectives
1. To determine the prevalence of diarrhea among children under five years in Turkana County.
2. To determine the effect of caregivers’ knowledge on diarrhoea among children under five years in Turkana County.

3. To determine the effect of caregivers’ perceptions on diarrhoea among children under five years in Turkana County.

4. To determine the effect of caregivers’ practices on diarrhoea among children under five years in Turkana County.

5. To determine the effect of socio-demographic factors on diarrhoea prevalence among children under five years in Turkana County.

1.7 Significance of the study

The findings of the study can inform local county governments, national government and concerned organizations on policies and programmatic diarrhoeal interventions targeting children aged under-five years living in marginalized areas like Turkana County. This study can guide development of new interventions by the Ministry of Health (MOH) to approach health education processes, community dialogues and sensitization campaigns which promote behavioral changes and adoption of healthy practices by mothers and caregivers in general. The study provides information for further references and areas of study on diarrhoea management.

1.8 Scope and delimitation of the study

Due to time constraints, the study was only conducted in Turkana Central sub-county Constituency among mothers and caregivers. Therefore, the study findings were only generalized to counties in remote settings with similar ecological and contextual
characteristics. Self-reported information was gathered which is prone to recall bias. There was a Hawthorns effect due to the fact that the households were visited at baseline. Refusal to give consent, for whatever reason, may have left out many important participants. Another weakness of the study was that a checklist for the environment and waste management was not done. Delimitation in the study was that the study focused only on the prevalence of diarrhoea disease, while other co-morbidities among children under five years were not considered in the study. Besides, only under fives were being investigated while children above five years were not included in the study.

1.9 Conceptual framework

The conceptual framework of the study illustrates the relationship between the independent variables (socio-demographic factors, caregivers’ knowledge and perceptions, and caregivers’ practices) and the dependent variable (diarrhoea occurrence among under fives) as shown in Figure 1.1.
Independent variables

**Socio-demographic factors**
(Age of caregivers, marital status, education level, household size, number of children under five years, main source of income, type of house, gender of caregiver, age of children, and religious affiliation)

**Caregivers’ knowledge**
(Diarrhea treatment, causes of diarrhea, prevention of diarrhea, diarrhea management, and barriers to management of diarrhea.)

**Caregivers’ perceptions**
(Diarrhea management, causes of diarrhea, severity of diarrhea, and diarrhea treatment)

**Caregivers’ practices regarding diarrhea**
(Preferences for diarrhea management, treatment of diarrhea, hygiene practices, water use practices, sanitation practices, child feeding & weaning practice)

**Dependent variable**
Diarrhea prevalence among under fives

**Figure 1.1:** Conceptual framework of the study

Source: Modified from Othero et al. (2008)
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents literature reviews from other related studies in globally, regionally and in Kenya. The literature review section provided the framework for understanding and synthesizing key concepts, methods and approaches used in the study. The findings of the review were used to identify existing gaps and emerging trends in caregivers’ perceptions and practices towards diarrheoa and diarrheoa management. The review was done based on the study objectives.

2.2 Global epidemiology of diarrheoa among children under five years

Global mortality in children aged under five years has fallen substantially in the past two decades, from more than 12 million in 1990, to 6.9 million in 2011, but progress is inconsistent between countries. Pneumonia and diarrheoa are the two leading causes of death in this age group and have overlapping risk factors (Zulfiqar et al., 2013). Globally, diarrheoa remains the second leading cause of death among children under five. About 16% of deaths among children under five years is caused by diarrheal diseases with the pediatric death toll exceeding that of AIDS, tuberculosis and malaria combined (Ecotact, 2012). This translates to about 1.5 million deaths each year due to diarrheoa. Diarrheoa kills more young children than AIDS, malaria and measles combined (UNICEF, 2012). Although diarrheoa disease is preventable and can be managed with low-cost interventions, progress in reducing its prevalence in children has been slow in recent years.
Carter et al., (2015)’s systemic review of 114 articles on diarrhea among under fives observed that harmful, uninformed practices in the management of childhood diarrhea are associated with negative health outcomes, and in many instances, not conforming to the standard guidelines such as WHO treatment guidelines. Despite significant improvements in the interventions to treat diarrhea in children, it continues to pose a daunting public health challenge, especially in children from developing countries. Recent estimates suggest that nearly 3% of neonatal mortality and 17% of under-five child mortality is attributable to diarrhea. Asia and Africa have an alarmingly high prevalence of childhood diarrhea (Archana et al., 2010). Environmental status and diarrhea is regarded as a complex and multidimensional topic. Diarrhea is one of the main water-borne diseases considered to be endemic in many regions of the world and brings the major health threats to the world populations, both in tropical and subtropical poor countries (Damiki and Siva, 2011).

According to a study that was carried out in Northeast India state Meghalaya, various factors like poor environmental sanitation, unavailability of safe drinking water, seasonal rainfall, infected foods, infection through fomites, flies, cockroaches, etc. are the main culprit that led to the cause of diarrhea in the state, (Damiki and Siva, 2011).

Although mortality rates due to diarrhea have decreased globally, diarrhea morbidity rates have not followed the same trend, especially in poor regions experiencing rapid population growth. This is where morbidity due to diarrhea may actually have increased in recent years and new emerging evidence for long-term consequences of early childhood
diarrhea on growth and on physical and cognitive development, effects that may translate into costly impairment of human potential and productivity (Guerrant et al., 2013).

Diarrhea morbidity and mortality are probably greatest in areas where resources for surveillance, diagnosis, prevention, and treatment are most scarce, areas that are often under-represented in national estimates of diarrhea prevalence that are based on data from health facilities (Rudan et al., 2013). Economic development has brought rapid shifts in patterns of disease across the globe that has come to be known as the epidemiological transition. Improvements in housing, sanitation, caregivers’ education, infant care, vaccination, vector control and health care have brought profound changes in population health in many low and middle countries.

2.3 Diarrhea among children under five years in sub-Saharan Africa

According to Webaraza (2013), diarrhoeal disease causes the death of about 1.5 million children every year, with most of them in Sub-Saharan Africa while in Kenya, it is the third biggest cause of death among children under five, claiming roughly 17,760 lives last year alone. A report published by World Bank in 2012 stated that in Tanzania, nearly 30,000 children under five years die annually due to diarrhea diseases and an estimated 12.6-% of children suffer from diarrhea diseases. The 2011 Ethiopian Demographic and Health Survey (EDHS) reported that 13% of the children had diarrhea in the two weeks preceding the survey at the national level (Thomas et al., 2014). There is a widespread and deep-rooted belief that diarrhea is part of growing up and cannot be prevented though health education
promoting diarrhea; prevention practices have been embraced as an important intervention by various programmes working in poor communities in developing countries.

The Medical Research Council Burden of Disease Report indicates that diarrhea disease is responsible for over 10,000 deaths every year in South Africa. South Africa is one of the countries where the infant mortality rate has increased between 1990 and 2008, with no progress towards achieving Sustainable Development Goals (SDGs) (Cooke et al., 2013). In a study carried out in Ethiopia to investigate causes of death and its determinants in under-five children in Gilgel Gibe, it was found out that neonatal and infant mortality rates were respectively 38 and 76.4 per 1000 live births. Diarrheal diseases were among the top causes of death in post-neonatal period. Maternal education, practice and perception of mothers on the severity of illness and benefits of modern treatment were found to be independent predictor of child survival (Walker et al., 2013).

2.4 Diarrhea prevalence among children under five years in Kenya

Diarrhea disease accounted for 16% of child deaths under five in Kenya, just below that of deaths attributable to neonatal disease and child pneumonia. It is the leading cause of malnutrition in children under five. It was also revealed that diarrhea was responsible for 16.6% of outpatient consultations in Kenya, putting extra strain on national resources (WHO, 2012). A nutritional report by TNSR (2012) reported a diarrhea prevalence of 32.2% in Turkana County. This was high which revealed an increasing burden of diarrheal diseases in Kenya and especially remote areas. According to household longitudinal study conducted in Nyando district, diarrhea was found to contribute to 48% of child mortality.
in the area (Najjemba et al., 2014). With a slacking rate towards the SDGs, a critical understanding of where and why these deaths occur, and of strategic, data-based prioritization of interventions, are essential to accelerate progress by ensuring there is clear understanding of maternal perceptions and prevention practices of diarrhea among the children under five years.

2.5 **Pathogenesis of diarrhea among children under five**

Transmission of food borne pathogens remains a growing concern despite increasing public awareness and measures taken to control infection. Mechanisms of infection include consumption of a preformed toxin, formation of toxin following ingestion, and direct invasion of intestinal epithelial cells by the infecting organism (Cangemi, 2011). The most common causes of diarrhea in Kenya include infections involving rotavirus and shigellosis. Rotavirus is most common cause of moderate to severe diarrhea in children under 23 months while shigellosis for the age group 24 to 59 months of age (Desai et al., 2011). Chronic diarrhea is often a diagnostic challenge and has a broad etiology. The diagnosis can often be made by a thorough history and examination with the addition of basic blood tests and stool analysis; however, exhaustive investigations are infrequently required (Banks and Farthing, 2012).

Predisposition to diarrhea include factors like younger age, male gender, early weaning, seasonal patterns, low maternal education, lack of piped water supply, poor water-storage practices, younger maternal age, lack of hand washing with soap by caregiver, poor sanitation, limited knowledge of pathogenesis, poor perceptions, visible feces in the yard,
unsatisfactory garbage disposal, shorter boiling time, using water from cistern trucks, and not treating water in the home (Smith et al., 2011).

Mitigating factors for childhood diarrhoea include promotion of hand washing with soap, hygiene education, latrine installation at the household and community level, municipal water connection, water kiosk, household based chlorination, filtration, solar disinfection, and improved water storage. However, these interventions vary by population with some factors being more important than others in particular settings (Rivera et al., 2013).

2.6 Caregivers’ perceptions towards diarrhoea

The study by Etea (2014) on mothers’ perception about transmission of childhood diarrhoea revealed that the mothers believe diarrhoea is transmitted from one child to another through sweat, breath, smell since children in the same family sleep in one place. In addition, they noted that most mothers preferred to consider home treatments or traditional treatments before taking their sick children to a health facility. That is, seeking treatment from health facilities was common after home and traditional treatments failed and the disease got severe. The local concepts concerning home treatment were linked with provision of less fluid and solid food. In developing countries, mothers usually manage diarrhoea at home with the pattern of management depending on perceived disease severity and beliefs and most people residing in rural and remote areas of developing nations, prefer to manage diarrhoea at home (Mangal, et al., 2014). Maternal perception can influence diarrhoea management and prevention
According to Choube et al. (2014), the perception and attitude of caretakers about the severity of diarrhoeal illness ultimately affects the choice for seeking treatment. Research conducted in rural Northeast Thailand to understand how mothers perceive children's acute illness episodes, and their resulting illness management strategies reported that although diarrhoeal disease is one of the leading causes of illness among young children in Thailand, mothers and caregivers frequently do not classify infantile diarrhoea as an “illness.” Infantile diarrhoea is commonly labeled “thai su”, meaning a type of diarrhoea believed to “lighten the body” so that the infant can attain a new developmental stage, such as sitting up, standing, or walking. Consequently, mothers do not perceive infection-related diarrhoeal illness as common in infants, and therefore do not direct much attention to prevention, nor manage diarrhoeal cases in a manner consistent with biomedical recommendations (Mumtaz et al., 2013). This has far reaching public health implications since such beliefs results in ignorance of the real causes and effective preventive and control measures as a primary health care intervention. This makes curbing associated burden of diarrhoeal diseases a challenge.

2.7 Caregivers’ knowledge of diarrhoea

Mothers’ knowledge in management of diarrhoea is likely related to its mortality and morbidity. In regards to such knowledge, Kadam et al., (2012) found that only 39.31% of mothers knew that ORS replenishes the water lost during diarrhoea. Such cases of poor knowledge could explain the high burden of diarrhoea and its high prevalence across the globe.
A study carried out by Mathuram et al., (2010) indicated that prevention of diarrhoea is challenging because of the ubiquitous exposure to individuals through contaminated food, water and generally unhygienic conditions in much of the developing world. The study pointed out the need to assess maternal and caregivers’ knowledge, and practices in managing and prevention of diarrhoea among the under-five with respect to new methods for prevention, management, and treatment of diarrhoea—including an improved oral rehydration formulation, zinc supplementation, and rotavirus vaccines—make now the time to revitalize efforts to reduce diarrhoea mortality worldwide.

According to a study carried out in Brazil it was found out that knowledge of diarrhoea and its causes in the community is broad but many and negative traditional beliefs about the illness still prevail (Tavares et al., 2011). The Brazilian experience is an example of the critical effect that policies to promote income redistribution and universal access to education, health, water supply, and sanitation services may have on the reduction of diarrhoea among children.

Therefore, as improvements in treatment lead to decreases in diarrhoea mortality, it is important to understand the substantial impact of maternal knowledge, perceptions and prevention practices of diarrhoea among children under five years and adults worldwide and to take them into accountable in developing primary health care interventions customized to the local needs (Lamberti et al., 2012).
2.8 Caregivers’ practices on diarrhea

Studies have revealed that maternal behaviors were found to be related to their perceptions. The results of Kundu et al. (2010)’s study carried out in Vietnam indicated that maternal health beliefs towards diarrheal diseases in children played a crucial role in their home management of diarrhea. Maternal perceptions on the susceptibility and severity of diarrhea and the benefits and barriers to maternal home care for diarrheal children were significantly correlated to maternal practices.

Millions of children die every year due to failure to replace fluid effectively (Mengistie et al., 2012) and this is a clear indication of the existing gaps concerning maternal perceptions and prevention practices. In addition to increased implementation of strategies already known to effectively prevent and manage diarrhea, further research is needed to address the recognition, prevention, and treatment of prolonged episodes of diarrhea and persistent diarrhea in resource-limited settings (Cohen, 2011).

In a household survey in Guinea-Bissau, 319 episodes of diarrhea in children were followed by interviews every second day with the aim of investigating perceived morbidity and subsequent actions taken. The majority of the mothers had good knowledge of oral rehydration salts (ORS). However, only 58% of the episodes were treated with ORS and the amount given was insufficient. Mothers with no knowledge of ORS did not use it during the observed attack of diarrhea regardless of contact with a health center, which suggests that maternal knowledge is an important determinant of use of ORS for diarrhea management (Sodemann et al., 1999).
Hand washing contribute to under-five morbidity, including diarrheal disease. The study by Rabbi & Dey (2013) empirically examined the determinants of child mortality in Bangladesh. According to their results, hand washing was significantly related to child diarrheoa. In essence, lower diarrheoa rates were experienced in household with handwashing practices.

Sanitation aspects also contribute to diarrheal disease among children under five years. Walker et al. (2013)’s study showed that the presence or absence of feces around the pit-hole is a factor associated with under-five diarrheal morbidity. They noted that children from households where there was feces around the pit-hole/on the slab were about three times more likely to have diarrheoa than those children from the households where feces was not observed around the pit-hole (OR : 3.13, 95% CI 1.04,9.45). This has an important implication that the mere presence of latrine facility does not have a great contribution for prevention excreta-related disease but it is the proper utilization that had a vital importance. Access to clean water has been shown in past studies to contribute to diarrheal disease among children under five years. However, some studies show no significant association. For instance, Aboubaker et al. (2014)’s study indicated that a significant association was not observed between drinking water sources and diarrheal morbidity. This is might be due to the fact that no great differences exist in the sample households with respect to the use of drinking water sources. Childhood diarrheoa has become the burning issue and a topic of interest to population research owing to its obvious direct link with lack of health
facilities. This implies that health facility factors influence diarrhea prevalence among under fives.

2.9 Summary and gaps in literature review

The review has shown that better understanding the context in which diarrhoeal illness is managed can have important implications for addressing the substantial burden of these diseases. Understanding public knowledge especially maternal perceptions and management of diarrhea and about common causes of diarrhoea illness can help focus preventive education on areas of important misperception (Jones and Grimm, 2011). Though a significant body of research exists on the relationship between diarrhoea likelihood and maternal knowledge, perception and practices there are gaps remaining. The impacts of maternal knowledge and perception have been shown to vary by location, demanding country-specific analyses wherever diarrhoea is a major cause of childhood morbidity and mortality.

Although diarrhoeal disease is recognized as a major problem in Turkana County, no studies on preventive behaviors of diarrhoea in children and maternal knowledge and perceptions have been conducted. With an estimated high number of diarrhoea cases annually in children under five years in Turkana County, it is important to examine the association between diarrhoea prevalence and maternal knowledge, perception and practices in the context of Turkana County. No such examination has been conducted with data from Turkana County. This study fills that gap, providing an analysis of data from Turkana County.
CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction
The chapter presents the methods used in the study. It discusses the study design, variables, study area, target population, sample and sampling procedures, data collection, data analysis and ethical considerations for this study.

3.2 Study design
A cross-sectional descriptive study design was used. This study design was appropriate in collecting and describing the study variables. The design allowed for collection of extensive data within a short time on the variables of study.

3.3 Study Variables

3.3.1 Dependent variable
Diarrhoea occurrence among children under five years. Prevalence defined as the number of cases of diarrhoea reported, both new and existing, within the two weeks preceding the study. Diarrhoea was defined as the passage of frequent watery or loose stools (>3/24 h) caused by variety of viral, bacterial and parasitic agents.

3.3.2 Independent variables
Socio-demographic characteristics of caregivers and children under five years included age of caregiver (years), marital status, education level, household size, number of children
under 5 years, main source of income, type of house, gender of caregiver, age of children (in months) and religious affiliation. Caregivers’ perceptions included the views about myths on susceptibility of diarrhea, severity of diarrhea, benefits of practices and barriers of practices. Caregivers’ knowledge included the level of understanding the facts about susceptibility of diarrhea, severity of diarrhea, benefits of practices and barriers of practices. Caregivers’ practices included the measures taken to prevent, control and manage diarrhea in children under five years.

3.4 Study Area

Turkana County, Kenya. The map of the study area is shown in appendix 7. The county is located in latitude: 3° 06' 54" N and longitude: 35° 34' 16" E. In Turkana County majority are pastoralists hence they keep cattle, camels, donkeys, sheep and goats as their major source of income. Turkana County was reported to have a high prevalence of diarrhea cases of 32.2% (Nutritional survey report, 2012). In Turkana County, infant mortality rate is 66/1000, while under 5 mortality rate is 117/1000. There is a health worker shortage where the doctor to patient ratio is 1: 50,000 while nurse patient ratio is 1: 3500 (Turkana County Health Report, 2011). Diarrhea is among the top three diseases affecting children under five years in Turkana County (see appendix 8).

3.5 Study Population

The primary respondents were mothers and caregivers with children aged 0–5 years, who willingly consented to the study. There were 2,322 households in the area according to Turkana County Survey Records.
3.6 Sample size determination and sampling technique

3.6.1 Sample size determination

The sample size was determined using Fisher et al. (1998) formula for sample size determination expressed as follows:

\[
    n = \frac{Z^2pq}{d^2}
\]

Where;
- \( n \) is the desired sample size
- \( Z \) is the standard normal deviate (1.96) that corresponds to 95% confidence level
- \( p \) is the proportion in target population estimated to have a particular characteristic; which is the percentage of children aged 0-5 years who have diarrhoea.
- \( q \) is 1-p
- \( d \) is degree of accuracy desired (0.05)

Prevalence of diarrhoea prevalence among under five (diarrhoea) in Turkana Central is 32.2% according to Turkana Nutrition Survey Report for December 2012. Therefore, based on the sample size determination formulae,

\[
    n = \frac{1.96^2 \times 0.322 \times (1 - 0.322)}{0.05^2}
    = 335.5
\]
To cater for non-response of questionnaires, 5% attrition was added on the sample size. Therefore, the final minimum sample size was 352. However, upon issuance of 352 questionnaires, 340 were duly filled and returned which represented a response rate of 96.6% which was within acceptable range.

3.6.2 Sampling Technique

In the first stage, First, Turkana County was purposively selected due to the Arid and Semi-Arid Land (ASAL) nature of the area and being the driest County in Kenya. Secondly, multi-stage cluster sampling was used to select primary respondents of the study. This sampling design was selected due to its ability to provides a strategy through which a population can be sampled when a comprehensive population list does not exist and it is not possible to construct one (Mugenda, 2008).

In the first step, the Turkana County was divided into six clusters namely: Turkana Central Constituency, Turkana North, Turkana East, Turkana South, Turkana West and Loima Constituency. In the second step, Turkana Central Constituency was randomly selected from the sample frame (the six clusters). Turkana Central sub-County has a population of 35,506 people according to 2009 National Census. Turkana central has specific characteristics of a rural area where existing water, sanitation and hygiene practices remains a problem.

In the third step, Turkana Central Constituency was divided into 7 wards: Lodwar Township, Kerio Delta, Kang’atatha, Kanamkemer and Kaloko. In the fourth step, Lodwar
Township was randomly selected from the sample frame for administration of survey. Lodwar Township reflects household practices, range of health service accessibility, socio-economic status of the residents and geographical location of the County. Lodwar Township has 3 sub-locations namely: Lodwar Town, Nakwamekwi and Napetet Sub-locations. The villages in each of these sub-locations were then considered to arrive at households.

In the fifth step, up to date number of households in each village were obtained from the village Executive Officers in Lodwar Township for study implementation. The households were listed in an excel sheet and given identification numbers. In the sixth step, a total of 352 households were randomly selected from the list for participation in the study. See the multistage sampling process in Figure 3.1 below.
Turkana County
Purposely selected

Divided into clusters
Turkana Central Constituency,
Turkana North, Turkana East,
Turkana South, Turkana West and
Loima Constituency

Turkana Central Constituency
Randomly selected

Divided into wards
Lodwar Township, Kerio Delta,
Kang’atotta, Kanamkemer and
Kaloko

Lodwar Township
Randomly selected

Sub-locations
• Lodwar Town, Nakwamekwi and
Napetet Sub–Locations

Villages & households
Randomly selected

Figure 3.1: Multistage sampling process
To achieve this study sample, the researcher identified the geographical center of the village with the assistance of village chairman and counted all households from the center to the edge of a village. One household from the total counted was selected to act as the first household to visit. This method was done for all villages in order to attain the sample size of 352 households. Table 3.1 show the sample size distribution matrix of the responses.

Table 3.1: Sample size distribution matrix

<table>
<thead>
<tr>
<th>Villages</th>
<th>No. of households</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakwamekwi</td>
<td>220</td>
<td>32</td>
</tr>
<tr>
<td>Legio</td>
<td>158</td>
<td>23</td>
</tr>
<tr>
<td>Ngadirkonyen</td>
<td>270</td>
<td>40</td>
</tr>
<tr>
<td>Loyo</td>
<td>419</td>
<td>61</td>
</tr>
<tr>
<td>Ngitakito</td>
<td>250</td>
<td>37</td>
</tr>
<tr>
<td>Red barna</td>
<td>182</td>
<td>27</td>
</tr>
<tr>
<td>IDP</td>
<td>605</td>
<td>88</td>
</tr>
<tr>
<td>Ngitakais</td>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>Nauren puu</td>
<td>120</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>2,322</td>
<td>340</td>
</tr>
</tbody>
</table>

3.6.3 Inclusion criteria

The study included any household with children under five years whose mothers/caregivers were living in the selected villages and who consented to participate in the study.

3.6.4 Exclusion criteria

The study excluded mothers of children under five years who did not consent to participate in the study. Households that have mothers who do not have children under five years were not selected. In addition, mothers of children under fives years who were too sick to communicate were excluded from the study.
3.7 **Data collection tools**

The study used pre-tested questionnaires (appendix 2) and key informant interview guides (appendix 2) as the main data collection tools for collecting data from the primary respondents. Key informant guide was used to guide Key Informant Interviews to ensure consistency, accuracy and comparability of interview outcomes.

3.8 **Pre-testing of study tools**

Pretesting of research instruments was carried out in Turkana Central Sub-County, in Nakwamekwi village which has similar context, population, geographical and ecological conditions as that of the study area. This was important to ensure the pre-testing results and review of the study tools reflected the opinions, views and needs of the study respondents.

Few changes conceived during pre-testing such as reducing the number and length of the study tools in order to minimize the time required to conduct an interview, proper placement of the questions in the study tools to enhance logical flow of questions and answers and revision of questions which were not clear to respondents.

3.9 **Validity**

The study used other similar study questionnaires to inform and guide development of the study tools and measurement of items included in the tools as measure of enhancing validity of the tools. Expert opinion from the supervisors was also sought and their inputs
taken into account in development of the study tools to enhance validity. The incomplete questionnaires were not included in the analysis.

3.10 Reliability
To achieve reliability, Cronbach’s alpha was calculated using SPSS Version 20 to determine reliability of the instruments used in this study. According to Sekaran (2002), coefficients which are greater than 0.6 but less than 0.8 are considered good. The average Cronbach’s alpha reliability coefficient for the instrument was 0.734 which was within the acceptable reliability range hence the tools were reliable.

3.11 Data collection procedure
Quantitative and qualitative data was collected in this study with the help of research assistants. Research assistants, who were experienced in household surveys and were proficient in local language, were recruited and trained to assist in carrying out data collection. Training was designed to equip research assistants with skills and knowledge for successful field data collection and management. The content of the training session included an overview of the research, including the problem to be investigated, research objectives, study methods, respondents’ interaction and handling techniques, ethical considerations, data quality assurance and field data management. A diploma in a health or health related discipline, and familiarity with the study area were key requirements for selection.
Quantitative data was collected using pre-tested questionnaires (appendix 2). The questionnaire was translated into the local language which can be understood by locals. First, the lead researcher introduced himself and his research assistants to the respondent. Informed consent was then sought where the consent form (appendix 1) was read to each respondent after which the subject either accepted or declined to participate in the study. Those who did not consent to participate were thanked for their time. Participants were allowed time to fill the questionnaires after which they were collected. However, those who could not write and or read were assisted by research assistants to respond to the questionnaires.

Qualitative data was collected using Key Informant Interview guides (appendix 3). Key informants that consented to participate in the study were interviewed using a standardized key informant guide. The principal investigator conducted the study while the research assistants facilitated scheduling of interviews at convenient times and neutral venues for the participants.

Secondary data was collected from past documentation and published studies on similar study themes. The findings were used to inform the interpretation, discussions, deductions and conclusions of the study.

3.12 Data management and analysis

The data collected was checked for inconsistencies, incorrectness and/or missing data. Quantitative data was coded then entered into SPSS Version 20 for analysis to be
conducted. Descriptive statistics comprising of frequencies and percentages were used to describe variables used in the study. Chi-square test of independence was used to establish the association between independent variables and diarrhoea prevalence. Relationship between study variables was tested at 0.05 level of significance. The results from quantitative data analysis were presented in tables and figures.

Qualitative data was analyzed using QSR/Nvivo to conduct thematic analysis. This was done to identify emerging themes and patterns within and between variables and triangulate the quantitative findings.

3.13 Logistical and ethical considerations
An informed consent form (appendix 1) was administered to each respondent to provide information to the respondents about the study and aid in obtaining informed consent for participation. Consent was written and/or verbal in cases where a respondent could not read and write. Information obtained from the study was treated with confidentiality. All the documentations related to the study was kept in a lockable box and later destroyed (by burning) after extracting the required information. No actual names were used to identify participants in the study for privacy purposes. Research permit to carry out the research was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) (appendix 6). Approval to undertake the study was granted by Kenyatta University graduate school (appendix 4). Ethical clearance was obtained from Kenyatta University Ethics Review Committee (KUERC) (appendix 5).
CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study. Detailed analysis of the data, interpretation and explanation of the results with regard to objectives are given. The chapter is organized as follows: Socio-demographic characteristics of respondents, diarrhoea prevalence, caregivers’ perceptions and caregivers’ practices in management of diarrhoea.

4.2 Socio-demographic characteristics of respondents

In terms of age, 54.2% of the respondents were aged 21-30 years, while most children studied (49.6%) were aged between 12 to 24 months. According to our findings, 83.2% of respondents indicated that they were married. The highest educational level achieved by most respondents was primary education (34.7%), while 27.4% had no formal education at all. In terms of the main source of income for the families, 45.0% were livestock farmers followed by business at 21.0%. Regarding type of house, most respondents were living in a semi-permanent house (51.2%) while only 22.6% were living in a permanent house. In regard to number of children under five years per household, 52.9% of the respondents had one child under five years, while 17.1% had three children. In terms of household size, most households had between 4 to 5 members (47.5%), while majority of respondents (89.9%) indicated that they were Christians. The proportion of male caregivers (50.3%) and female caregivers (49.7%) was almost equal. The socio-demographic characteristics of the respondents are presented in Table 4.1 below.
Table 4.1: Socio-demographic characteristics of respondents (N=340)

<table>
<thead>
<tr>
<th>Demographic characteristic</th>
<th>Category</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of caregivers (years)</td>
<td>&lt;21</td>
<td>76</td>
<td>22.4</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>92</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>92</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>55</td>
<td>16.2</td>
</tr>
<tr>
<td></td>
<td>36-40</td>
<td>23</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>41-45</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>283</td>
<td>83.2</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>31</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td>Widow</td>
<td>17</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>Separated</td>
<td>9</td>
<td>2.6</td>
</tr>
<tr>
<td>Education level</td>
<td>None</td>
<td>93</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>118</td>
<td>34.7</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>83</td>
<td>24.4</td>
</tr>
<tr>
<td></td>
<td>Post-Secondary</td>
<td>46</td>
<td>13.5</td>
</tr>
<tr>
<td>Household size</td>
<td>2-3</td>
<td>101</td>
<td>29.3</td>
</tr>
<tr>
<td></td>
<td>4-5</td>
<td>164</td>
<td>47.5</td>
</tr>
<tr>
<td></td>
<td>6-7</td>
<td>48</td>
<td>13.9</td>
</tr>
<tr>
<td></td>
<td>8-9</td>
<td>24</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>&gt;9</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>Number of children under five years</td>
<td>1</td>
<td>180</td>
<td>52.2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>102</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>58</td>
<td>16.8</td>
</tr>
<tr>
<td>Main source of Income</td>
<td>Livestock keeping</td>
<td>153</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Farming</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>72</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Informal employment</td>
<td>61</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Formal employment</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Type of House</td>
<td>Permanent</td>
<td>77</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>Semi-permanent</td>
<td>174</td>
<td>51.2</td>
</tr>
<tr>
<td></td>
<td>Temporary</td>
<td>89</td>
<td>26.2</td>
</tr>
<tr>
<td>Gender of caregiver</td>
<td>Male</td>
<td>171</td>
<td>50.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>169</td>
<td>49.7</td>
</tr>
<tr>
<td>Age of children (months)</td>
<td>0 - 11</td>
<td>135</td>
<td>39.1</td>
</tr>
<tr>
<td></td>
<td>12 - 24</td>
<td>171</td>
<td>49.6</td>
</tr>
<tr>
<td></td>
<td>25 - 59</td>
<td>34</td>
<td>9.9</td>
</tr>
<tr>
<td>Religious affiliation</td>
<td>Christian</td>
<td>310</td>
<td>89.9</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>5</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>Non-religious</td>
<td>8</td>
<td>2.3</td>
</tr>
</tbody>
</table>
4.3 Prevalence of diarrhoea among children under five years in Turkana County

Respondents were asked whether there was a case(s) of diarrhoea among children aged under five years within two weeks preceding the study. Our findings were that 56 (16.5%) of the children were reported to have diarrhoea.

Qualitative results revealed a high burden of diarrhoea as emphasized in the following statements drawn from key informant interview:

‘…Although prevalence rate of diarrhoea has reduced overtime, many cases go unreported because many of them do not take their children to the health facility….” ~ CHEW

“…Diarrhoea cases are common in this area. We need constant community involvement to tackle this problem.” ~ Health Care Provider

4.3.1 Treatment of diarrhoea cases in health facilities

Respondents were asked whether they took their children to a health facility for treatment when they noticed signs of diarrhoea. Among the children who have diarrhoea (n = 56), only 33 (58.9%) were taken to hospital for treatment while the remaining 23 (41.1%) children who have diarrhoea were not taken to hospital for treatment.

Qualitative results indicated low health service utilization for children suffering from diarrhoea. Health facilities are used as a last resort in many cases because of distance to
health facilities and beliefs related to diarrhea as expounded in the following key informant interview quote:

“...Most cases come when the condition has worsened which at times results to hospitalization and even deaths...this is mainly caused by long distances from nearby health facilities and also beliefs surrounding \textit{diarrhea} to a very big extent...”~Health Care Provider

4.3.2 Use of ORS in managing diarrhea

Respondents whose children had diarrhea were asked if they had used ORS to manage the diarrhea. Results showed that only 32(57.1%) of children with diarrhea received ORS, while the remaining 24(42.9%) were not given ORS despite having diarrhea. The main source of ORS information was health staff (28.1%) followed by media(21.9%). Qualitative results revealed that health care workers provided information on ORS during care delivery in the facility and outreach camps as expounded by the following statement derived from a one of the key informant’s interview:

“...We educate them how to use ORS in managing \textit{diarrhea} during home visits and when they come for treatment...”~CHEW

4.3.3 Socio-demographic factors and diarrhea prevalence among children under five years in Turkana County

Socio-demographic characteristics of caregivers were subjected to chi-square test of independence to establish their influence on diarrhea prevalence (Table 4.2).
Table 4.2: Influence of socio-demographic characteristic on diarrhea prevalence

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Diarrhea Yes</th>
<th>Diarrhea No</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n(%)</td>
<td>n(%)</td>
<td></td>
</tr>
<tr>
<td><strong>Age of caregiver (years)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>10(13.2)</td>
<td>66(86.8)</td>
<td>χ²= 7.662; df=5; p = .176</td>
</tr>
<tr>
<td>21-25</td>
<td>23(25.0)</td>
<td>69(75.0)</td>
<td></td>
</tr>
<tr>
<td>26-30</td>
<td>12(13.0)</td>
<td>80(87.0)</td>
<td></td>
</tr>
<tr>
<td>31-35</td>
<td>9(16.4)</td>
<td>46(83.6)</td>
<td></td>
</tr>
<tr>
<td>36-40</td>
<td>2(8.7)</td>
<td>21(91.3)</td>
<td></td>
</tr>
<tr>
<td>41-45</td>
<td>0(.0)</td>
<td>2(100.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>51(18.0)</td>
<td>232(82.0)</td>
<td>χ²=3.108; df=3; p = .375</td>
</tr>
<tr>
<td>Single</td>
<td>3(9.7)</td>
<td>28(90.3)</td>
<td></td>
</tr>
<tr>
<td>Widow</td>
<td>1(5.9)</td>
<td>16(64.1)</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>1(11.1)</td>
<td>8(88.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>25(26.9)</td>
<td>68(73.1)</td>
<td>χ²=10.652; df=3; p = .014</td>
</tr>
<tr>
<td>Primary</td>
<td>17(14.4)</td>
<td>101(85.6)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>9(10.8)</td>
<td>74(89.2)</td>
<td></td>
</tr>
<tr>
<td>Post-Secondary</td>
<td>5(10.9)</td>
<td>41(89.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Household size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>19(18.8)</td>
<td>82(81.2)</td>
<td>χ²=3.831; df=4; p = .429</td>
</tr>
<tr>
<td>4-5</td>
<td>28(17.1)</td>
<td>136(82.9)</td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>7(14.6)</td>
<td>41(85.4)</td>
<td></td>
</tr>
<tr>
<td>8-9</td>
<td>1(4.2)</td>
<td>23(95.8)</td>
<td></td>
</tr>
<tr>
<td>&gt;9</td>
<td>1(33.3)</td>
<td>2(66.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Number of children under 5 years</strong></td>
<td></td>
<td></td>
<td>χ²=.895; df = 2; p = .639</td>
</tr>
<tr>
<td>One</td>
<td>31(17.2)</td>
<td>149(82.8)</td>
<td></td>
</tr>
<tr>
<td>Two</td>
<td>14(13.7)</td>
<td>88(86.3)</td>
<td></td>
</tr>
<tr>
<td>three</td>
<td>11(19.0)</td>
<td>47(81.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Main source of Income</strong></td>
<td></td>
<td></td>
<td>χ²=2.109; df = 4; p = .716</td>
</tr>
<tr>
<td>Formal employment</td>
<td>22(19.6)</td>
<td>90(80.4)</td>
<td></td>
</tr>
<tr>
<td>Farming</td>
<td>2(8.7)</td>
<td>21(91.3)</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>19(14.8)</td>
<td>109(85.2)</td>
<td></td>
</tr>
<tr>
<td>Livestock keeping</td>
<td>6(16.2)</td>
<td>31(83.8)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>7(17.5)</td>
<td>33(82.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Type of House</strong></td>
<td></td>
<td></td>
<td>χ²=1.569; df = 2; p = .456</td>
</tr>
<tr>
<td>Permanent</td>
<td>13(16.9)</td>
<td>64(83.1)</td>
<td></td>
</tr>
<tr>
<td>Semi-permanent</td>
<td>32(18.4)</td>
<td>142(81.6)</td>
<td></td>
</tr>
<tr>
<td>Temporary</td>
<td>11(12.4)</td>
<td>78(87.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender of caregiver</strong></td>
<td></td>
<td></td>
<td>χ²=.060; df = 1; p = .807</td>
</tr>
<tr>
<td>Male</td>
<td>29(17.0)</td>
<td>142(83.0)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>27(16.0)</td>
<td>142(84.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Age of children (in months)</strong></td>
<td></td>
<td></td>
<td>χ²=1.266; df = 2; p = .531</td>
</tr>
<tr>
<td>0 - 11</td>
<td>26(19.3)</td>
<td>100(80.7)</td>
<td></td>
</tr>
<tr>
<td>12 - 24</td>
<td>25(14.6)</td>
<td>146(85.4)</td>
<td></td>
</tr>
<tr>
<td>25 - 59</td>
<td>5(14.7)</td>
<td>29(85.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Religious affiliation</strong></td>
<td></td>
<td></td>
<td>χ²=.292; df = 2; p = .864</td>
</tr>
<tr>
<td>Christian</td>
<td>50(16.1)</td>
<td>260(83.9)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>4(20.0)</td>
<td>16(80.0)</td>
<td></td>
</tr>
<tr>
<td>Non-religious</td>
<td>1(12.5)</td>
<td>7(87.5)</td>
<td></td>
</tr>
</tbody>
</table>

According to the results, only level of education was found to have a statistically significant relationship with diarrhea prevalence (χ²=10.652, df =3, p = 0.014). Consequently, the number of diarrhea episodes reduced as educational level rose. For example, respondents
with no formal education had the highest diarrhoea prevalence of 26.9% compared to diarrhoea prevalence of 10.9% among those with post-secondary education.

Qualitative results showed that education level of household heads and members influenced disease management practices adopted in a household. Higher educational attainment was linked to good knowledge and diarrhoea management practices. The following statement from a key informant interview explains the finding:

“…Households whose heads and or members are more educated have demystified diarrhoea disease and its management. They have easily embraced proper preventive practices especially sanitary measures compared to the rest...”~PHO

4.4 Caregivers’ perceptions on diarrhoea among children under five years in Turkana County

The perception of caregivers on diarrhoea among children was examined and the results presented in the sections that follow.

4.4.1 Perceptions on diarrhoea management

Respondents were asked to indicate their perceptions on different aspects of diarrhoea. The results are presented in Figure 4.1.
According to the results, 131 (38.5%) perceived that they are well educated to manage diarrhea at home. Results on perception about best practices show that over half of respondents 184 (54.1%) perceived that children should be treated at home before taking them to hospital. In addition, most respondents 159 (46.8%) had the perception that traditional medicine is adequate to treat diarrhea. In terms of perception about severity of diarrhea, most caregivers’ 188 (55.3%) had the perception that diarrhea is not a serious disease to be treated at the hospital.

Qualitative results showed that many caregivers had wrong perceptions on diarrhea and diarrhea management which undermined proper management practices as expounded by the following statement drawn from key informants’ interview:

**Figure 4.1:** Caregivers’ perception about diarrhea management
“...Many take diarrhea lightly with some attributing it to bewitching. Educating them has helped to change some of these perceptions though much remains to be done...” – CHEW

4.4.2 Caregivers’ perception on causes of diarrhea

Respondents were asked about the causes of diarrhea. The results are presented in Figure 4.2.

![Perceived causes of diarrhea](image)

**Figure 4.2**: Perceived causes of diarrhea

Results showed that 180 (52.9%) caregivers attributed diarrhea to supernatural causes such as witchcraft and evil eye, while 162 (47.9%) had the perception that growth stage such as teething is a cause of diarrhea among children under five years.

Qualitative results showed that many caregivers had wrong perceptions on causes of diarrhea as explained in the following statement drawn from key informants’ interview:
“...The reason for high prevalence of diarrheoa is because there is inadequate awareness on its route of transmission which affects control measures...”~PHO

4.4.3 Caregivers’ perceptions and diarrheoa prevalence among children under five years in Turkana County

The relationship between diarrheoa prevalence and caregivers’ perception was tested using chi-square test of independence and the results shown in the Table 4.3 below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Diarrhea</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n(%)</td>
<td>No n(%)</td>
</tr>
<tr>
<td>Diarrheoa is not a serious disease to be treated at hospital</td>
<td>55(29.3)</td>
<td>133(70.7)</td>
</tr>
<tr>
<td></td>
<td>1(0.7)</td>
<td>151(99.3)</td>
</tr>
<tr>
<td>Traditional medicine is adequate to treat diarrheoa</td>
<td>53(33.3)</td>
<td>106(66.7)</td>
</tr>
<tr>
<td></td>
<td>3(1.7)</td>
<td>178(98.3)</td>
</tr>
<tr>
<td>Children should be treated at home before taking them to hospital</td>
<td>54(29.3)</td>
<td>130(70.7)</td>
</tr>
<tr>
<td></td>
<td>2(1.3)</td>
<td>154(98.7)</td>
</tr>
<tr>
<td>I am well educated to manage diarrheoa at home</td>
<td>28(21.4)</td>
<td>103(78.6)</td>
</tr>
<tr>
<td></td>
<td>28(13.4)</td>
<td>181(86.6)</td>
</tr>
<tr>
<td>Supernatural causes</td>
<td>54(30.0)</td>
<td>126(70.0)</td>
</tr>
<tr>
<td></td>
<td>2(1.3)</td>
<td>158(98.8)</td>
</tr>
<tr>
<td>Growth stage such as teething</td>
<td>55(33.7)</td>
<td>108(66.3)</td>
</tr>
<tr>
<td></td>
<td>1(0.6)</td>
<td>176(99.4)</td>
</tr>
</tbody>
</table>

According to the results, perceptions that diarrheoa is not a serious disease to be treated at hospital ($\chi^2=49.961$, df = 1, p<0.00), traditional medicine is adequate to treat diarrheoa ($\chi^2=61.731$, df = 1, p<0.001), children should be treated at home before taking them to hospital ($\chi^2=48.336$, df = 1, p<0.001), supernatural causes ($\chi^2=50.891$, df = 1, p<0.001),
and growth stage such as teething ($\chi^2 = 67.892, \text{ df } = 1, p<0.001$) were significantly associated with diarrheoa prevalence. However, the perception that I am well educated to manage diarrheoa at home was not significantly associated with diarrheoa prevalence ($p = .054$).

4.5 Caregivers’ knowledge on diarrheoa among children under five years in Turkana County

Caregivers’ knowledge on causes, prevention and treatment of diarrhea was examined in this study and the results are presented in the sub-section below.

4.5.1 Caregivers’ knowledge on causes of diarrheoa

Results on caregivers’ knowledge of causes of diarrheoa revealed that 31.5% of caregivers attributed diarrheoa causes to poor feeding and 36.5% of caregivers attributed diarrheoa to poor fecal disposal. In addition, caregivers who considered poor hands hygiene as a cause of diarrheoa were 30%, while those attributed diarrheoa to contaminated water or food were 37.9%. Refer to Figure 4.3 below.
4.5.2 Caregivers’ knowledge on prevention of diarrhea

Respondents were asked to name at least three ways of preventing diarrhea among children under 5 years. Those who named at least three correct ways of preventing diarrhea were categorized as possessing good knowledge while the rest were categorized as having poor knowledge. Results showed that 232 (68.2%) of the caregivers had good knowledge on prevention of diarrhea while the remaining 108 (31.8%) had poor knowledge on prevention of diarrhea among children under 5 years.

Qualitative results revealed that knowledge on diarrhea and its prevention practices reduces prevalence, improves diarrhea cases reporting and hence facilitates timely and
proper interventions. The following statements derived from key informants’ interviews expound this finding:

“...Generally, mothers and caregivers who are well knowledgeable on diarrhoea and its prevention have a higher tendency of not only seeking treatment at the hospital but also informing health care providers for appropriate intervention...”~PHO

“...Many cases of these diarrhoea cases are caused by ignorance and lack of proper community awareness on prevention strategies...”~Health Care Provider

4.5.3 Caregivers’ knowledge on treatment of diarrhoea

A considerable number of caregivers 121(35.6%) agreed that ORS is effective in treating diarrhoea and 160(47.1%) agreed that diarrhoea can be adequately managed at home. When asked what fluid can a child with diarrhoea be given at home, majority of caregivers 104(30.6%) reported Herbal fluids followed by plain water (21.2%) and Fruit juice (21.8%).

4.5.4 Caregivers’ knowledge and diarrhoea prevalence among children under five years in Turkana County

Chi-square tests on the relationship between diarrhoea prevalence and caregiver’s knowledge are shown in Table 4.4 below.
### Table 4.4: Diarrhea prevalence and caregivers’ knowledge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Diarrhea prevalence</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n (%)</td>
<td>No n (%)</td>
</tr>
<tr>
<td>ORS is effective in treating diarrhea</td>
<td>Yes</td>
<td>16(13.2)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>40(18.3)</td>
</tr>
<tr>
<td>Diarrhea can be adequately managed at home</td>
<td>Yes</td>
<td>19(11.9)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>37(20.6)</td>
</tr>
<tr>
<td>Contaminated water or food</td>
<td>Yes</td>
<td>1(0.8)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55(26.1)</td>
</tr>
<tr>
<td>Poor hands hygiene causes diarrhea</td>
<td>Yes</td>
<td>2(2.0)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>54(22.7)</td>
</tr>
<tr>
<td>Poor fecal disposal causes diarrhea</td>
<td>Yes</td>
<td>1(0.8)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55(25.5)</td>
</tr>
<tr>
<td>Poor feeding causes diarrhoea</td>
<td>Yes</td>
<td>1(0.9)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55(23.6)</td>
</tr>
<tr>
<td>What fluid can a child with diarrhoea be given at home?</td>
<td>ORS</td>
<td>7(25.9)</td>
</tr>
<tr>
<td></td>
<td>Salt sugar solution</td>
<td>5(19.2)</td>
</tr>
<tr>
<td></td>
<td>Plain water</td>
<td>11(15.3)</td>
</tr>
<tr>
<td></td>
<td>Fruit juice</td>
<td>14(18.9)</td>
</tr>
<tr>
<td></td>
<td>Herbal fluids</td>
<td>16(15.4)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>3(30.0)</td>
</tr>
<tr>
<td>Knowledge on prevention of diarrhoea</td>
<td>Good knowledge</td>
<td>17(7.3)</td>
</tr>
<tr>
<td></td>
<td>Poor knowledge</td>
<td>39(36.1)</td>
</tr>
<tr>
<td>Barriers towards proper management of diarrhoea</td>
<td>Lack of knowledge on ORS</td>
<td>15(17.9)</td>
</tr>
<tr>
<td></td>
<td>Long distance to health care</td>
<td>17(21.3)</td>
</tr>
<tr>
<td></td>
<td>Financial constraints</td>
<td>15(13.4)</td>
</tr>
<tr>
<td></td>
<td>Traditional beliefs and customs</td>
<td>9(14.1)</td>
</tr>
</tbody>
</table>

According to the results, knowledge that diarrhoea can be adequately managed at home ($\chi^2=4.639, df = 1, p=.031$) and knowledge on prevention of diarrhoea ($\chi^2=44.378, df = 1, p<0.001$) had a statistically significant relationship with diarrhoea prevalence. In addition, knowledge on causes of diarrhoea such as contaminated water or food ($\chi^2=37.220, df = 1, p<0.001$), poor hands hygiene ($\chi^2=22.299, df = 1, p<0.001$), poor fecal disposal ($\chi^2=34.811, df = 1, p<0.001$) and poor feeding ($\chi^2=27.393, df = 1, p<0.001$) were significantly related to diarrhoea prevalence.
However, there was no statistically significant relationship between knowledge on ORS is effective in treating diarrhoea ($\chi^2 = 1.440$, df = 1, $p = 0.230$), and barriers towards proper management of diarrhoea ($\chi^2 = 2.487$, df = 3, $p = 0.478$).

4.6 Caregivers’ practices on diarrhoea among children under five years in Turkana County

This section presents results on caregivers’ practices on management of diarrhoea.

4.6.1 Preferences for diarrhoea management

Respondents were asked to indicate their preferences for managing diarrhoea cases whenever it occurs and results presented in Figure 4.4.

![Figure 4.4: Diarrhoea management preferences](image)
Results revealed that 78(22.9%) of the respondents preferred treating the child personally at home while 143(42.10%) preferred the traditional medicine treatment. A considerable number 119(35%) indicated that they preferred treatment in a health facility.

Qualitative results indicated that most caregivers preferred treating diarrhoea at home using home-based therapies as opposed to taking them to a health facility due to their perceptions towards diarrhoea and long distance between their home and a health facility. The following statement drawn from key informant interview explains the findings:

“…In this community, most mothers do not take their children to hospital; instead, they treat them at home by administering fluids and also taking them to herbalists. You know, even if you show them the need for taking them to hospital, the distance between where they live and a nearby health facility is very long and there are no reliable and affordable means of transport...”~CHEW

4.6.2 Types of treatment to manage diarrhoea at home

Respondents were asked to identify ways in which they managed diarrhoea at home. The results are presented in Figure 4.5.
Results showed that majority of respondents 28.2% used herbal medicines to treat diarrhea at home followed by drugs 23.1% and fluids 21.8%. On the other hand, qualitative results indicated that ORS and plain water were the main fluids used to treat diarrhea.

4.6.3 Hygiene practices

In terms of hygiene practices undertaken by the caregivers, the results are shown in Figure 4.6 below.
According to our findings, slightly over half 54.1% of respondents agreed that they are ensuring proper hygiene as a measure to prevent diarrhoea. In terms of hand washing, less than half of caregivers wash their hands before food preparation 43.8%, before feeding children 40.3%, after defecation 43.2% and after helping children defecate 39.4%.

4.6.4 Water use practices

Caregivers were asked questions relating to water use practices. The results are shown in Figure 4.7 below.
According to our findings, those treating drinking water were 36.8%, those boiling drinking water were 45% while those reporting that they use clean drinking water were slightly over half of respondents 51.2%.

### 4.6.5 Sanitation practices

Sanitation practices were also examined and results showed that majority of caregivers reported that they engage in proper disposal of feces (68.2%) and about 60.3% indicated the use of latrines. When asked to specify the disposal of child’s feces, 40.0% indicated burying (of which 7.6% had diarrhoea and 32.4% had no diarrhoea), 38.8% indicated throwing with refuse (of which 8.8% had diarrhea and 30.0% had no diarrhea) while very few 21.2% indicated pit latrine (of which 0.0% had diarrhea and 21.2% had no diarrhea) (Figure 4.8).
4.6.6 Child feeding practices

Proper child weaning or feeding practices were being conducted by a majority of the caregivers 60.3% (of which 2.1% reported diarrhea among under five and 58.2% had no diarrhea among under five).

4.6.7 Caregivers’ practices and diarrhea prevalence among children under five years in Turkana County

The various practices were subjected to a test of independence to establish their influence on occurrence of diarrhea. The results of the test are shown in Table 4.5.
<table>
<thead>
<tr>
<th>Practices</th>
<th>Diarrhea prevalence</th>
<th></th>
<th></th>
<th>Chi-square statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>n (%)</td>
<td></td>
</tr>
<tr>
<td>Hygiene</td>
<td>Yes</td>
<td>5(3.4)</td>
<td>142(96.6)</td>
<td>$\chi^2=32.151$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td>Hand washing after defecation</td>
<td>No</td>
<td>51(26.4)</td>
<td>142(73.6)</td>
<td></td>
</tr>
<tr>
<td>Hand washing before feeding children</td>
<td>Yes</td>
<td>5(3.6)</td>
<td>132(96.4)</td>
<td>$\chi^2=27.415$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>51(25.1)</td>
<td>152(74.9)</td>
<td></td>
</tr>
<tr>
<td>Hand washing before food preparation</td>
<td>Yes</td>
<td>4(2.7)</td>
<td>145(97.3)</td>
<td>$\chi^2=36.640$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>52(27.2)</td>
<td>139(72.8)</td>
<td></td>
</tr>
<tr>
<td>Hand washing after helping children to defecate</td>
<td>Yes</td>
<td>5(3.7)</td>
<td>129(96.3)</td>
<td>$\chi^2=26.089$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>51(24.8)</td>
<td>155(75.2)</td>
<td></td>
</tr>
<tr>
<td>Ensuring proper hygiene</td>
<td>Yes</td>
<td>7(3.8)</td>
<td>177(96.2)</td>
<td>$\chi^2=46.765$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>49(31.4)</td>
<td>107(68.6)</td>
<td></td>
</tr>
<tr>
<td>Sanitation</td>
<td>Yes</td>
<td>7(3.4)</td>
<td>198(96.6)</td>
<td>$\chi^2=63.969$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>49(36.3)</td>
<td>86(63.7)</td>
<td></td>
</tr>
<tr>
<td>Proper disposal of feces</td>
<td>Yes</td>
<td>26(11.2)</td>
<td>206(88.8)</td>
<td>$\chi^2=14.709$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>30(27.8)</td>
<td>78(72.2)</td>
<td></td>
</tr>
<tr>
<td>Disposal of child's feces</td>
<td>In pit latrine</td>
<td>0(.0)</td>
<td>72(100.0)</td>
<td>$\chi^2=18.646$; df = 2; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>Throne with refuse</td>
<td>30(22.7)</td>
<td>102(77.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Burying</td>
<td>26(19.1)</td>
<td>110(80.9)</td>
<td></td>
</tr>
<tr>
<td>Child feeding</td>
<td>Yes</td>
<td>7(3.4)</td>
<td>198(96.6)</td>
<td>$\chi^2=63.969$; df = 1; $p=.051$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>49(36.3)</td>
<td>86(63.7)</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Yes</td>
<td>10(5.7)</td>
<td>164(94.3)</td>
<td>$\chi^2=29.788$; df = 1; $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>46(27.7)</td>
<td>120(72.3)</td>
<td></td>
</tr>
<tr>
<td>Treating drinking water</td>
<td>Yes</td>
<td>18(14.4)</td>
<td>107(85.6)</td>
<td>$\chi^2=6.16$; df = 1; $p=.433$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>38(17.7)</td>
<td>177(82.3)</td>
<td></td>
</tr>
<tr>
<td>Boiling drinking water</td>
<td>Yes</td>
<td>22(14.4)</td>
<td>131(85.6)</td>
<td>$\chi^2=8.84$; df = 1; $p=.347$</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>34(18.2)</td>
<td>153(81.8)</td>
<td></td>
</tr>
</tbody>
</table>
Analysis of water use practices and relationship with diarrheoa prevalence show that the proportion of reported diarrheoa prevalence was lower among respondents who use clean drinking water (5.7%), treating drinking water (14.4%) and boiling drinking water (14.4%) than those who did not use clean drinking water (27.7%), not treating drinking water (17.7%), and not boiling drinking water (18.2%). There was a statistically significant relationship between diarrheoa prevalence and use of clean drinking water ($\chi^2=29.788$, df = 1, $p<0.001$). However, there was no significant relationship between diarrheoa prevalence and treating drinking water ($\chi^2=.616$, df = 1, $p=0.433$), and boiling drinking water ($\chi^2=.884$, df = 1, $p=0.347$).

In regards to hygiene, the proportion of reported diarrheoa prevalence was lower among respondents who washed their hands after defecation (3.4%), before feeding babies (3.6%) before food preparation (2.7%), after helping children to defecate (3.7%) and those ensuring proper hygiene (3.8%) than those who did not wash their hands after defecation (26.4%), before feeding babies (25.1%), before food preparation (27.2%), after helping children defecate (24.8%) and those who don’t ensure proper hygiene (31.4%). There was a statistically significant relationship between reported diarrheoa prevalence and hand washing after defecation ($\chi^2=32.151$, df = 1, $p<0.001$), hand washing before feeding children ($\chi^2=27.415$, df = 1, $p<0.001$), hand washing before food preparation ($\chi^2=36.640$, df = 1, $p<0.001$), hand washing after helping children to defecate ($\chi^2=26.089$, df = 1, $p<0.001$), and ensuring proper hygiene ($\chi^2=46.765$, df = 1, $p<0.001$).
In terms of fecal disposal, there was lower diarrhoea prevalence reported among respondents who used pit latrines (3.4%), those who dispose feces properly (11.2%), those who dispose of child’s feces in pit latrine (0%) compared to those who do not use latrines (36.3%), do not dispose feces properly (27.8%) and those throwing child feces with refuse (22.7%) and those burying child’s feces (19.1%). Use of pit latrines to dispose feces ($\chi^2=63.969$, df = 1, $p<0.001$), proper disposal of feces ($\chi^2=14.709$, df = 1, $p<0.001$), and disposal of child's feces ($\chi^2=18.646$, df = 2, $p<0.001$) had a statistically significant relationship with reported diarrhea prevalence. However, proper child weaning/feeding had no statistically significant relationship with occurrence of diarrhea ($\chi^2=63.969$, df = 1, $p=0.051$).

Qualitative results linked proper hygiene and fecal disposal as an effective control measure for diarrhea as illustrated by the following statement from a key informant interview:

“...The community is embracing good hygiene as a control measure which has helped reduce prevalence of diarrhoea significantly; Some households are now using pit latrines and boiling water for drinking...”~PHO
CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion, conclusions and recommendations of the study based on the study objectives and findings.

5.2 Discussion

This section presents a discussion of the study findings. The outcomes were compared with other similar studies to help highlights similarities and differences in findings.

5.2.1 Prevalence of diarrhoea among children under five years in Turkana County

In this study, reported diarrhoea prevalence was 16.5% in Turkana County. The timing of this study, which was done during rainy season characterised by increased transmission through contaminated water sources, especially rivers, streams and wells compared to dry season could explain the high diarrhoea prevalence in this study. The high prevalence of diarrhoea is an indication of a high diarrheal disease burden in the county which requires timely interventions such as early recognition of the disease and initiation of timely treatment options to save children’s lives and avert long-term effect associated with disease. Nigatu and Tadesse (2015) emphasized that early intervention on diarrhoea cases is crucial in reducing the high mortality and morbidity associated with the illness.
5.2.2 Socio-demographic characteristics and prevalence of diarrhoea among children under five years in Turkana County

Socio-demographic factors and their relationship with diarrhoea was tested using chi-square test of independence. The study established that only education level of mothers/caretakers played an important role in prevalence of diarrhoea. This was similar to Dessalegn et al., (2011) and WHO (2011) where education level was found to influence individual perceptions, knowledge and prevention practices of diarrhoeal diseases. According to WHO (2011), in developing countries, maternal education has been linked to infant morbidity and mortality as a result of diarrhoea and other illness (WHO, 2011). This can be explained by the finding that mothers with higher education attainment have better opportunity for obtaining relevant and reliable information about childcare than mothers/caretakers with lower educational attainment (Yilgwan and Okolo 2012). Mothers with less educational status may lack the basic knowledge on the impacts of potential risk factors, such as water supply, latrine utilization, hygiene, and sanitation on diarrhoea prevalence. For instance, a study in India revealed that the educated mothers were more likely to take their child with diarrhoea to a health facility or use ORS compared to those who had no education (Shah et al., 2012).

However, these results were dissimilar with study findings by Mengistie et al., (2012) and Asakitikpi (2010) in which education of the mother was not related to the diarrhoea prevalence. This difference can be explained by the difference in context of the study especially the nature of the study population such as a study population where respondents have high education attainment.
On the other hand; age of caregivers, marital status, household size, number of children under 5 years source of income, type of house, religious affiliation, main source of income, gender of caregiver, and age of children were not associated with diarrheoa prevalence. This was similar to other past studies (Mengistie et al., 2012; Mathuram et al., 2010) in which socio-demographic characteristics of a respondents were found to have no statistically significant association with prevalence of diarrheoa. However, the study was inconclusive on the role of total health care cost (travel, time, good health and use fees) on diarrheoa management as a motivational factor.

5.2.3 Caregivers’ perceptions and prevalence of diarrheoa among children under five years in Turkana County

Caregivers’ perceptions are important in understanding individual attitudes and beliefs towards diarrheoa prevention, control and management in children under five years (Strand et al., 2012). In this study, it was found that a considerable proportion of caregivers’ of children under five years had wrong perceptions about diarrheoa severity, its treatment, its causes and its management. For instance, many caregivers perceived diarrheoa not to be a serious disease to be treated in hospital and that children should be treated at home before taking them to hospital. Some caregivers also believed that traditional medicine is adequate to treat diarrheoa while others attributed diarrheoa to growth stage such as teething and supernatural causes such as witchcraft and poor feeding habits of a child. Such wrong perceptions about diarrheoa influenced diarrheoa management treatment seeking behaviours adopted by individual caregivers leading to diarrheoa prevalence.
Wrong perceptions on diarrheoa and its causes are directly linked to poor and infective management practices at the household and community level which increases disease prevalence (Mumtaz et al., 2013). For instance, a caregiver who perceives diarrheoa to be caused by supernatural powers would more likely seek traditional remedies especially spiritualist as opposed to one who attributes it to poor hygienic practices (Khalili et al., 2013). Demystification of diarrheoa and its management through awareness campaigns would be an important approach in reduction of diarrheoa among children.

Moreover, the low health facility utilization rate for diarrheoa case(s) management was mainly due to negative beliefs and perceptions towards health facilities and ignorance.

5.2.4 Caregivers’ knowledge and prevalence of diarrheoa among children under five years in Turkana County

Caregivers’ knowledge on diarrheoa, its treatment, prevention and management were found in this study to be important factors in diarrheoa prevalence. This finding was similar to that of Tavares et al., (2011) who found knowledge of diarrheoa and its causes in the community to vary and to affect effective diarrheoal prevention, control and management practices. This is key in curbing high burden of diarrheoal diseases especially among low income earners.

In particular, knowledge on causes of diarrheoa such as contaminated water or food, poor hands hygiene, poor fecal disposal and poor feeding can help to prevent diarrheoa. Further,
as a result of poor knowledge on diarrhoeal causes, Mathuram et al., (2010) reported diarrhoea disease prevention and control remains a challenging issue because of the ubiquitous exposure to individuals through multiple transmission routes such as contaminated food, water and generally unhygienic conditions especially in the developing world. A substantial proportion of mothers and caregivers were not adequately knowledgeable and or knowledgeable on use of ORS which resulted in many of them using traditional medicine and or worsening of the conditions.

In addition, due to improvements in treatment efficacies which lead to decreases in diarrhoea prevalence and mortality, there is need for increased health education focused on increasing caregivers’ knowledge and enhancing adoption of appropriate prevention practices of diarrhoea among children under five years. In a study done in Thailand, children whose mothers didn’t know about infection-related diarrhoeal illness as common in infants directed little attention to prevention and or management of diarrhoeal cases in a manner consistent with biomedical recommendations (Mumtaz et al., 2013).

5.2.5 Caregivers’ practices and prevalence of diarrhoea among children under five years in Turkana County

The study established that most of the diarrhoea cases are managed using traditional medicine treatment while some caregivers personally treat the sick child at home. On the other hand, few diarrhoeal cases are taken to the health facility for appropriate treatment and management. This findings was similar to those of Kamiya (2011) who reported most diarrhoea cases to be managed at home. In many instances, facilities were mainly used as
a last resort, that is, after the disease deteriorated. This explains the high burden of
diarrhea and related mortality in such remote areas like Turkana County. Most people
residing in rural and remote areas preferred to manage diarrhea at home. According to
Mangal et al. (2014), most diarrhea cases to be managed at home with the pattern of
management depending on perceived disease severity and beliefs.

At home, use of herbs and fluids were the main method used to manage diarrhea. This
was similar to findings of a study conducted by King et al. (2010) to assess knowledge and
practices of men and women on maternal and child health in rural Guinea Bissau where
use of fluids was reported as the predominant methods used to treat diarrhea at the
household level. The main types of fluids used were fruit juice, herbal fluids and plain
water. Fluids are mainly administered to replace lost fluids, prevent dehydration and restore
lost energy from the body during diarrhea episode (Tobin et al., 2014).

WHO (2011) defines Oral Rehydration Therapy (ORT) as a primary intervention for the
management of diarrhea which can be easily administered at home by the
mothers/caregivers as soon as a diarrhea episode begins. This intervention is a simple,
inexpensive and the most effective way to treat dehydration and reduce diarrhea mortality
(Amare et al., 2014). Information on ORT was mainly obtained from health care providers
during health education and awareness campaigns. Olson et al., (2011) emphasized that
health care workers play a critical role in promoting ORT use in the community through
education and its promotion. As a result, it is important for health care workers to enhance
promotion and education of community members especially mothers and caregivers on
best practices for preparing and administering ORS and its benefit in management of the common diarrheoa cases to children.

Access to safe and clean drinking water remains a challenge in remote settings such as Turkana County with the main source of water being open sources such as wells or lagas. These Open water sources for domestic use which are largely untreated were associated with increasing prevalence of diarrheoa. These findings are similar with the study of Nigatu and Tadesse (2015) which showed a significant association between unprotected/contaminated source of water and diarrheoal morbidity among under-five children. Similarly, a study conducted in Uganda, showed that there was strong association between source of drinking-water obtained from rivers/streams and diarrheoal morbidity among under-five children. This underpins needs for proper sanitary measures and community dialogue on diarrheoa control and prevention practices such as use of pit latrines to avoid contaminating open water sources.

Proper hygiene such as washing of hands with soap after toilet, before eating and feeding children and proper disposal of faeces were found to be significant practices in preventing diarrheoa. This was similar to findings by Mathuram et al. (2010) who found contaminated food, drinks and general unhygienic factors to make diarrheoa management challenging at the household level. Proper community education and awareness creation on measures for safe and hygienic practices for diarrheoa management remains a key interventional measure for diarrheoa management.
5.2.6 Summary of findings

According to the results, 56 (16.25%) of the children were reported to have diarrheoa. Among those who had diarrheoa (n = 56), only 33 (58.9%) were taken to hospital for treatment. Results showed that only 32 (57.1%) of children with diarrheoa received ORS. According to the results, only education level was found to have a statistically significant relationship with the management of diarrheoa prevalence \((\chi^2=10.652, df =3, p = 0.014)\).

According to the results, perceptions that diarrheoa is not a serious disease to be treated at hospital \((p<0.00)\), traditional medicine is adequate to treat diarrheoa \((p<0.001)\), children should be treated at home before taking them to hospital \((p<0.001)\), supernatural causes \((p<0.001)\), and growth stage such as teething \((p<0.001)\) were significantly associated with diarrheoa prevalence.

Results show that knowledge that diarrheoa can be adequately managed at home \((p=.031)\) and knowledge on prevention of diarrheoa \((p<0.001)\) had a statistically significant relationship with diarrheoa prevalence. In addition, knowledge on causes of diarrheoa such as contaminated water or food \((p<0.001)\), poor hands hygiene \((p<0.001)\), poor fecal disposal \((p<0.001)\) and poor feeding \((p<0.001)\) were significantly related to diarrheoa prevalence.

5.3 Conclusions

The study sought to determine the prevalence of diarrheoa among children under five years in Turkana County. It was revealed in this study that there was a high prevalence of diarrheoa and burden of diarrheoa in the Turkana County. All the null hypotheses in this
study that diarrheoa among children under five years in Turkana County was not influenced by socio-demographic factors, caregivers’ knowledge, perceptions and practices were rejected.

Secondly, the study sought to determine the effect of caregivers’ knowledge on diarrheoa among children under five years in Turkana County. It was evident in the results that there was a statistically significant relationship between diarrheoa prevalence and knowledge that diarrheoa can be adequately managed at home; contaminated water or food; poor hands hygiene; poor fecal disposal; poor feeding; and knowledge on prevention of diarrheoa. Many mothers had inadequate knowledge on proper prevention and management practices of diarrheoa which contributes to increasing burden of the disease.

Thirdly, the effect of caregivers’ perceptions on diarrheoa among children under five years in Turkana County was also determined in the study. The results revealed that there was a statistically significant relationship between diarrheoa prevalence and perceptions that diarrheoa is not a serious disease to be treated in hospital; traditional medicine is adequate to treat diarrheoa; children should be treated at home before taking them to hospital; supernatural causes of diarrheoa; and growth stage such as teething causes diarrheoa. Such wrong perceptions affect adoption of proper and effective diarrheoa management practices and hence the high diarrheoa prevalence in Turkana County.

Another objective was to determine the effect of caregivers’ practices on diarrheoa among children under five years in Turkana County. It was evident in the results that there was a
statistically significant relationship between diarrhea prevalence and caregivers’ practices of hand washing after defecation; hand washing before feeding children; hand washing before food preparation; hand washing after helping children to defecate; ensuring proper hygiene; use of latrines; proper disposal of feces; disposal of child's feces; and use of clean drinking water.

Lastly, the study sought to determine the effect of socio-demographic factors on diarrhea prevalence among children under five years in Turkana County. The results findings revealed that caregivers’ level of education has a statistically significant relationship with diarrhea prevalence. Higher educational attainment helps individuals to have good knowledge on diarrhea and most appropriate diarrhea management strategies through access to relevant information.

5.4 Recommendations

5.4.1 Recommendations for policy action

The study recommends that the government (National and County) in partnership with all relevant stakeholders such as donors/partners and community should:

1. A high prevalence of diarrhea among under fives in Turkana County was found in this study hence there is need for current strategies for managing diarrhea to be reviewed to identify areas to improve on.

2. Caregivers’ knowledge level on diarrhea need to be improved in order to demystify diarrhea and embrace proper management practices.
Negative misconceptions and perceptions on diarrhoea and its management need to be countered through improving on health education in areas like diarrhoea causes and dissemination of health information.

Enhance community conversation and training on appropriate diarrhoea control and management practices focusing on knowledge of diarrhoea disease and skills transfer for addressing behavioral and social factors associated with management of diarrhoea such as health seeking behaviors, disposal of faeces and hygiene.

5.4.2 Further research

The study proposes rigorous epidemiological studies such as Random Clinical Trials (RCT) to assess feasible and effective household and community level interventions for management and prevention of diarrhoea in Turkana County. There is also need for more investigations on caregivers’ perceptions about causes of diarrhoea and their influence on management of childhood diarrhoea. Further research need to investigate effect of wealth levels on diarrhoea prevalence. In addition, future studies should verify the self-reported information from caregivers’ by interviewing more family members to confirm each statement given.
REFERENCES


UNICEF. (2012). *Pneumonia and diarrhoea: Tackling the deadliest diseases or the world’s poorest children*. UNICEF


APPENDICES

Appendix I: Consent form

My name is Antony Muiruri Wanjiru, I am a Masters student from Kenyatta University. I am conducting a study on “Maternal perceptions and prevention practices on management of diarrheoa among under five in Turkana Central Sub-County, Turkana County”. The information can be used by the Ministry of Health to improve access and quality for screening of diarrheoa cases in the hospital as well as in other regions of Kenya.

Procedure to be followed

Participation in this study requires that I ask you some questions and record the information from you in a questionnaire. You have the right to decline participation in this study. Participation in this study is purely voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and stop an interview at any time.

Discomforts and risks

Some of the questions asked are on intimate subject and may make you feel uncomfortable to respond to. If this happens, you may refuse to answer these questions if you so choose. You may also stop the interview at any time.

Benefits

If you participate in this study you can help us learn how to provide effective screening services that can improve the health of under-fives and reduce the risk of diarrheoa. You can also benefit through proper referrals to the nearest health care for treatment.
Confidentiality

The interviews are conducted in a private setting within the households. Your name will not be recorded on the questionnaires. All the questionnaires will be kept safe, secure and private.

Contact information

If you have any questions you may contact Dr. Justus Osero on 0724869330 and Dr. Peterson Warutere on 0721993833, and/or Kenyatta University Ethical Review Committee Secretariat on kuerc@ku.ac.ke.

Participant’s statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time.

ID no of the participant ………………Signature or Thumbprint……………………

Date………………….

Investigator’s statement

I, the undersigned, have explained to the volunteer in a language s/he understands the procedure to be followed in the study and the risks and benefits involved.

Name of the interview……………………………………………………………………

Signature of the interviewer………………………………………Date …………..
Appendix II: Study Questionnaire

My name is Antony Muiruri Wanjiru, I am a Masters student from Kenyatta University. I am conducting a study on “maternal perceptions and preventions practices on management of diarrheoa among under five in Turkana Central Sub-County, Turkana County”. The information will be used by the Ministry of Health to improve access and quality for screening of diarrheoa cases in the hospital as well as in other regions of Kenya. There is no right or wrong answer. The information you give will be treated with uttermost confidentiality. No names will be required and or used in this study. Please feel free to participate.

DEMOGRAPHIC INFORMATION

1. What is your age in years? ________________ years
2. What is your marital status? (1) Married (2) Single (3) Widow (4) Separated (5) Divorced
3. What is your highest level of formal education? (1) None (2) Primary (3) Secondary (4) College (5) University
4. Number of children under five years? ________________
5. What is the family source of income?  
   1 = Formal employment  
   2 = Farming  
   3 = Business  
   4 = Livestock keeping  
   5 = Others, specify…………………………………………..
6. Type of house used by family? (1) Permanent (2) Semi-permanent (3) Temporary
7. In the last two weeks, has any of your children aged under five year ever had any diarrheoa? (1) Yes (2) No
8. If yes in Question 7 above, did you take the child to hospital? (1) Yes (2) No
9. The following statement relates to diarrheoa and its management. Please tick the response to each of the statement that best describes your opinion and or view.
<table>
<thead>
<tr>
<th>Statement</th>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORS is effective in treating diarrheoa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrheoa can be adequately managed at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrheoa is not a serious disease to be treated at hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional medicine is adequate to treat diarrheoa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children should be treated at home before taking them to hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am well educated to manage diarrheoa at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7=Others (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. In your own view, what causes diarrheoa? (Tick appropriately)

<table>
<thead>
<tr>
<th>What causes diarrheoa</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Supernatural causes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Contaminated water/food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = Poor hands hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 = Poor faeces disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 = Poor feeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 = Growth stage such as teething</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7=Others (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. What is your preferred method of managing diarrheoa?
(1) Hospital treatment
(2) Traditional medicine treatment
(3) Personally treating the child at home

12. If you manage diarrheoa personally at home, what do use to manage the diarrheoa?
(1) Fluids
(2) Herbs
(3) Drugs
(4) Others, specify………………………..

13. What fluid can a child with diarrheoa be given at home?
(1) ORS
(2) Salt sugar solution
(3) Plain water
(4) Fruit Juice
(5) Herbal fluids
(6 = Others, Specify………………………..)
14. If your child had diarrhoea in the last two weeks, did you use ORS?
   (1) Yes  (2) No
15. If yes in question 15 above, where did you learn about use of ORS for diarrhoea
    management?
   (1) Health Workers
   (2) Herbalist
   (3) Traditional Healers
   (4) Media
   (5) Others (Specify) ____________________________________________
16. What is the source of water for routine domestic use?
   (1) Stand pipe
   (2) Rain water harvesting
   (3) Laga
   (4) Well
17. Please name at least three ways of preventing diarrhoea?
   1. ____________________________________________ 2. ________________________
   3. ____________________________________________ 4. ________________________
18. What are some of the methods you use to prevent diarrhoea at the household level?

<table>
<thead>
<tr>
<th>Method</th>
<th>Tick appropriately</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Ensuring Proper hygiene</td>
<td></td>
</tr>
<tr>
<td>(2) Use of clean drinking water</td>
<td></td>
</tr>
<tr>
<td>(3) Proper child weaning/feeding</td>
<td></td>
</tr>
<tr>
<td>(4) Proper disposal of feces</td>
<td></td>
</tr>
<tr>
<td>(5) Use of latrines</td>
<td></td>
</tr>
<tr>
<td>(6) Others (specify)</td>
<td></td>
</tr>
</tbody>
</table>

19. How do you dispose child’s feces? (Pick appropriately)

<table>
<thead>
<tr>
<th>Method</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = In pit latrine</td>
<td></td>
</tr>
<tr>
<td>2 = Throne with refuse</td>
<td></td>
</tr>
<tr>
<td>3 = Burying</td>
<td></td>
</tr>
<tr>
<td>4 = Others, specify</td>
<td></td>
</tr>
</tbody>
</table>
Which of the following do you do at home?  
<table>
<thead>
<tr>
<th></th>
<th>Tick appropriately</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hand washing with soap?</td>
<td></td>
</tr>
<tr>
<td>a) Before food preparation</td>
<td></td>
</tr>
<tr>
<td>b) Before feeding children</td>
<td></td>
</tr>
<tr>
<td>c) After defecation</td>
<td></td>
</tr>
<tr>
<td>d) After helping children defecate</td>
<td></td>
</tr>
<tr>
<td>2. Boiling drinking water</td>
<td></td>
</tr>
<tr>
<td>3. Treating drinking water</td>
<td></td>
</tr>
</tbody>
</table>

20. What are the barriers toward proper management of diarrhoea?
   (1) Lack of knowledge on ORS.
   (2) Long distance to health care.
   (3) Financial constraints.
   (4) Traditional beliefs and customs
   (5) Others (Specify) ____________________________
Appendix III: Key Informant Guide

Identification Panel
Position of the Interviewee____________________________________________

Sub-County_________________________________________________________

Questions

1. In your own view, what is the prevalence of diarrheoa in this County disaggregated by sub-county?

2. From experience, in what ways does the socio-demographics of mothers and caregivers influence diarrheoa management practices?

3. In your own view and from practice, what are the maternal perceptions regarding diarrheoa and diarrheoa management in this county? How do these perceptions affect diarrheoa prevention, control and management practices?

4. From experience, what are the main maternal practices for preventing and managing diarrheoa in this county? In what ways do the maternal practices influence successful diarrheoa management at the household and community level?

5. From experience, what are the key barriers toward proper management of diarrheoa at household and community level in this area?

6. In what ways can these barriers resolved for a successful diarrheoa management campaign in this County?
Appendix IV: Kenyatta University Graduate School Approval Letter

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Internal Memo
FROM: Dean, Graduate School
DATE: 17th September, 2013

TO: Antony Muiruri Wanjurur
C/o Community Health Department
REF: P57/CTY/PT/23706/2011

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board, at its meeting of 11th September, 2013, approved your Research Proposal for the M.P.H Degree Entitled, “Maternal Perceptions and Practices in the Management of Acute Diarrhoea among Under Five Children in Turkana Central District Turkana County, Kenya.”

You May Now Proceed with Data Collection.

Thank you,

DAVID NJOROGE
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Department of Community Health

Supervisors:

1. Dr. Justus O. Osero
   C/o Department of Community Health
   Kenyatta University

2. Dr. Peterson Warutere
   C/o Department of Environmental Health
   Kenyatta University
Appendix V: Ethical Clearance letter

This is to certify that Mr. Antony Muiruri Wanjiru of Kenyatta University, 0-600 Nairobi, has been permitted to conduct research in Turkana County on the topic: Maternal Perceptions and Practices in the Management of Acute Diarrhoea among Under-five Children in Turkana Central District Turkana County, Kenya.

for the period ending:
2nd May 2014

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, digging and collection of biological specimens are subject to further permission from the Government Ministries.
5. You are required to submit at least two (2) hard copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.

Republic of Kenya

National Commission for Science, Technology and Innovation

Research Clearance Permit

CONDITIONS: see back page
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

NACOSTI/P/14/3239/1039

Antony Muiruri Wanjiru
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Maternal perceptions and practices in the management of Acute Diarrhoea among under five children in Turkana Central District, Turkana County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Turkana County for a period ending 2nd May, 2014.

You are advised to report to the County Commissioner, the County Director of Education and the County Coordinator of Health, Turkana County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

Said Hussein
For: Secretary/CEO

Copy to:

The County Commissioner
The County Director of Education
The County Coordinator of Health
Turkana County.
Appendix VI: Research Permit for Conducting the Study

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Our Ref: P57/CTY/PT/23706/2011

DATE: 17th September, 2013

The Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,


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


Any assistance given will be highly appreciated.

Yours faithfully,

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

DNN/rwm
Appendix VII: Map of the Study area
Appendix VIII: Top diseases in Turkana County

<table>
<thead>
<tr>
<th>TEN DISEASES UNDER 5 YRS TURKANA CENTRAL</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Clinical Malaria</td>
<td>23536</td>
</tr>
<tr>
<td>2 Other Dis. of Respiratory</td>
<td>16203</td>
</tr>
<tr>
<td>3 Diarrhoea</td>
<td>7567</td>
</tr>
<tr>
<td>4 Pneumonia</td>
<td>5803</td>
</tr>
<tr>
<td>5 Confirmed Malaria</td>
<td>5340</td>
</tr>
<tr>
<td>6 Eye Infections</td>
<td>3156</td>
</tr>
<tr>
<td>7 Dis. of the skin (incl. wound)</td>
<td>1963</td>
</tr>
<tr>
<td>8 Ear Infections</td>
<td>1577</td>
</tr>
<tr>
<td>9 Intestinal worms</td>
<td>1211</td>
</tr>
<tr>
<td>10 Anaemia</td>
<td>414</td>
</tr>
</tbody>
</table>

**Source:** Turkana Central Health Report, 2011