EFFECTIVENESS OF WATER, SANITATION AND HYGIENE (WASH) INTERVENTIONS IN CHANGING MOTHERS' BEHAVIOUR AND IMPROVING CHILD HEALTH: A CASE STUDY OF KAMUKUNJI SUB COUNTY, NAIROBI COUNTY

BY

AUDREY ADHIAMBO ASUDI

A Research project submitted in partial fulfilment of the requirements for the award of Masters in Sociology (Rural Sociology and Community Development), University of Nairobi

NOVEMBER 2016

DECLARATION

This study proposal is inventive and unique and has not been presented to any other tertiary institution.

Sign: ..... Date .....

Audrey Adhiambo Asudi **C50/64148/2010**

With my consent and the institution's supervisor has this study proposal been succumbed for examination.

Sign: ..... Date: .....

Professor Edward Mburugu

University of Nairobi

Department of Sociology and Social Work

DEDICATION

I dedicate this project to my family

ACKNOWLEDGEMENTS

My gratefulness goes to my supervisor for guiding and reassuring me. My family too for their love and aid.

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ELLIPSES LIST

ADB - African Development Bank

APD - Administration**,** Planning and development

CBOs - Community Based Organisations

CBS - Central Bureau of Statistics

Cspro - Census for population processing

DALYS - Disability Adjusted Life Years

DFID - Department For International Development

DHS - Demographic and Health Survey

GOK - Government of Kenya

JMP - Joint Monitoring Programme

KEMRI - Kenya Medical Research Institute.

KNBS - Kenya National Bureau of Statistics

MDG - Millennium Development Goals

NGOs - None Governmental Organisations

OECD - Organization for Economic Co-operation and Development

TOT - Training of trainers

UK - United Kingdom

UNESCO - United Nations Educational, Scientific and Cultural Organisation

UN-HABITAT- United Nations Human Settlement programme

UNICEF - United Nation Children Fund

WASH - Water Sanitation and Hygiene

WHO - World Health Organisation

ABSTRACT

This study sought to look into effects of WASH in altering the character of a mother's practices and enhancing a child's wellbeing in Kamukunji Sub County, Nairobi County. The study adopted a longitudinal/cohort design. It aimed at all toddlers below 5 years aboding at Kamukunji sub County of Nairobi County. 60 households in the area were targeted. 60 respondents took part in this research. The research constituted both questionnaires for care givers and interview guides for Community Health Workers to collect data. Chi square testing was done using Pearson's coefficient. This was done by the use of SPSS. It should be noted, however that this calculation was based on only the close ended part of the questionnaire. The study found that most of the respondents who don't have a toilet at their residence use the neighbour's toilet. Majority of the respondents do not have a refuse pit but they dispose of their refuse in open land, toilets or by burning. The study also revealed that water that families collects from the sources was insufficient for their drinking needs. The study indicated that respondents pay for water they fetch from their sources with majority of them paying one shilling per litre. Further the study indicated that water which was being got from the source would be considered unsafe for drinking. The study indicated that there is a considerable number of households that have no soap in the house though majority of the residents had soap in their houses. The study revealed that in the last six months' majority of children under five years were suffering from diarrhea. The study concludes that the water in Kamukunji is insufficient and unsafe for drinking. The study recommends proper construction of latrines to eliminate fear, training on use of latrines, public awareness and training of mothers on the need for hand washing.

CHAPTER ONE: INTRODUCTION

1.1 Background

Diarrhoea morbidity: public health problem amongst toddlers below 5 years in unindustrialized states with the outcome usually being poor health, stunted growth, mental retardation and micro nutrient deficiencies (Black, 2003). He also stated that children are one of the major vulnerable groups to diseases and malnutrition. Those under five years of age are especially more vulnerable since they grow at a fast rate and have a weak immunity to curb infections.

Today, diarrhoea has become a major health problem relating to WASH making death rates among toddlers much. Globally close to 2 million children die from diarrhoea every year (UNICEF, 2007) while others growth is inhibited due to this scourge of diarrhoea. In Kenya, it is less as it is approximately 4.7% and approximately 3.5 to 4.6 occurrences annually. Dessication being the major cause of death. Approximately 225 million toddlers worldwide are underdeveloped whereas 181 million are under weight. Kenya's case is close to 33% being malnutrited.

The main reason for this infection is due to the poor hygiene in their unhealthy surrounding especially for those residing in slums. This has been controlled by educating these people on the essentiality of cleanliness and sanitation an aim to also curb poverty.

Children mainly below 5 in unindustrialized states are faced with this epidemic whereby growth is inhibited due to poor nutrients intake. According to the World Health Organization (2012), lack of water in line with deprived cleanliness has caused the death of close to 16 million cases globally.

States have numerous occurrences of water borne diseases, especially toddlers who ail or even die. This hence shows the essentiality of cleanliness and sanitation whereby sanitation centres need be erected to make people see the importance of change.

Water and Sanitation is crucial to life, fitness and dignity. Adequate cleanliness is preferred for enhancing the lives of all initiating WASH. The UN believes that all refugees, asylum seekers, internally displaced human beings and returnees should have get admission to clean water whether they stay in camps or cities (ECOSOC, 2002). Right disposal of all waste in addition to control of the carriers of communicable sicknesses, along with mosquitoes, rats, mice and flies, is vital to mitigate health risks and sanitation related epidemics.

WASH access is important for healthy people, improved well-being and overall development. Without it, population and economic growth women, children and marginalized communities are highly affected negatively. Improvement of WASH is beneficial to people's properly-being, mainly the marginalized. It also reduces the risk of health-related diseases. The health risks are described as inclusive of unsafe water, lack of water linked to inadequate hygiene, contact with hazardous water, bad private.

1.2 Problem Statement

Inadequate water, improper clean practices has been the cause of close to 1 million deaths induced by diarrhoea which is equivalent to 18% of deaths of toddlers below 5 years. Making diarrhoea the second most cause of death to toddlers in this age bracket. Diarrhoea has been the major contributor to child deaths especially in the developing nations although the effect has been reducing in the last decades Murray et al., (1994).

According to World Health Organization (2003) diarrhoea has been found to contribute to about 1.6 million under-fives annually which represents about 15% of deaths among children. Sanitation relates to health in that water being discarded in a poor manner or it being dirty also discarding of waste in a unhealthy way has been the reason of these deaths. This has also been associated with worms, diarrhoea and skin related diseases with diarrhoea being the worst disease among them (Pruss, et al., 2008).

Health related problems associated with water, sanitation and hygiene in Africa are high (240 times) compared to other continents (Pruss *et al.,* 2002). According to Ustun & Corvalan (2006) 94% of WASH related diseases cases in Africa are preventable through interventions that would lead to adequate sanitation, water and good hygiene. Black and Fawcett (2008) noted that increased water supply and safety reduces incidences of diarrhoea by one over five and deaths attributed to the same by half.

WASH programmes that are effective should use the right technology on interventions towards changed behaviour of the mothers. This requires health education that is appropriates and fits with the culture of the community in which the interventions are implemented. There is need for mothers to understand the importance of observing cleanliness, water safety and hygiene in their households.

In Africa, inadequate sanitation is related to numerous diseases like bilharzia and typhoid where more than 3 million people perish annually most of this being children from these diarrhoea induced

ailments. Kamukunji Sub County, has had numerous occurrences from the MOH ailments reports especially of cholera and typhoid most people perishing. (GOK, 1989).

The purpose for this study was to evaluate on WASH on mothers' behaviour, mothers have concentrated on providing food and shelter for their families they have ignored the interventions and effectiveness on matters of water, sanitation and hygiene in the settings like slums, refugee camps and among street families. Not much has been done about WASH especially to those children who less than 5 years yet much prone.

It is vital to point out on the reasons for poor WASH around these toddlers below 5 years moreover, looking into the steps emerging states need to take to curb poor hygiene practices. Coupled with the fact that limited studies have been done on the determinants of diarrhoea morbidity, nutritional status and illnesses among mothers who have children less than 5 years, it is important to undertake this study in order to identify areas that need interventions so as to decrease direct diseases and improve child health. The effects of WASH on the characters of mothers and enhancing toddlers' wellbeing was the research's main aim.

1.3 Research Questions

i. Is there a transformation in the mother's character after WASH involvement in Kamukunji sub county?
ii. What is the effect of WASH interventions on mothers' behaviour and practices in Kamukunji sub county?
iii. How does the occurrence of diarrhea in toddlers change with WASH interventions in Kamukunji sub county?
iv. How effective are WASH involvement at altering the general wellbeing of a child and character of the mother in Kamukunji sub county?

1.4 Objectives of the study

1.4.1 General Objective

The effects of WASH on the characters of mothers and enhancing toddlers' wellbeing was the research's main aim in Kamukunji Sub County.

1.4.2 Specific objectives

It was moreover guided by these aims:

i. The impact of the involvement of WASH to the mother's character and know how in Kamukunji sub county.
ii. Reviewing WASH practices in women's character after their involvement.
iii. The extent at which the occurrence of diarrhea induced infections reduces after WASH involvement.

1.5 Justification of the study

Improvement in WASH is key to child health. WHO reports show that close to 2 million toddlers perish from diarrhoea and many more being worm infested where other acquire trachoma due to poor hygiene practices. Prior researches illustrate the impact WASH has made in reducing diarrhoea but no research has shown the impact of WASH intervention among the less fortunate at Kenya in specific Kamukunji.

Recently, numerous researches on WASH at Kamukunji were government induced which proved futile because of record fail. These researches have no specificity in aiming at WASH practices especially among toddlers hence has had no impact on diarrhoea ailments hence resulting to the need of a research to be conducted specifically to those below 5 years.

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1.6 The Study's Importance

The research's findings impart knowledge at how WASH affects the character of mothers and hence enhancing a toddler's wellbeing. MOH and NGOs interested in health issues of children will benefit , mothers and the community at large in coming up with intervention measures to curb the problems that arise because of poor cleanliness.

The information generated from the study will help policy makers, planners and implementers of programmes to be able to approach the fight against poor hygiene and sanitation in a more holistic way. Lastly it will be vital to academicians at how at how WASH affects the character of mothers and hence enhancing a toddler's wellbeing in this area of Kamukunji sub county.

1.7 Scope and limitation of the study

Geographically the study covered Kamukunji sub county, Nairobi county especially the slum areas. The study was taken by mothers who toddlers below 5 years.it sought at evaluating at how WASH affects the character of mothers and hence enhancing a toddler's wellbeing at Kamukunji Sub County.

The major setbacks to this study were largely from data sources and data quality problems.For example there are many NGOs and CBOs within the study area dealing with different aspects of WASH but they had inconsistent data on the same subject. A case in point NGO's had comprehensive enumeration data at household level, similar data from Kenya National Bureau of Statistics KNBS especially on population was different. The researcher relied on the enumeration data as it was generated through a community process and the opinion leaders held the position that it was more accurate

Kamukunji Sub County has attracted many researchers, local and international alike. There has been a sense of research fatigue among opinion leaders and many resourceful persons significantly undermining the accuracy of information of WASH as some of them were too busy to attend discussion groups which are done in the community setting. Other respondents gave biased responses.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 LITERATURE REVIEW

2.1.1 Impact of Water, Sanitation and Hygiene on health

First looked into during the UICL at Argentina about 35 years ago whereby they aimed at providing access to pure and good drinking water globally together with clean facilities hence contributing to the global need of people to embrace good hygiene and sanitation. Emerging states have specifically be in the fore run of providing these amenities to especially the less fortunate in a bid to promote social and health state. This has however deemed to a be a problem especially in the tropical Africa which is way behind in fulfilling WASH's core objective that is free and safe sanitation and cleanliness amenities even in Kenya.

Offering of clean and healthy amenities for the safety of the human race in curbing diarrhoea induced ailments can define sanitation in this contextwhich aims at improving the general health of everyone. More than a third of the populace in emerging states are ailing from diarrhoea induced diseases like trachoma, bilharzia, typhoid etc.

2.1.2 Impact of Diseases in relation to proper cleanliness and sanitation

Looking into the state of a country it has been noted that most problems relating to one's wellbeing can be enhanced by enhancing the surrounding within us as many perishes are due to a result of the surrounding. Diarrhea being one of the leading causes of death. It has been noted that to reduce the occurrences of this scourge one ought to look into water specifically its safety and hygiene. Breastmilk is not the only necessity a toddler needs but protective foods are also essential especially in boosting its immune. It has been depicted that more than 3 billion of the total global populace have proper hygiene but close to 38% lack good hygiene and this has been some of the core reasons for the death of specifically toddlers below 5.

It has been noted that the death rates of toddlers have lessened despite that many more perish annually due to poor hygiene practices hence acquire diarrhea related ailments. Most suffer as a result of contamination and worm infested ailments. WHO states that many diarrhea ailments prevail yearly due to poor sanitation especially from toddlers and also due to DALYs or sudden change in the way of life.this has been a major cause of deaths in emerging states and continents. For those perishes occurring in Africa most of them are toddler deaths.

Diarrheal illnesses, caused by water being infested is the core reason of child perish rate in emerging states. WHO (2004) indicated that increased supply of water can reducediarrhea related deaths by 21% with better sanitation reducing the deaths by 37.5%. lack of soap, unclean environment, poverty, and insecure water have been identified as the risk factors associated with diarrhoea (Sharon *et al.,* 1987). The risk factors which mainly exist in the rural areas can be reduced through improved WASH *(*Ezzati *et al., 2003).*

According to WHO (2004) in Kenya, 52% nationally did not have quality sanitation with 57% in the rural areas. Pit latrine was the main sanitation facility (mainly shared across households) with more than 16% disposing human waste in the fields and bushes (CBS, 2010*).*

2.1.3 Environment and sanitation interventions

There has been reduced cases of diarrhoea, inclusive of dysentery and continual diarrhoea in under-fives accrued to WASH interventions. This is also a case from Kamukunji which shows that less people are ailing from diarrheal ailments. This has been as a result of provision of clean and hygienic services. If this was to be properly handled, then it will not only affect the social and health welfare of people but it will also affect the economic wellbeing of the people globally. Time would also be improved in that it would enable people focus on what they desire.

2.1.3.1 General Hygiene Practices

Infections and their spreading is reduced with observation of hygiene which makes hygiene crucial to good health *(*Aiello & Larson, 2002. Hygiene is essential in helping to curb contamination of hazardous ailments especially toddlers. It would also prevent malnutrition. Improved hygiene practices entail a clean and safe place to discard human waste, which is also vital for toddlers below 5 years. Most people seeking health assistance are usually because of diarrhoea related ailments due to improper hygiene and clean practices. For instance, in the 1990s diarrhoea was the cause of so many people seeking medical attention.

2.1.3.2 Hand washing

Another important thing to note is the washing of hands which is vital after disposing of faecal waste which reduces the risk of contamination and diarrhoea related infections hence reduced ailments related to poor hygiene. Cleaning of hands with specifically a cleaning agent kills germs at a high rate. It has been noted to reduce diarrhoea related cases to a great extent. The first being properly disposal of faecal waste especially when one first prevent contamination of faecal material of one with diarrhoea with that who doesn't and then properly disposing of a child's faecal material in the proper manner. Hands washing to be effective in killing germs and reducing contamination is made effective when one uses soap and water and this resulted to diarrhoea related ailments reducing marginally. It also reduces the rate of respiratory ailments. Hand washing with cleaning soap through start attendants and moms appreciably extended new-born survival charges through up to 44% (Rhee et al., 2008).

2.1.3.3 Clean and hygienic water

Most of the perishes globally re usually as a result of lack of clean and safe water for consumption. Clean water distribution has been said to reduce the risk of diarrhoea related ailments to a great extent and also one's overall health.it is also said to improve the economic growth overall. Most of the ailments caused by improper hygiene and sanitation has been as a result of impure drinking water as it increases the chances of contamination by a great margin especially water containing faecal material whereby faecal matter is known to be composed of a lot germs and bacteria which will lead to general contamination of a person hence a diarrhoea related ailment. This has although been controlled whereby in Kenya's case for instance water distribution has been managed by people being supplied for clean and hygienic drinking water. People have also been advised to thoroughly boil their water before consumption. Many WSS zones have reduced the prevalence of acquiring of water borne ailments which has in turn resulted to overall economic growth and a lot of children especially girls remaining in school due to clean and hygienic amenities provided.

2.1.4 How WASH affects diarrhea death rate reduction

We have seen earlier that diarrhea related ailments are brought about by improper hygiene and sanitary practices and this has resulted to a lot of perishes especially among toddlers and in many emerging states. Which shows that the cause of all these is because of unhealthy water being distributed, poor hygiene etc. How a home is looked after also greatly affects the rate of cleanliness of a home. This also includes how one's diet is looked after, the kind of water one is consuming etc. which according to prior researches is a step to be taken in emerging states. This will reduce the rate of diarrheal ailments to great extent.

The overall repercussions of this resulted to close to 35% of deaths of toddlers because of failing to wash hands with soap, approximately 32% of toddler perish as a result of poor hygiene and 25% perish as a result of unsafe water. A study at Bangladesh to look into the practice of washing of hands which was carried out by UNICEF and the state in general. It resulted to the following effects of their look at. the subsequent are the results in their have a look at showing discount in diarrhoea morbidity in children elderly <five years as consistent with intervention. They concluded that hand washing before

cooking will greatly lower the cases of diarrhoea among toddlers.

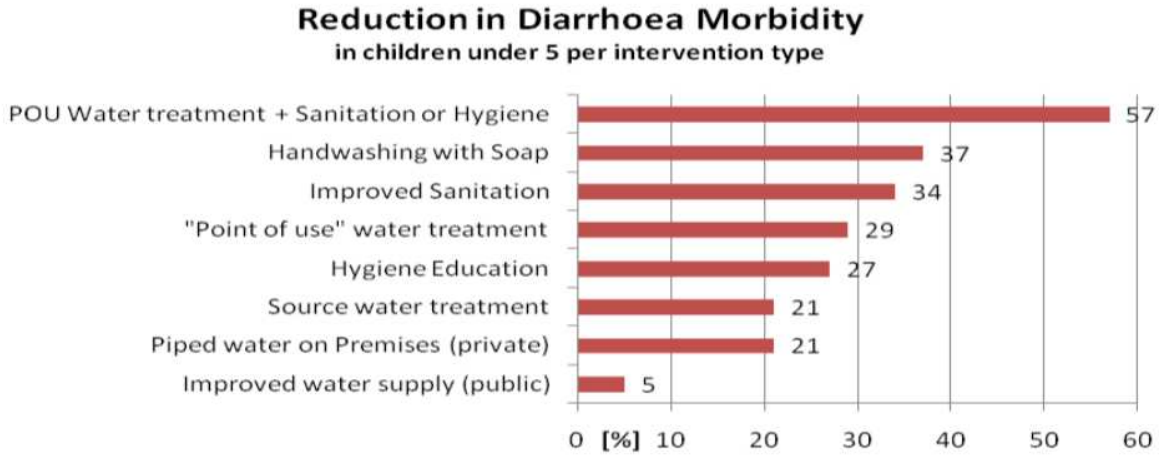


Figure 2.1: How WASH affects diarrhoea death rate reduction Source: (Waddington et al., 2009)

2.1.5 Using support method to WASH involvement

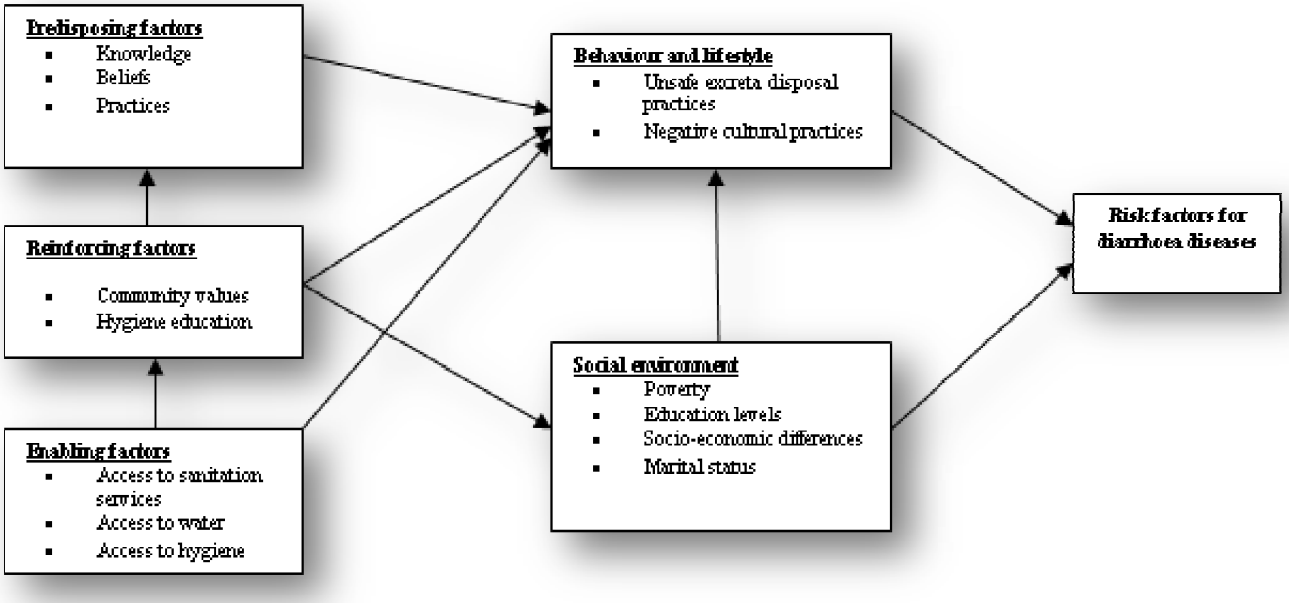
WHO/UNICEF-JMP (2008) estimate that regardless of what is done to promote hygiene most people perish yearly due to poor hygiene. Therefore, supporting good hygiene practices will help control this situation. Research in Ugnda shows that after promoting WASH people took to heed what they were told as close to 77% of the populace constructed toilets. There are however factors that determine the measures to take like for instance their customs and way of life. However, there are measures that can be taken to curb diarrhoea related ailments.

2.2 Theoretical Framework: Procede-Proceed Model

The Precede-Proceed model is used in the study. This is a framework used in health to examine a health issue and establish an efficient wellbeing. Started as a result of strategical outline to save on costs, it looks into assessing of designs that will meet one's expectations. It aims at involving the selected people in who will give their own hitches, design what they want and also facilitate their own answers. Enhancing the wellbeing's undertakings is evaluated using this model.

2.3 Conceptual Framework

Figure 2.2: Conceptual outline


Predisposing factors
Knowledge
Beliefs
Practices
Reinforcing factors
Community values
Hygiene education
Enabling factors
Access to sanitation services
Access to water
Access to hygiene
Behaviour and lifestyle
Unsafe excreta disposal practices
Negative cultural practices
Social environment
Poverty
Education levels
Socio-economic differences
Marital status
Risk factors for diarrhoea diseases

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Location of the Study

The study was carried out at Kamukunji Sub County.

3.1.1 Kamukunji profile

Kamukunji sub county consists of central-eastern Nairobi County in Kenya. The constituency has an area of 11.7sq km with more than 1/3rdoccupied by Moi Airbase creating a very small area for economic and social development. Before assuming District status Kamukunji District was known as Pumwani Division of Nairobi North District and prior to 1969 as Nairobi Central Constituency. The population of Kamukunji is estimated at 261,855 (as per the 2009 population census). The sub county has a density of 45,147 people per sq.km. Kamukunji has three administrative divisions: Eastleigh, Pumwani and Bahati.

Figure 3.3: Map of Kamukunji sub county Area in relation to its position in Kenya

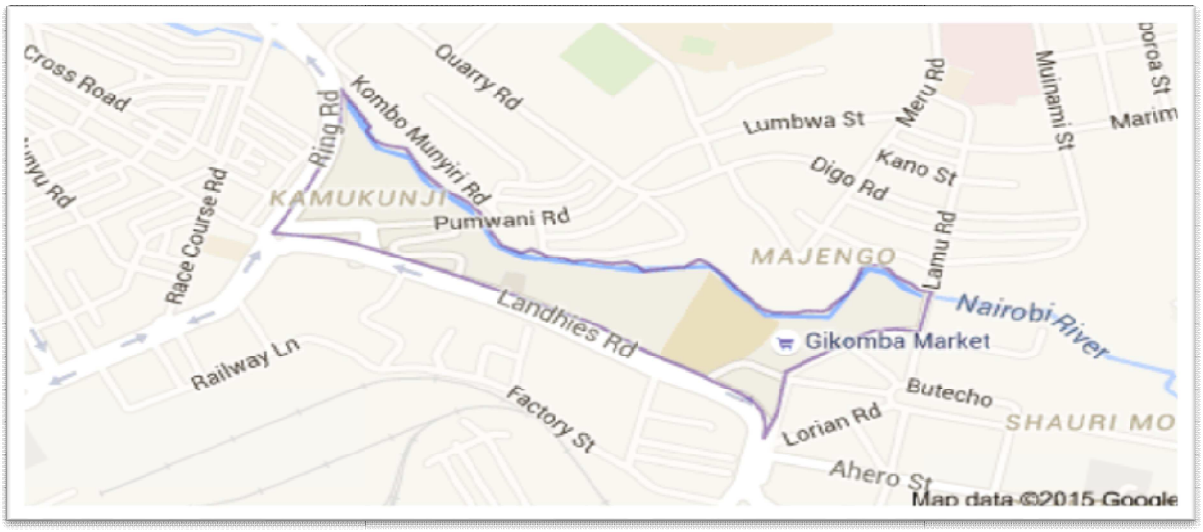


Figure 3.4: Map of Kenya

Source: Google Maps

3.1.2 Vegetation

Generally, the sub countyhas ever-green vegetation throughout the year. This feature has encouraged the otherwise illegal tendencies by residents especially along the Nairobi River that cuts across the constituency to engage in river bank agriculture. They mainly grow vegetables such as Sukuma wiki, spinach, tomatoes and yams for domestic use in such places as Kiambiu and Kitui informal settlements. The laxity on the part of Nairobi City Council to collect garbage and to provide garbage disposal bags and tins has led to deplorable health conditions in most parts of the constituency. The efforts by NEMA to restrict encroachment on Nairobi River banks by small business vendors has met with hostility and made environment conservation efforts untenable. The grabbing of every available empty space and encroachment on road reserves in Estates such as Eastleigh, Majengo, Gikomba, Bus station, Marikiti etc has made the lives of pedestrians unbearable and efforts to keep the constituency clean difficult. Living conditions in informal settlements such as Kitui, Kiambiu, City Carton, Kinyago, Blue Estate, and Majengo are pathetic due to scarcity of clean water and lack of sanitary facilities and disposal equipments. This combined with the chemical wastes disposal from scrap metals and poisonous gases from materials used by the Jua Kali Artisans in Shauri Moyo and part of Muthurwa continue to impact

negatively on the health of the locals and the environment in general. There is need to come up with measures to protect the environment and ensure that the natural and serene vegetation is restored in regions most affected.

3.1.3 Socio-Economic Profile

Kamukunji hostsUhuru, Shauri Moyo,Muthurwa, Eastleigh, Bahati and MajengoEstates. sub countyis mainly covered by Jua Kali sector. There are both informal and formal tradesin the sub county with most of them being in the Jua kali sector. Majority of the residents of Kamukunji are workers/employees in different government ministries, privately owned companies and commercial shops among others. High cost of living coupled with population growth and high level of unemployment has led to the sprouting of slums in order to exist in the uninhabitable environment.

In most of these Estates, business in illegal items, illicit brews, drugs, and to some extent small firearms and other dangerous weapons of mass destruction are traded and find their way into wrong hands. In major open air market centres such as Gikomba, Eastleigh and Burma access roads are in pathetic state. Further, there is lack of properly constructed sheds for traders, and security for both traders and buyers is not guaranteed. Each day seems to be a dangerous day for all those who frequent these busy business hubs. To a larger extent however, business thrives in most parts of the constituency especially in Eastleigh, Gikomba, Burma, Muthurwa, Marikiti, Uhuru, Bahati, Shauri Moyo, Machakos Country Bus, Kitui, Kinyago and Kiambiu. Kamukunji is not an industrial estate but a business hub for manufactured and consumer goods.

3.1.4 Pattern of Settlement, Housing and Living

Most people live in clustered Estates with planned pattern save for those in informal settlement areas such as Kinyago, Kiambiu, Kitui, Blue Estate and Majengo. Most of City Council residential houses are old model, built during colonial days for the blacks under the segregation and discriminative colonial laws. These estates are poorly maintained and apart from the City Council collecting rents from the residents the houses are hardly maintained, taps and toilet facilities have collapsed in most of them and the size of the houses are too small to accommodate the ever growing and large families. These Estates include the old Eastleigh, Majengo, Pumwani, Shauri Moyo, Bahati, Uhuru, Jerusalem, Biafra, the recently demolished Muthurwa and California among others. Some of the Estates built in the 70s and 80s include Kimathi, High-rise

and Buru-Buru phase1 which bear some face of modernity. In regions such as Eastleigh modern structures have been erected but without any uniform plan or pattern. Due to lack of proper planning and uniform architectural designs most parts of the constituency look congested, disorganized and more of a semi-urban or a suburb of the city of Nairobi,Administrative Divisions and Political Units. Kamukunji comprises of three (3) administrative divisions divided into nine (9) Locations and eighteen (18) sub-locations. For political purposes the constituency is divided into seven (7) electoral political civic wards.

3.2 Study Design

A longitudinal/cohort design was used in the study.The study used 10,000 households who received 6,150 water filters for home based water treatment. TOTs were trained on Participatory Hygiene and Sanitation Transformation (PHAST) coupled with community Led Overall Sanitation (CLTS) combined with animated video. Upon of entirety of the education, the tots were given the PHAST education equipment to enable them perform sensitization at family stages. They used audio-visible suggests blended with CLTS to ignite network dialogue most of the humans. The method additionally concerned the production of culture-specific participatory schooling tools and the films tailor-made with appropriate messages

3.3 Unit of Analysis and units of observation.

3.3.1 Unit of analysis

The unit of analysis was households with under-fives in Kamukunji Sub County.This study paper provided an overview of content analysis from a social perspective. The basic concepts and techniques are presented for operationalizing content analyses.

3.3.2 Units of observation

The units of observation have to do with sources of data and information that enabled the analysis. In this case units of observation were children and mothers who have children less than five years. Other observant are key informants who included the chief, sub chief and Community Health Workers (CHWs) of Kamukunji Sub County.

3.4 Target Population

Under-fives in Kamukunji sub County were targeted. 60 child caregivers were targeted in households**.**The households with under-fives were selected through random sampling.

3.5 Sample size and sampling procedure

3.5.1 Sample size

The study used the Lemeshow *et al.,* (1990) formula.

$$n=\frac{[Z_{\alpha/2}\sqrt{P(1-P)}+Z_{\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)}]^2}{(P_1-P_2)^2}$$

Where;

n = Population sample

$P=\frac{P_1+P_2}{2}$; Pooled proportion of disease (diarrhoea)

$Z^{\alpha}/_2 = 1.96$; Significance level, 0.05

Z_{β}= 95 % CL =1.28 ; Study power

1-P= Proportion without disease

P_1= Baseline diarrhoea prevalence, where from previous studies it is estimated at 25%

P_2 = Post intervention diarrhoea prevalence estimated at 12.5%, assuming that the intervention reduced diarrhoea prevalence by 50%.

This gave a minimum sample size of approximately 30. Considering a maximum design effect of 2, this gave a sample size of (30×2) = 60.

3.5.2 Population Sampling Procedure

Listing of the households was done. This involvedthe households, structures, and age of the household members. Sampling interval through filtering was done for households with under-fives. The population was clustered into 20 based on the divisions. Sampling was done through probability systematic sampling.

3.6 Data collection methods

3.6.1 Questionnaire

Data collection was done through semi-structured questionnaires. These were administered to the respondents who provided the information required. The questionnaires had open-ended and closed-ended. A household survey was carried with the help of research assistants trained on the job. They were well conversant with Kiswahili and English. Spot checks on structural elements were done to check on the behaviours.

3.6.2 Key informant interview guide

Interview guide was used to collect data from Key informants. The purpose of key informant interviews was to collect information from a wide range of people including Community leaders, professionals, or residents who have firsthand knowledge about Kamukunji Sub County. These community experts like the Community Health Workers (CHWs) with their particular knowledge and understanding can provide insight on the nature of problems and give recommendations for solutions.

In this study the researcher used the face-to-face interview technique. The technique was used to inform us about a pressing issue or problems in Kamukunji Sub County from a limited number of well-connected and informed community experts.

3.7 Ethical Issues and considerations

The respondentswere assured of the confidentiality of the information given and academic use only. Local leadership were involved in the data collection process for involvement of the community members. They were also assured that there is no fee to be paid in participating of the respondents. However, participation was accrued to generate knowledge for the benefit of the community and government.

3.8 Data analysis and management

Data was cleaned and entered into SPSS version 17.0. Descriptive statistics like mean, standard deviation were used in analysing quantitative data. Content analysis was used in analysing the qualitative data.

Chi square testing was done using Pearson's coefficient. This was done by the use of SPSS. It should be noted, however that this calculation was based on only the close ended part of the questionnaire.

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATIONS AND PRESENTATION

4.1 Introduction

This chapter analyses, interprets and presents the study findings as per the aim of this study. The chapter begins with household information, followed by findings on the objectives of the study.

4.1.1Questionnaire Response Rate

The study had a sample size of 60 child caregivers who were the respondents and also households in the area**.** Out of 60 respondents 50 responses were obtained giving a response rate of 83.3%. The study did not achieve a 100% response rate as some of the questionnaires were half way filled by the respondents and hence could not be used in the study. This was an acceptable basis for drawing conclusions.

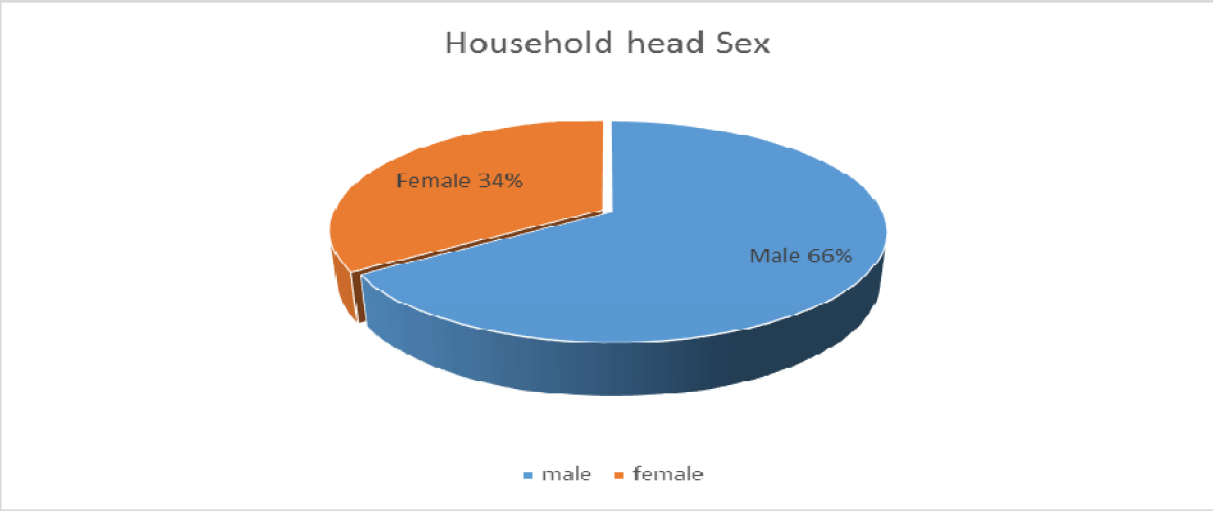
4.2 Social and DemographicCharacteristics

The social and demographic characteristics of the respondents were discussed. This comprised of the respondents' sex, age groups, marital status, education, occupation and the type of the house structures. The findings are presented in figures 4.3, 4.4, 4.5, 4.6, 4.7 and 4.8.

4.2.1 Household Sex

The respondents were requested to indicate the household head sex of their residence. Figure 4.5 shows that 66% of the respondents indicated that their household head were males, 34% indicated that their household head were female. This indicates that majority of the household head sex are males though there are also household head sex who were female. This shows that the WASH interventions have to ensure that the men are involved in such interventions in order to ensure that the households in Kamukunji adopt the WASH interventions for improved health and hygiene amongst the residents.

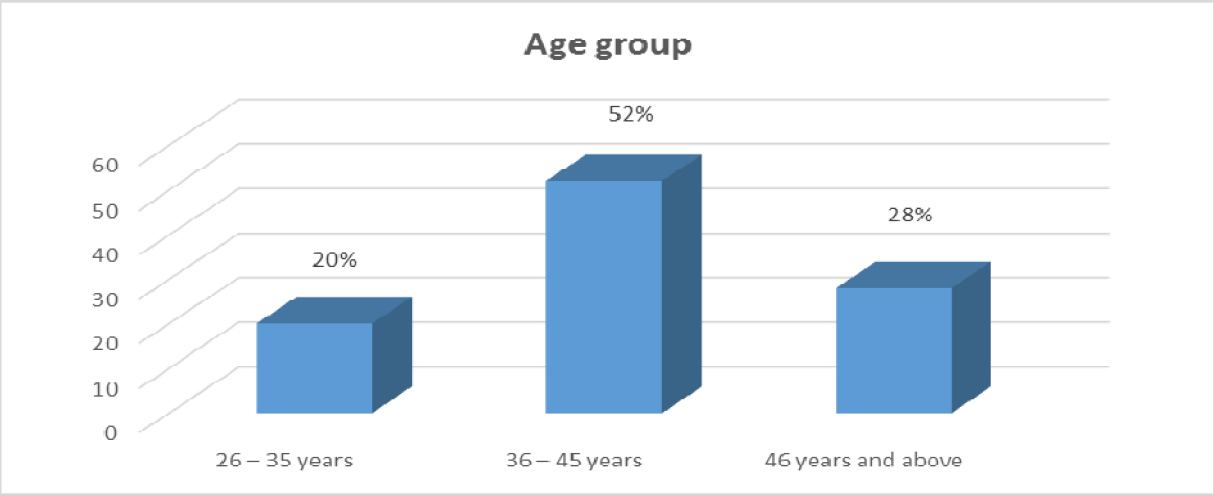
Figure 4.5:Distribution of the household heads by sex



4.2.2 Age of Household heads

The respondents were asked to indicate the ages of household heads. The findings are as presented in figure 4.4. From the figure 4.6, 52% of the respondents indicated that the ages of household heads are between 36 to 45 years, 28% indicated that the heads were 46 years and above whereas 20% indicated that they were 26 to 35 years. This indicates that majority of the household heads in Kamukunji were aged more than 35 years. This shows that the household heads are old enough to understand the need for improved hygiene and improved health of their families. The middle aged people are also more concerned about their families wellbeing compared to the young and the old. This would lead to effectiveness in the WASH interventions in Kamukunji as the mother and children would be encouraged by the middle aged heads to adopt hygienic and healthy ways of living.

Figure 4.6:Distribution of the household heads by age



4.2.3 Respondents' Marital Status

The respondents were requested to indicate the marital status of mother of the under-five, the guardian or the care taker. From the results in figure 4.7, 64% of the respondents indicated that the marital status of mother of the under-five, the guardian or the care taker were married, 24% were separated, 8% were windowed and 4% indicated that they were single. This indicates that majority of the marital status of mother of the under-five, the guardian or the care taker in Kamukunji were married. This implies that the WASH interventions should focus on ensuring that all the members of the families are included as each and every one of them has to agree to the interventions. The mothers may not be the decision makers in the households despite them being the people who deal with hygiene in the households. Married people are more concerned about their children health and so would accept the WASH interventions more compared to the single and separated.

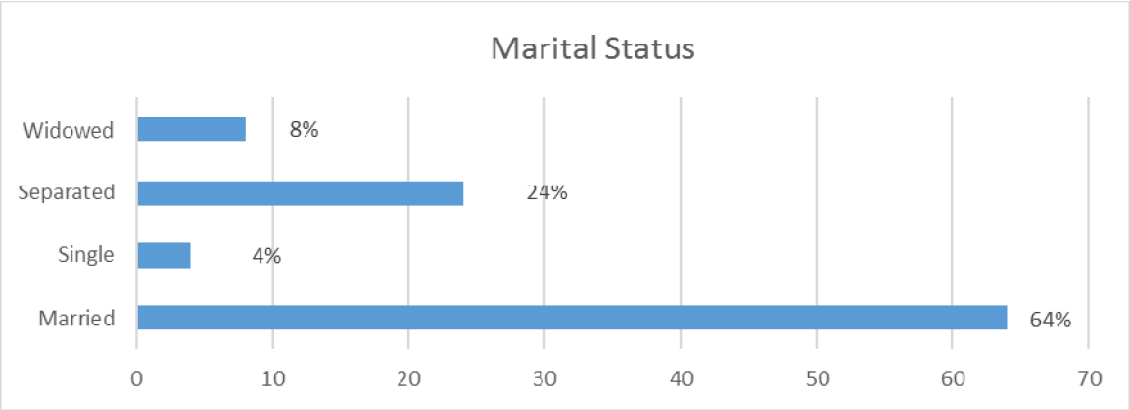


Figure 4.7: Distribution of the respondents by marital status

4.2.4 Sex and age of household members

The respondents were asked to indicate the sex and ages in years of household members. Table 4.1 shows how household members were distributed in various age groups according to their sex. From the table, 46% of the respondents indicated that their households had onefemale aged below 5yrs, 32% indicated two while 22% indicated that they were three. The table further shows that 38% indicated that there were three females aged between 5 – 10 years, 36% indicated four, 16% indicated that two, 6% indicated five while 4% indicated one. On the female aged between 11 – 14 years, the respondents indicated that 40% indicated that they were two, 26% indicated that three, 16% indicated that four and three in each case whereas 2% indicated one child. On the female aged between 15 – 25 years, the tableshows that 62% had two, 16% had three, 8% had one and four in each case whereas 6% had five. On the Female aged above 25 years, 70% indicated one whereas 30% indicated two females. The findings indicate that the families in Kamukunji have more than one girl aged below 5 years. This implies that the mothers have to adhere to hygiene techniques as girls are more prone to hygiene related illness compared to boys. WASH interventions will therefore be crucial for improved hygiene for healthy girls in the area.

The table shows that for the males under 5 years, 64% of the respondents had one and 36% had two. On the male aged between 5 – 10 years, the table shows that 52% had two, 32% had three while 16% had one. On those aged between 11 – 14 years 54% indicated that they had three while 46% had four. For the males aged between 15 – 25 years 56% had two, while 44% had three. On males aged above 25 years, 64% had one member, while 36% had two. Based on the findings, many of the households had at least one boy aged below 5 years. This is the most vulnerable group which calls for WASH interventions in order to reduce hygiene related diseases amongst the children. For the children aged below 10 years, the hygiene is also key to improved health of the children. This creates a high chance for increased adoption of WASH interventions in the area.

Table 4.1: Sex and Ages in years of Household members

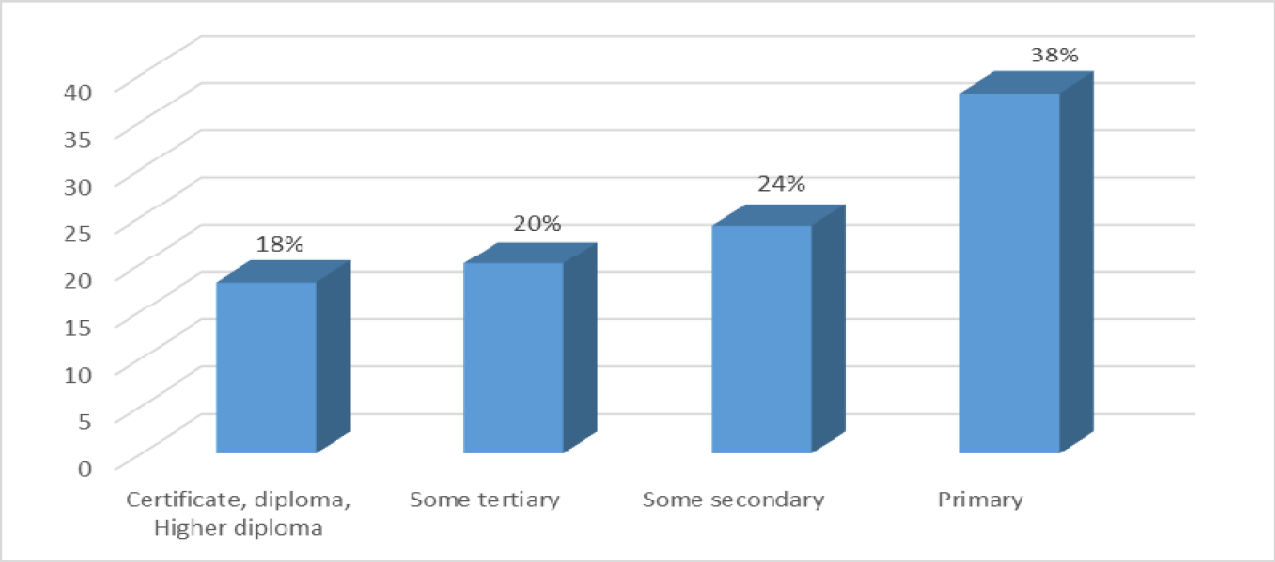
Age Category	Number in the household (%)					Total	
	One	Two	Three	Four	five	Percent	N
Female Under 5yrs	46	32	22	-	-	100.0	50
Female aged 5 – 10 years	4	16	38	36	6	100.0	50
Female aged 11 – 14 years	2	40	26	16	16	100.0	50
Female aged 15 – 25 years	8	62	16	8	6	100.0	50
Female above 25 years	70	30	-	-	-	100.0	50
Male Under 5yrs	64	36	-	-	-	100.0	50
Male aged 5 – 10 years	16	52	32	-	-	100.0	50
Male aged 11 – 14 years	-	-	54	46	-	100.0	50
Male aged 15 – 25 years	-	56	44	-	-	100.0	50
Male aged above 25 years in the family	64	44	-	-	-	100.0	50

4.2.5 Respondents level of education

The respondents were asked to indicate their highest level of education. Figure 4.8 shows that 38% of the respondents indicated that the highest education of the household head had finished primary, 24% indicated that they had completed secondary, 20% indicated that they were tertiary and 18% of the respondents indicated that the house heads had completed certificate, had a diploma and a higher diploma. This is an indication that most of the household heads in Kamukunji have primary education as the only education. This may create a barrier to the adoption of the WASH interventions in that they may not understand why they should do some of the things advised to do. They may also see the interventions as a bother and so may not accept or practice hygiene in their households.On the level of education of the mothers of children less than five the interview findings indicate that majority of the mothers had primary school education as the highest level. This was based on the fact that the area is inhabited by

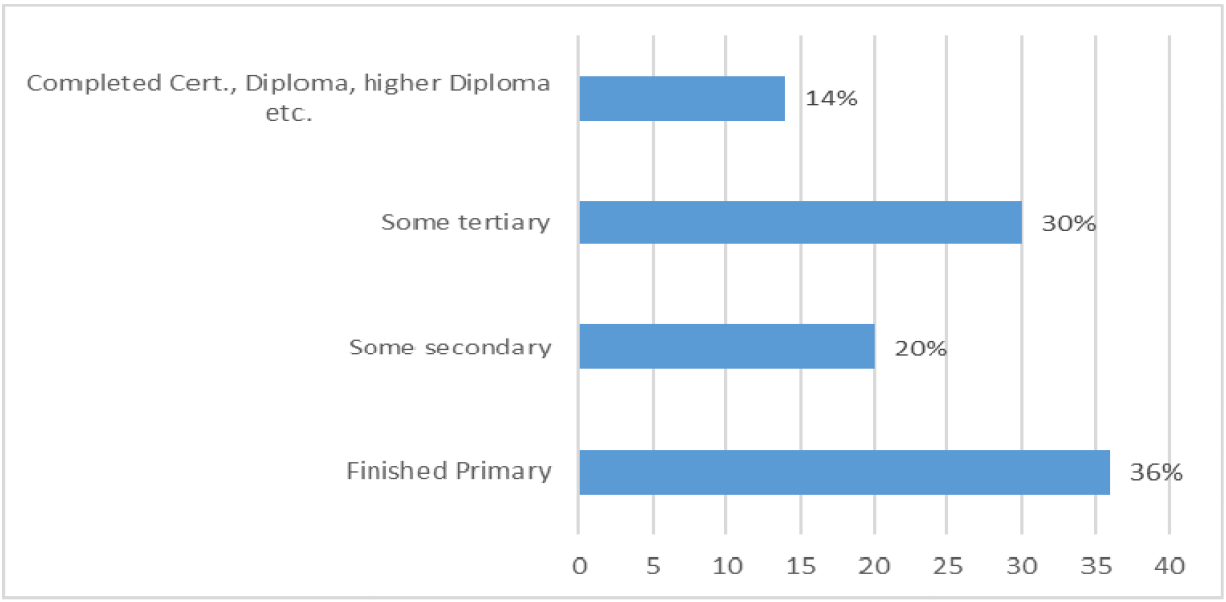
Somalis most of whom do not go to school. However, there were a few who had university education, especially the young mothers.

Figure 4.8: Education of Household head



The respondents were requested to indicate the highest education of mother of children aged under five years. From figure 4.9, 36% of the respondents had finished primary school, 30% had tertiary education, 20% had completed secondary school while 14% had completed cert diploma and higher diploma. This is an indication that the mothers of under-fives in Kamukunji have primary education which may limit the effectiveness of WASH interventions. They may not have the education to understand the need to adopt healthy hygiene practices for healthy children.

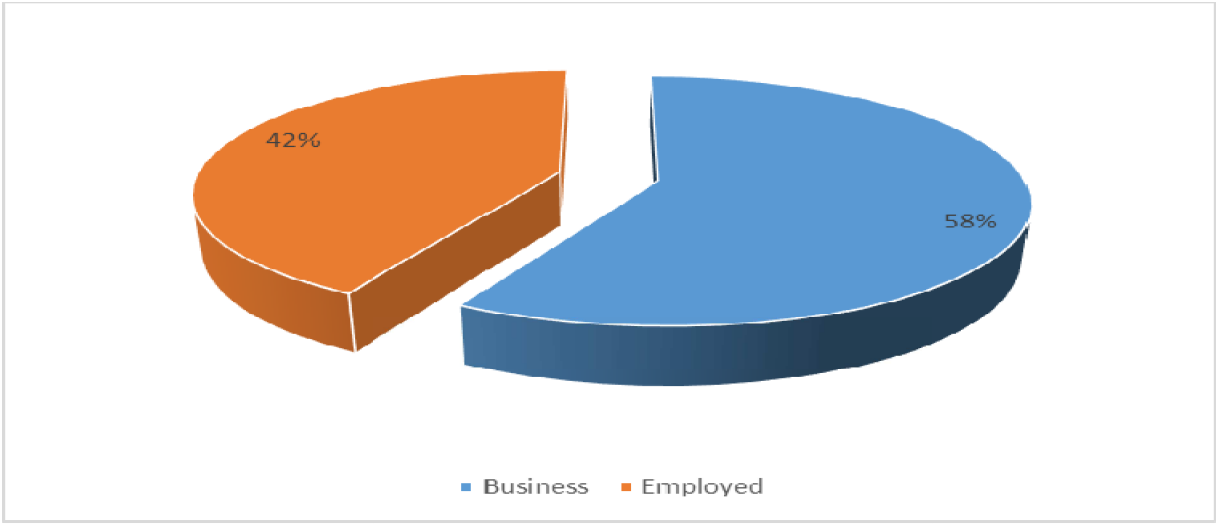
Figure 4.9: **Education of Mother of under-fives**



4.3.6 Respondents' type of occupation

The respondents were asked to indicate their occupation. From figure 4.10, 58% of the respondents indicated they were in business whereas 42% indicated that they were employed. This indicates that majority of the residents in Kamukunji are in business. This means that majority of the people may not have time to observe hygiene and healthy of their children. This reduces the effectiveness of the WASH interventions amongst the mothers with children under five years.

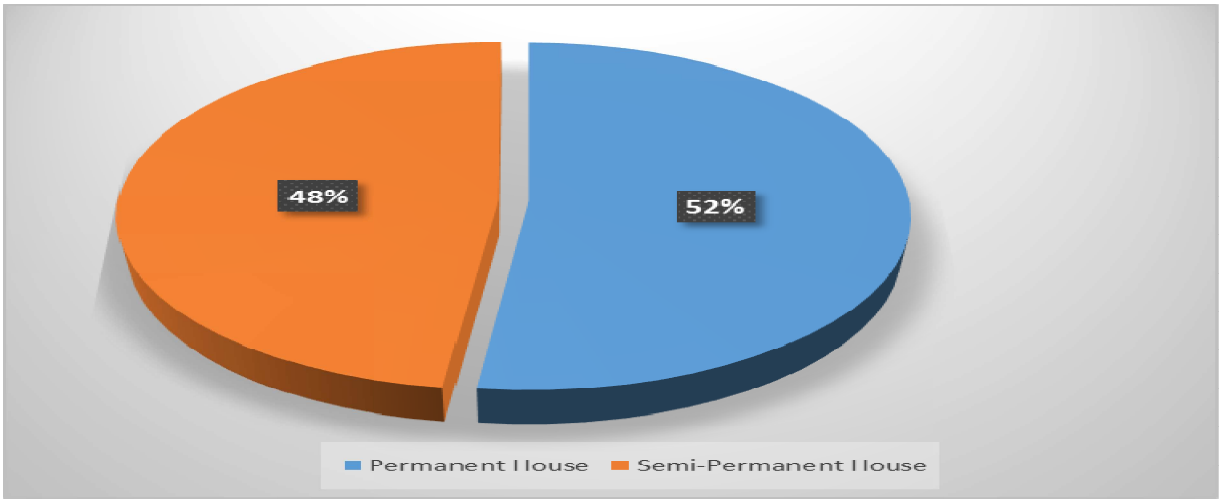
Figure 4.10: Type of occupation



4.3.7 Type of house structures

The respondents were requested to indicate the type of their house structures. From figure 4.11, 52% of the respondents indicated that they had a permanent house whereas 48% indicated that they had a semi-permanent house. The study indicates that majority of the respondents had a permanent house. This is accrued to the fact that majority of the houses in Kamukunji are rental and hence permanent. This means that the people can adopt hygiene practices that would ensure that their children under five years are healthy.

Figure 4.11: Whether house structure is permanent or semi-permanent



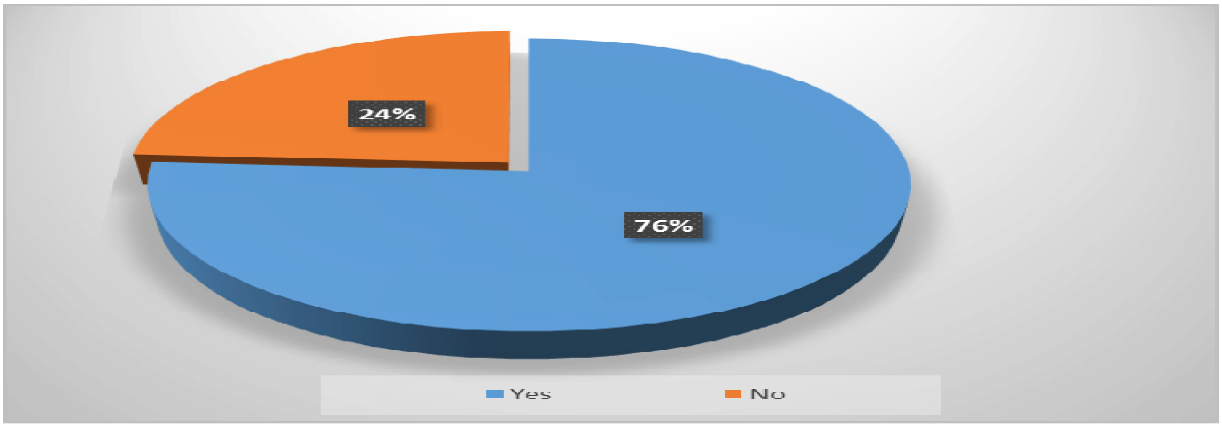
4.3 Sanitation

The first objective was to find out if there was any change in knowledge and attitude on water, sanitation and hygiene (WASH) among mothers after the interventions. The findings are as presented.

4.3.1 Toilet

The respondents were requested to indicate if they had a toilet in their compound. The results in figure 4.12 show that 76% had a toilet in their compound whereas 24% indicated on the contrary opinion. This indicates that majority of the respondents had a toilet in their compound. This implies that the WASH interventions have to focus on the hygiene concerned with toilets which can lead to increased waterborne diseases if hygiene is not observed.

Figure 4.12: Whether there is a toilet facility



The respondents were requested to indicate why they had no toilet. From table 4.2, 58.3% of the respondents indicated that they could not afford it whereas 41.7% did not have a toilet in the compound because they had collapsed. This is an indication that the residents of Kamukunji have different reasons for not having toilets as they cannot afford them and others have collapsed and they can't afford to build new ones. The WASH interventions should come up with plans to support the people by building toilets in the area to reduce cases of water and hygiene related diseases among under-fives.

Table 4.2: Reason for lack of toilet

Reason	Frequency	Percent
Can't afford it	7	58.3
Collapsed and full	5	41.7
Total	**12**	**100.0**

The respondents were asked to indicate where they go to make long call if they did not have a latrine. From table 4.3, 32% of the respondents indicated that they make a long call in friend's

house, 24% indicated that they use a public latrine, 20% indicated that they use bush/field, 16% indicated that they used to go a long call behind the house whereas 8% of the respondents indicated they use the neighbour's house. This indicates that most of the respondents who don't have a toilet at their residence use the neighbour's toilet. The use of neighbour's toilet may make the WASH interventions ineffective as the toilets will be accessed by many people who may not be concerned about hygiene. This may lead to diseases amongst the children under five years.

Table 4.3: Where respondents make a long call (defecate)

Place to defecate	Frequency	Percent
In the house of a friend	16	32
Bush/field	10	20
Public toilet	12	24
Neighbor's house	4	8
Behind the house	8	16
Total	**50**	**100**

The respondents with no toilet were asked to indicate where they defacated. From table 4.4, 44% of the respondents who do not have a latrine at home indicated that they make short call behind the house, 24% indicated that they make short call in a public latrine, 18% indicated that they make short call at friend's house whereas 14% indicated that they make short call somewhere on compound grounds. This indicates that most of the respondents who do not have a latrine at home make short call behind the house. This may affect the hygiene in the area and hence outbreak of diseases.

The study findings agree with Black and Fawcett (2008) who indicated that inadequate and poor WASH is a major challenge globally.

Table 4.4: Place of making a short call where there is no latrine

Place for short call	Frequency	Percent
On compound grounds somewhere	7	14.0
Behind the house	22	44.0
Friend's house	9	18.0
Public latrine	12	24.0

Total	**50**	**100.0**

4.3.2 Latrines

From table 4.5, 46% of the respondents indicated that the number of the latrines that were functioning currently in their compound were two, 34% indicated that the number was one whereas 20% indicated that the number of latrines that were currently functioning were three. Thus the study indicates that the in most cases the number of currently functioning latrines were two. The number is very low and this may lead to poor hygiene due to high number of people compared to operational latrines.

Table 4.5: Number of latrines in the compound that are functioning

Number	**Frequency**	**Percent**
One	17	34.0
Two	23	46.0
Three	10	20.0
Total	**50**	**100.0**

From figure 4.13, 84% of the respondents agreed that they shared the latrines with other households whereas 16% were of the contrary opinion. This indicates that majority of the respondents do share the latrines with other households. This create a risk of disease outbreak amongst the people, especially children, who share the toilets.

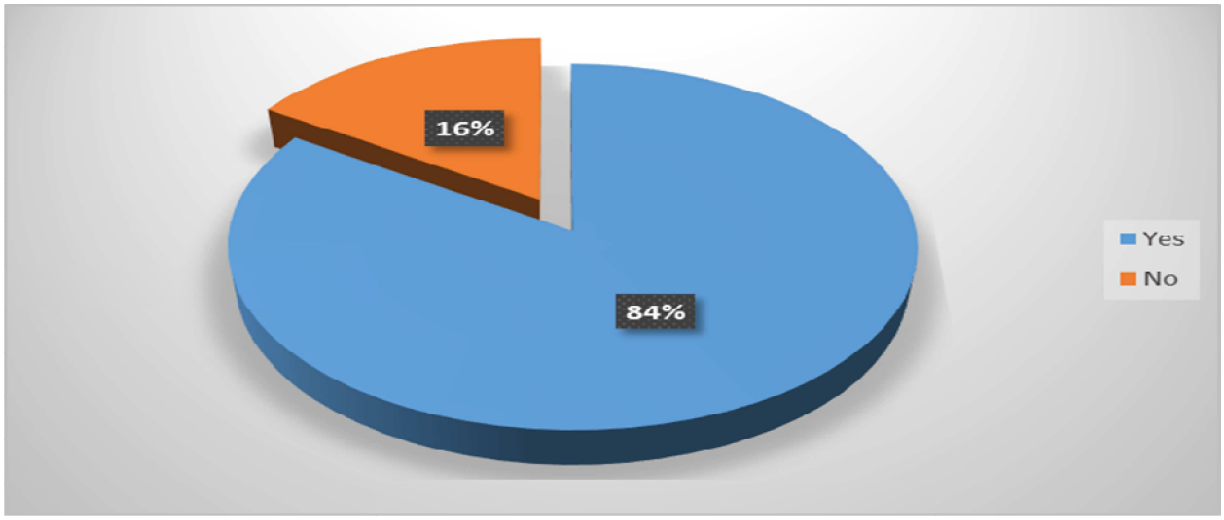


Figure 4.13: Sharing of the latrines with other households

From table 4.6, 31% of the respondents indicated that they shared toilets with more than five households, 28.6% indicated two households, 19% indicated three, 14.3% indicated three, whereas 9.5% indicated four households. This indicates that most homes with a toilet share the toilet with more than 5 households. This calls for increased interventions that would discourage sharing of toilets and encourage observation of hygiene in the toilets. This sharing would render the WASH interventions ineffective where the people would not stop sharing toilets.

Table 4.6: Number of the household that share the toilet

Number of households	**Frequency**	**Percent**
One	6	14.3
Two	11	26.2
Three	8	19.0
Four	4	9.5
More than five	13	31.0
Total	**42**	**100.0**

From figure 4.14, 84% of the respondents agreed that someone in their householddid not regularly use the latrine whereas 16% of the respondents were of the contrary opinion. This indicates that majority of the households have a member who does not regularly use the latrine

and this include even the children. This is a challenge to the health and hygiene of the households as this may mean that they help themselves somewhere else other than the latrine and hence lead to contamination of water and other utilities. This may lead to illness amongst under-fives.

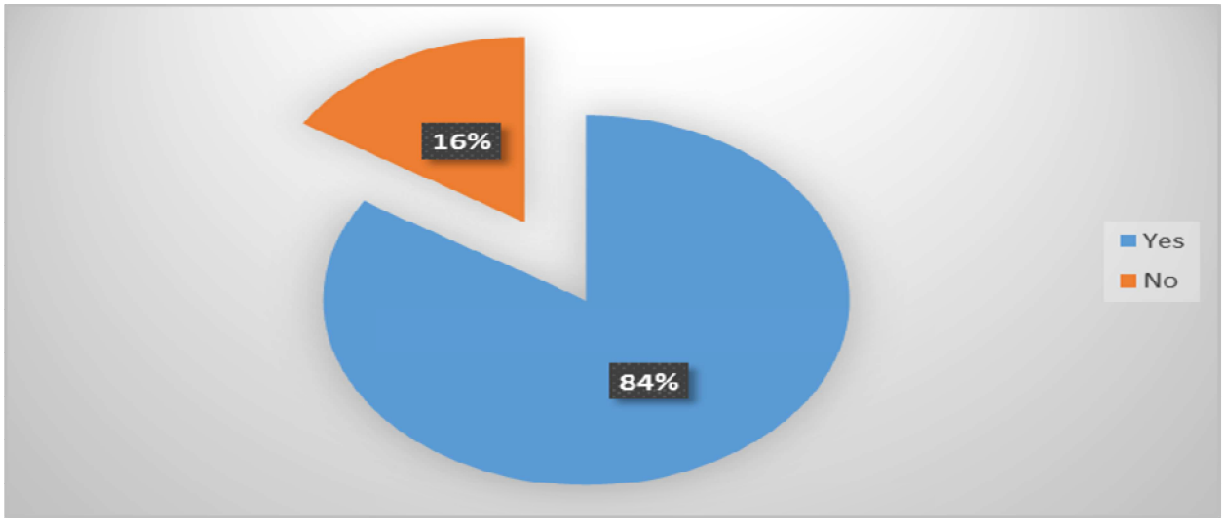


Figure 4.14: Whether member use regularly use the latrine

From table 4.7, 44% of the respondents indicated that the members who do not use regularly the toilet are Children under 2 years, 34% of the respondents indicated that it was Children under 5years whereas 3% of the respondents indicated that it was female adults who did not use the latrines regularly. Thus, the study indicates that most of the households' members who do not use the latrines regularly in Kamukunji are the under 2 years. This shows that the children are at a risk of being ill from poor hygiene.

Table 4.7: Household members who do not use the latrine

Household member	Frequency	Percent
Children<2 years	22	52.4
Children < 5years	17	40.5
Female adults	3	7.1
Total	42	100.0

From table 4.8, 59.5% respondents indicated that it was because the latrines were not well kept, 33.3% indicated because of fear or dislike whereas 7.1% indicated because the children were too small. This implies that majority of the households in Kamukunji do not use latrines regularly

because they are not well kept.This shows that there is poor hygiene amongst the households in Kamukunji which creates the need for WASH interventions in the area.

Table 4.8: Reason for not using the latrine

Reason for not using the latrine	Frequency	Percent
Children too small	3	7.1
Not well kept	25	59.5
Fear, dislike	14	33.3
Total	**42**	**100.0**

Respondents were requested to indicate how they dispose the faeces of their children who are under five years. From table 4.9, 76% indicated that they put it in the latrine whereas 24% of the respondents indicated that they do bury it. This indicates that majority of the households in Kamukunji dispose the faeces of their children who are below five years in the latrines. Despite putting the faeces in the toilet some of the households bury them which creates a hygiene problem hence affecting the health of the under-fives.

Table 4.9: The disposal of children faeces who are under 5 years

Disposal of children faeces	Frequency	Percent
Put in the latrine	38	76.0
Bury it	12	24.0
Total	**50**	**100.0**

The respondents were requested to indicate how they often clean their toilets. From table 4.10, 44% of the respondents indicated they clean their toilet when it is dirty, 34% indicated that they clean their toilets once a week, 12% indicated that they do not clean their toilets whereas 10% indicated that they clean their toilets once a day. This indicates that most of the residents of Kamukunji clean their toilets when it is dirty.

Table 4.10: Frequency of cleaning the toilet

Frequency of cleaning	Frequency	Percent
Once a day	5	10.0
Once a week	17	34.0
When it is dirty	22	44.0
Do not clean at all	6	12.0
Total	**50**	**100.0**

Respondents were requested to indicate whether they do own a refuse pit. From figure 4.15, 68% of the respondents indicated that they did not have a refuse pit whereas 32% of the respondents agreed that they do have a refuse pit. This shows that majority of the residents of Kamukunji do not have a refuse pit. This shows that hygiene is not observed in the area and hence illness amongst the children. Where the waste is disposed anyhow the children may eat the waste which leads to sickness.

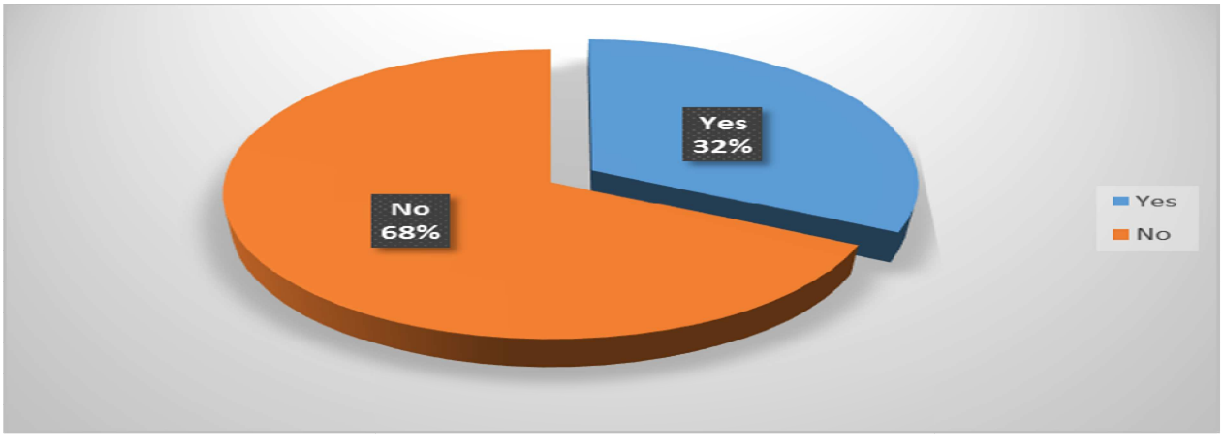


Figure 4.15: Ownership of a refuse pit

Respondents who did not have a refuse pit were asked to indicate where they disposed their refuse. From table 4.11, 42% of the respondents indicated that they dispose their refuse in an open land, 18% indicated that they burn their refuse whereas 10% indicated that they dispose their refuse in the toilet. This shows that most of the respondents disposed their refuse in open land. This makes the children vulnerable to hygiene related diseases and hence ineffectiveness of WASH interventions.

Table 4.11: Where respondents dispose their refuse

Where they dispose their refuse	Frequency	Percent
Open land	21	60.0
Toilet	5	14.3
Burning	9	25.7
Total	**35**	**100.0**

4.4 Water Sources Handling, Storage and Treatment

The study sought to find out on water sources handling, storage and treatment. The findings are shown on each category.

4.4.1 Water source

From the findings, table 4.12 shows that 78% of the respondents indicated that the source of water their family use was from the public tap outside the school, 14% indicated that the source of water was from an open well in the compound whereas 8% of the respondents indicated that the water the family used throughout the year was from an open public well. This implies that the main source of water for domestic purposes for the families is public tap (outside school). This creates a hurdle in ensuring water safety which may lead to water related diseases among children.

Table 4.12: The sources of water

Source of water	Frequency	Percent
A tapoutside the school	39	78.0
A school well	7	14.0
Well outside the school	4	8.0
Total	**50**	**100.0**

From figure 4.16, 74% of the respondents indicated that they took time to get water from the source and back whereas 26% of the respondents indicated that the water sources were on their premises. Thus, majority of the residents of Kamukunji fetch water far from their homes. The people may not have control over the source of the water they fetch and so makes it hard to ensure its safety.

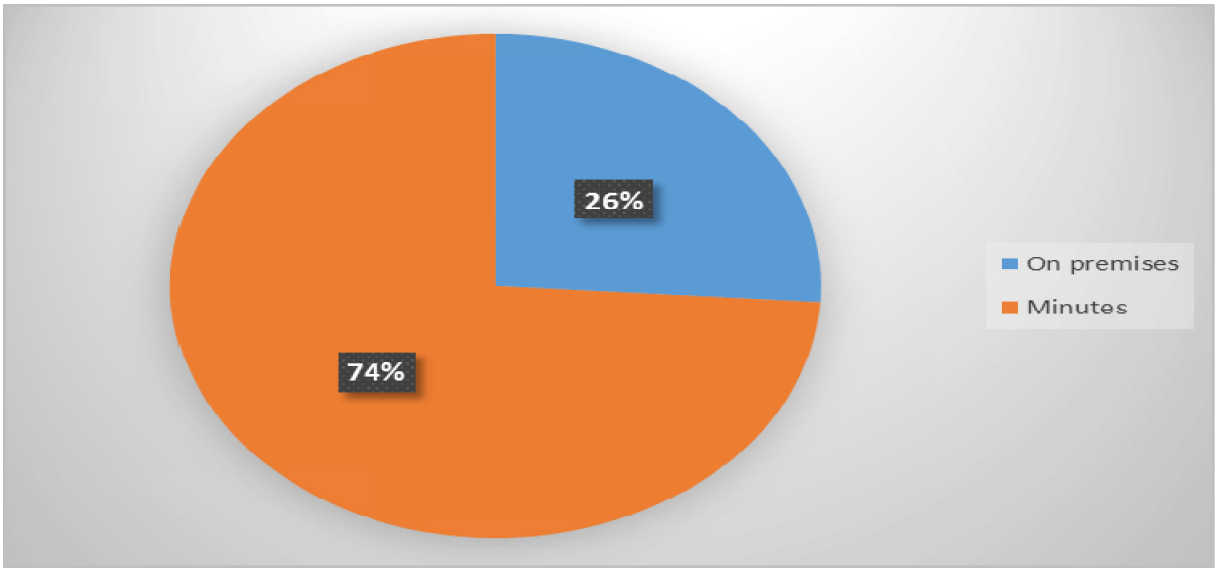


Figure 4.16: Time taken to draw water from the source and back

From table 4.13, 44% of the respondents indicated that the amount of water their families collect from the source daily amounts to 20 to 50 litres, 34% indicated that the water reaches above 50 litres whereas 22% indicated that the water got from the source is below 20 litres. This indicates that majority of families fetch more than 20 litres of water on a daily basis. This makes it hard for them to care about hygiene.

Table 4.13: Amount of water collected from the source daily

Amount of water collected	Frequency	Percent
Below 20 litres	11	22.0
20 to 50 litres	22	44.0
Above 50 litres	17	34.0
Total	**50**	**100.0**

From table 4.14, 50% of the respondents indicated that the approximate number of litres of water their families were using for drinking daily during the rainy season was 5 to 10 litres, 48% indicated above 11 litres whereas 2% indicated below 5 litres. This indicates that majority of families' approximate number of litres of water they use for drinking daily during the rainy season was more than 5 litres.

Table 4.14: Amount of water the family use for drinking

Water for drinking	Frequency	Percent
below 5 litres	1	2.0
5 to 10 litres	25	50.0
above 11 litres	24	48.0
Total	**50**	**100.0**

From table 4.15, 44% of the respondents indicated that always the water that they were collecting from the sources was sufficient for drinking needs for their families, 42% indicated that sometimes the water was adequate for drinking whereas 14% indicated that never was the water that they were collecting from the sources sufficient for drinking needs for their families. Thus, the study indicates that sometimes families in Kamukunji collectwater sufficient for drinking.

Table 4.15: Adequacy of water

Whether adequate	Frequency	Percent
Always	22	44.0
Sometimes	21	42.0
Never	7	14.0
Total	**50**	**100.0**

From table 4.16, 54% of the respondents indicated that the water was always available from the source during the rainy season, 30% indicated that water was available from the source during the rainy season for several hours per day whereas 16% of the respondents indicated that water was available from the source during the rainy season infrequently. Thus, the study indicates that majorly water was always available from the source during the rainy season.

Table 4.16: Availability of water from the source during the rainy season

Availability of water	Frequency	Percent
Always available	27	54.0
Several Hours per day	15	30.0
Infrequently	8	16.0
Total	**50**	**100.0**

4.4.2 Water usage

From the findings on table 4.17, 50% of the respondents indicated that they used the water for washing clothes/cleaning compound, 26% indicated that they used the water for bathing/Hygiene/hand washing, 16% indicated that they used the water for cooking whereas 8% of the respondents indicated that they were using the water for animals and agriculture. Thus the study indicates that majority of the households in Kamukunji use water for domestic purposes.

Table 4.17: The water usage

Water usage	**Frequency**	**Percent**
Hygiene like bathing and washing hands	13	26.0
To clean compound and wash clothes	25	50.0
To farm (animals and agriculture)	4	8.0
To cook	8	16.0
Total	**50**	**100.0**

From figure 4.17, 62% of the respondents indicated that they pay one shilling per litre, 36% of the respondents indicated that they pay for two shilling per litre of water from the source whereas 2% of the respondents indicated that they pay three shillings per litre from the water gotten from the source. Thus, the study indicates that households in Kamukunji pay for water they fetch from their sources with majority paying one shilling per litre. This makes the water cheap and hence makes the WASH interventions effective in ensuring hygiene and health of children under five years in the area.

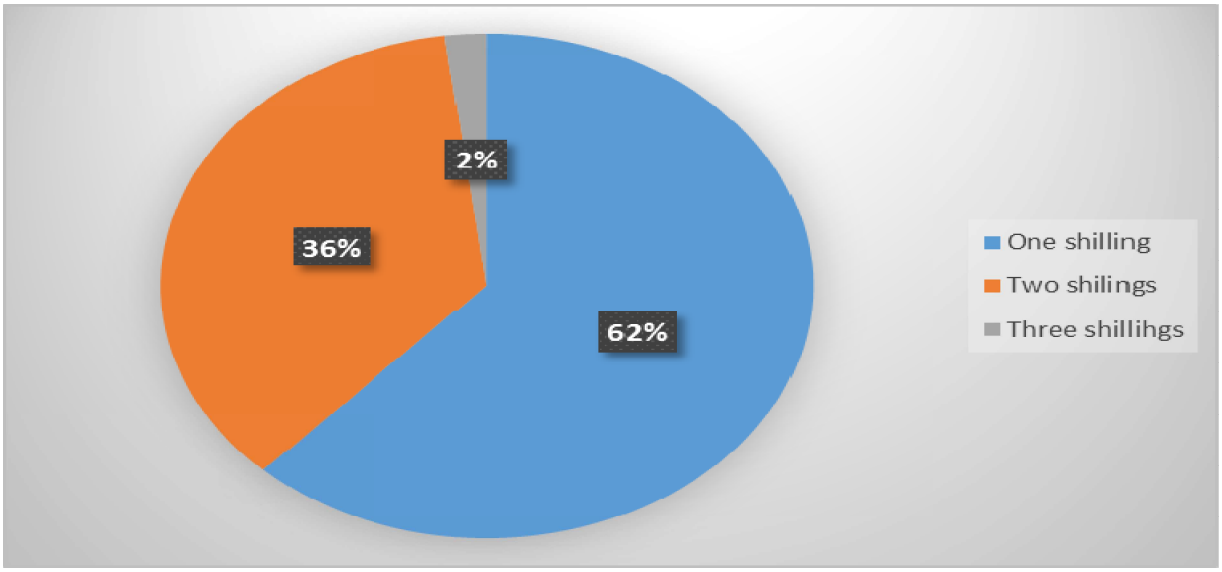


Figure 4.17: Payment for the water sources

From findings on figure 4.18, 60% of the respondents indicated that the source of water used most frequently during the dry season was the public tap outside school whereas 40% of the respondents indicated that the source of water used most frequently during the dry season is the piped water into the dwelling.

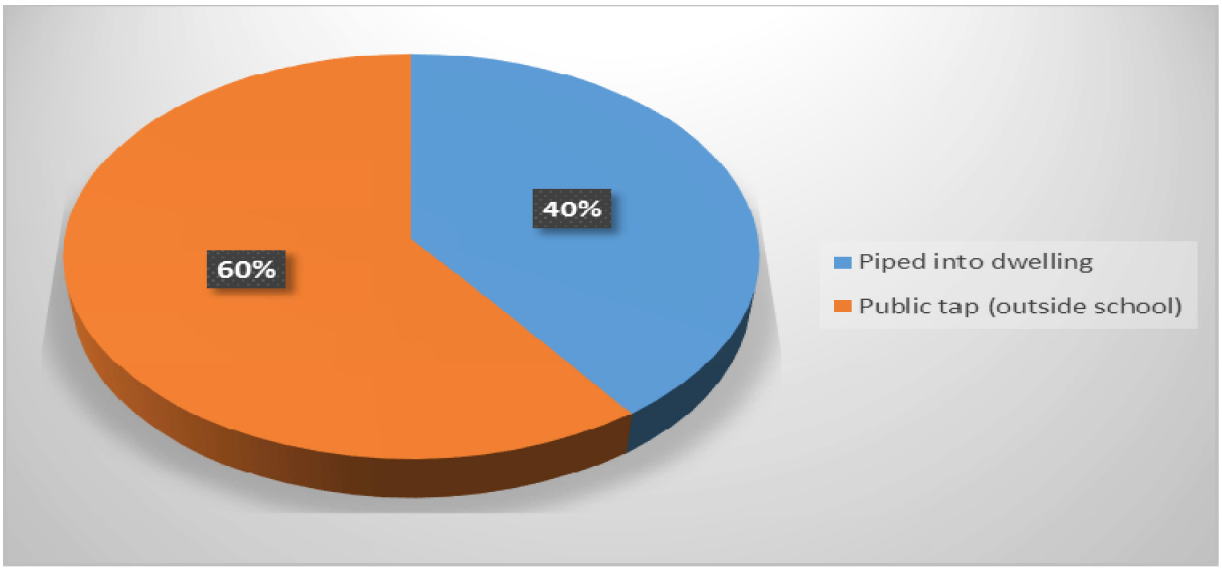


Figure 4.18: The source of water used most frequently during the dry season

From the findings on table 4.18, 46% of the respondents indicated that the water was infrequently available from the source during the dry season, 32% indicated that the water was

available once or twice per week from the source during the dry season, 12% indicated that the water was always available several hours per day from the source during the dry season whereas 10% indicated that the water was available several hours per day from the source during the dry season.

Table 4.18: The availability of water at the source during the dry season

Availability of water	**Frequency**	**Percent**
Always available	6	12.0
Most hours of the day	5	10.0
Weekly (once/twice)	16	32.0
Infrequently	23	46.0
Total	**50**	**100.0**

From table 4.19, indicated that 52% of the respondents indicated that they used water for washing clothes/ cleaning the compound, 26% indicated bathing/Hygiene/hand washing, 145 indicated cooking whereas 8% indicated animals and agriculture.

Table 4.19: The usage of the water during dry season

Type of use	Frequency	Percent
Hygiene like bathing and washing hands	13	26.0
To clean compound and wash clothes	26	52.0
To farm (animals and agriculture)	4	8.0
To cook	7	14.0
Total	**50**	**100.0**

4.4.3 Water safety and handling

The findings from figure 4.19show that 64% of the respondents disagreed that the water they get from their current source was safe drinking whereas 36% of the respondents agreed that they considered the water that they were getting from the source as safe for drinking.

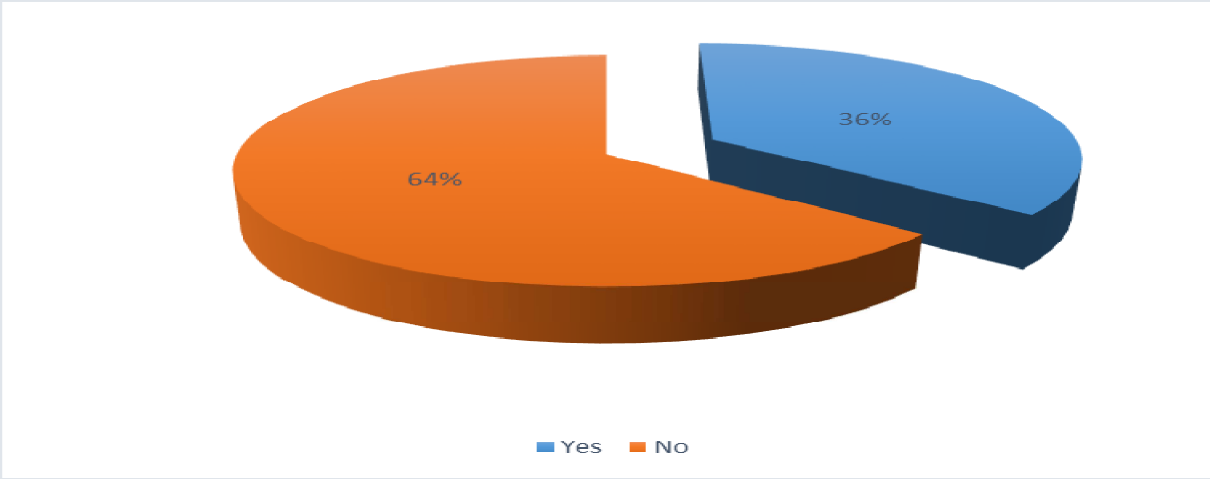


Figure 4.19: Water safety

Figure 4.20 shows that 74% of the respondents agreed that they treat water to make it safe for drinking whereas 26% of the respondents were of the contrary opinion. Thus the study indicates that majority of the residents of Kamukunji treat water to make it safe for drinking.

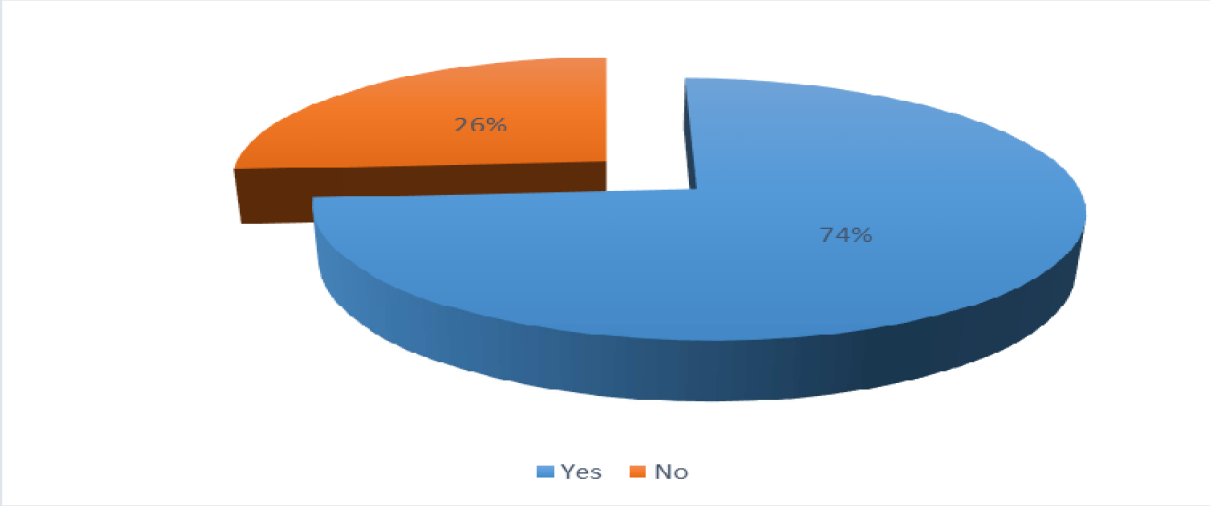


Figure 4.20: Water treatment

The respondents who indicated that they do treat the water were asked how they treat their water. The findings on table 4.20indicate that 26% of the respondents indicated that they treat the water by use of household filters, 24% indicated that they use boiling water and also a similar percentage of 24% indicated that they use water guard for the water treatment. Thus the study indicates that respondents imposes various means to treat water. The study findings agree with

those of Astier et al., (1997) who noted that hygiene related practices reduce the rates of intestinal infection considerably.

Table 4.20: Means of treating the water

How water is treated	Frequency	Percent
Boiling water	12	32.4
Use of household filters	13	35.1
Use of water guard	12	32.4
Total	**37**	100.0

The interviewees indicated that the water in the area was treated through boiling, sieving and use of water purifying chemicals. The water was found to be stored in large plastic Jerri cans with some using ceramic pots to store and fetch the water. The interviewees further observed that the water was not well covered in majority of the households. Majority of the mothers put the water on the balconies and corridors of the house. This was found to be a major risk towards health and hygiene in the area.

4.5 Hand Washing Practices

4.5.1 Hand washing

The study sought to determine whether the respondents washed their hand often. This was sought to establish the level of hygiene amongst the residents. From figure 4.21, the study established that majority of respondents as shown by 90% practiced hygiene through hand washing whereas 10% did not. This implies that considerable number of residents of Kamukunji practice hand washing hygiene in their urge to reduce cases of children illness.

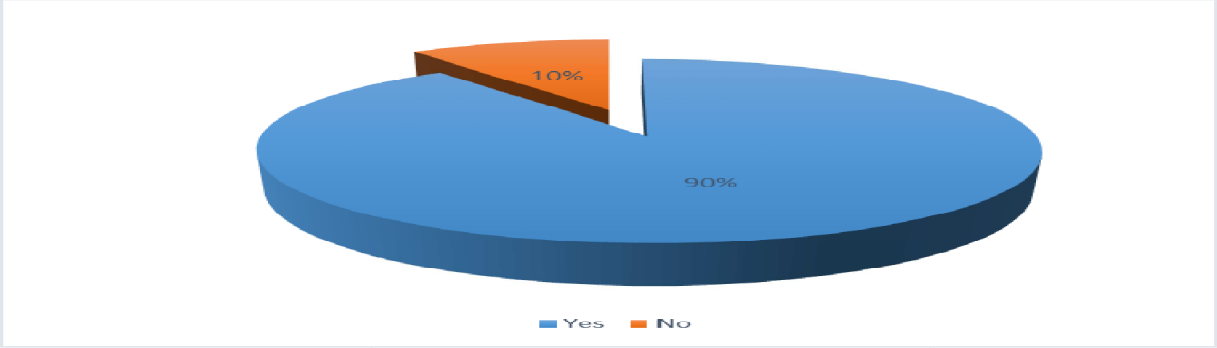


Figure 4.21: Hand washing frequency

The study sought to determine when the respondents wash their hands. From table 4.21, 36% of the respondents indicated that they washed their hands after visiting latrine/toilet, 26% indicated every time when they touched something dirty, 12% indicated before feeding the baby, 10% indicated before preparing food whereas 6% indicated before eating meals. Thus most residents of Kamukunji wash their hands after visiting latrine/toilet, every time when they had touched something dirty, before feeding baby, before eating meal or before preparing food.

Table 4.21: When the respondents wash their hands

When to wash hands	Frequency	Percent
After latrine/Toilet visit	18	40.0
Prior to food preparation	5	11.1
Prior to baby feeding	6	13.3
Prior to meal taking	3	6.7
After touching anything dirty	13	28.9
Total	**45**	**100.0**

Respondents were show requested to show the manner in which they washed their hands. From figure 4.22, majority of the respondents as shown by 94%were willing to show how they washed their hands whereas 6% declined. Thus the study indicates that majority of the residents of Kamukunji wash their hands.

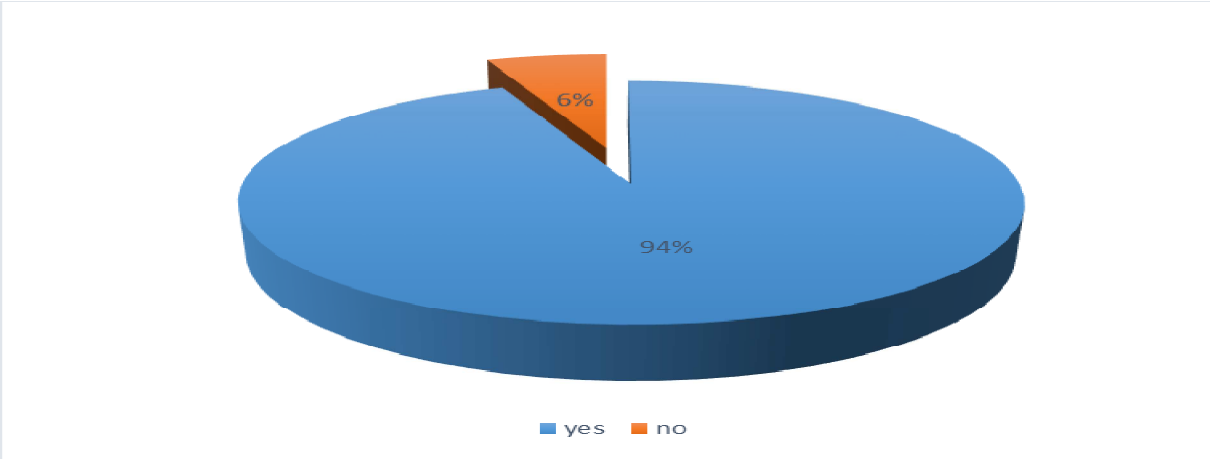


Figure 4.22: Manner in which residents washed their hands

The research sought to determine whether the participants posed the skills in washing their hands. This was sought to establish the level of respondent's awareness on recommended

procedures in hand washing exercise. From figure 4.23, 76% of the respondents posed the right skills for hand washing whereas 24% of the respondents were not able to pose for the right skills for hand washing. This indicates that majority of the residents of Kamukunji are able to pose the right skills for hand washing.

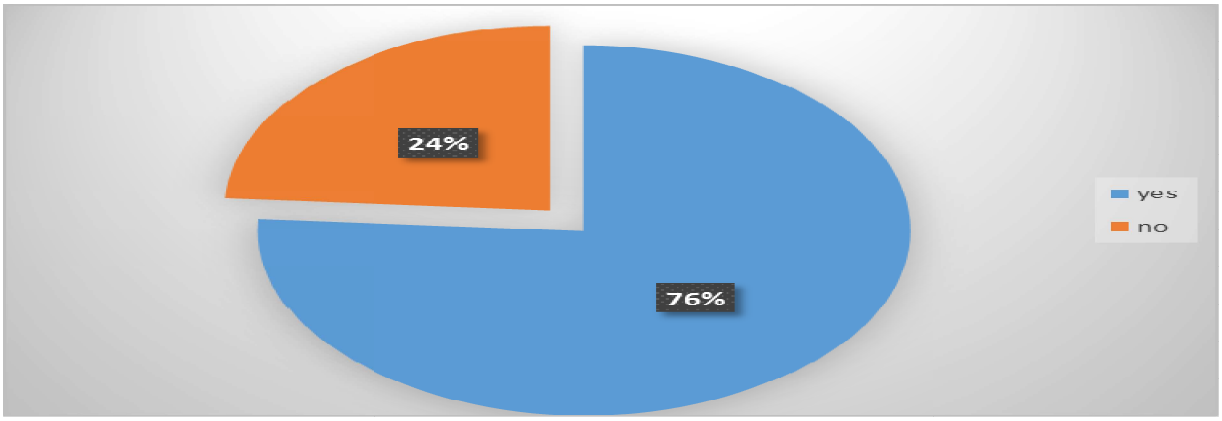


Figure 4.23: Posing of the right skills for washing hands

4.5.2 Hand washing facility

The research sought to investigate whether the households had washing facility in the house. From figure 4.24, most of the households as shown by 56% had a hand washing facility whereas 44% had not. This implies that considerable number of households in Kamukunji have no hand washing facility.

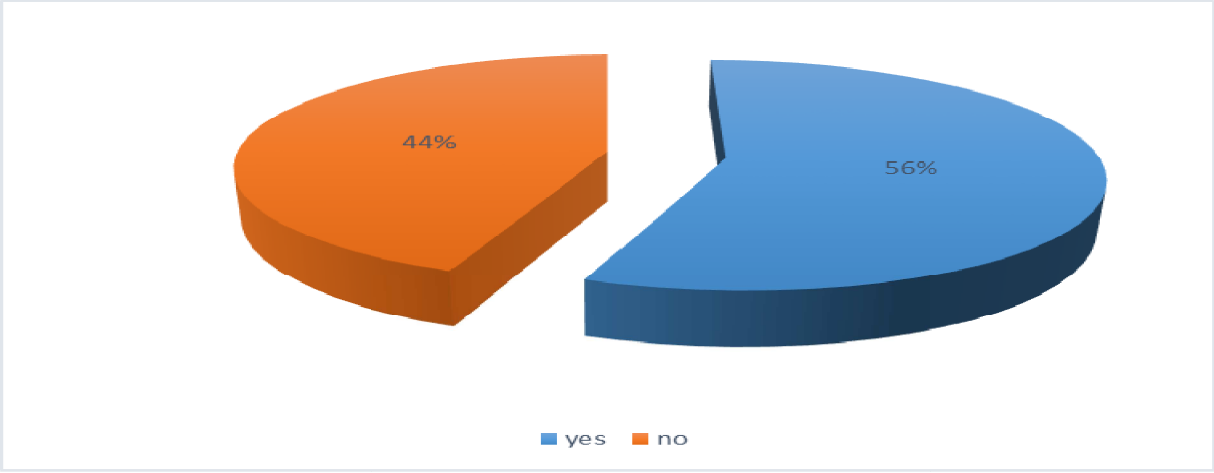


Figure 4.24: Hand washing facilities

Research sought to establish the kind of washing facility in the households that had indicated that they had a hand washing facility. This was geared at establishing the quality of hand washing facility. From the findings on table 4.22, 24% of the respondents were using a basin, 14% indicated that they were using a tilting can, 10% were using a stand pipe whereas 8% of the respondents were using the leak tins. Thus the study indicates that residents of Kamukunjiuse various types of hand washing facilities.

Table 4.22: Type of Hand washing facility

Type of facility	Frequency	Percent
Tilting can	7	14.0
Leak tins	4	8.0
Stand pipe	5	10.0
Basin	12	24.0
Total	**28**	**56.0**

The study sought to find out if the respondents had a soap in the house. Results shown by figure 4.25indicate that majority of the households as shown by 68.0% had hands washing soaps while 32.0% had not, this implies that a considerable number of households have no soap in the house though majority of the residents had soap in their houses.

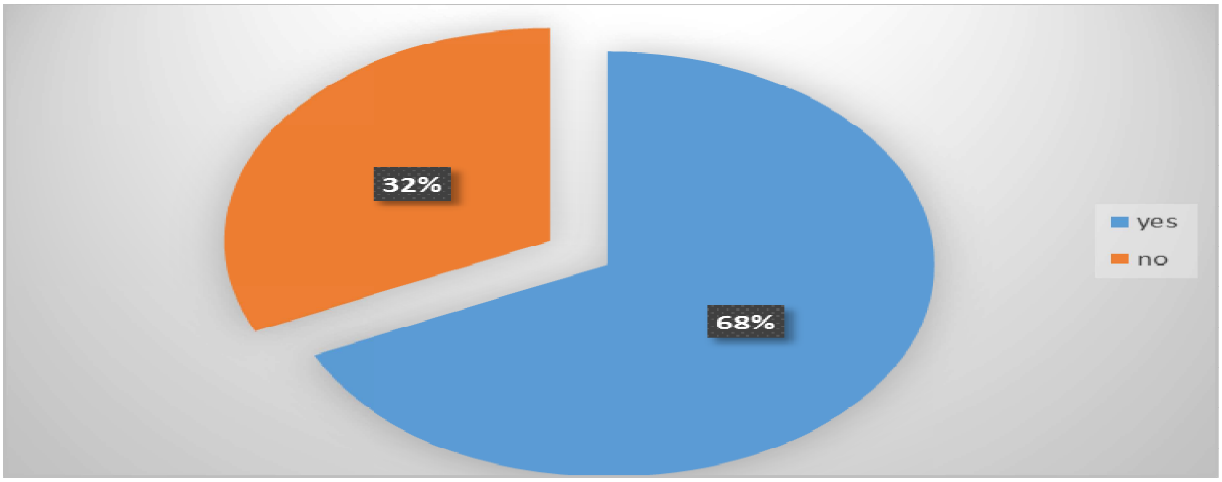


Figure 4.25: Availability of soap in the house

The study sought to establish the drinking water storage container, this deemed important in examining the quality of cleanliness with water storage container. From table 4.23, 62% of the households were using Plastic jerry can to store water 22.0% of the households were using

plastic or metal bucket to store water 14.0% of the households were using Super drum/tank to store water while 2.0% of the households were using Jar (Container with narrow mouth and tap) to store water. This indicates that majority of the households in Kamukunji use a plastic jerry can to store the drinking water which is unsafe. This increases risk of disease.

Table 4.23: Drinking water storage container

Type of storage	**Frequency**	**Percent**
Plastic jerry can	31	62.0
Bucket	11	22.0
Jar	1	2.0
Super drum/tank	7	14.0
Total	**50**	**100.0**

The study sought to establish whether the water storage container had a cover lid or cap. Results in figure 4.26, shows that most of the storage containers as shown by 66% had a cover lid or cap while 34.0% were uncovered. This implies that considerable number of storage container had a cover lid or cap.

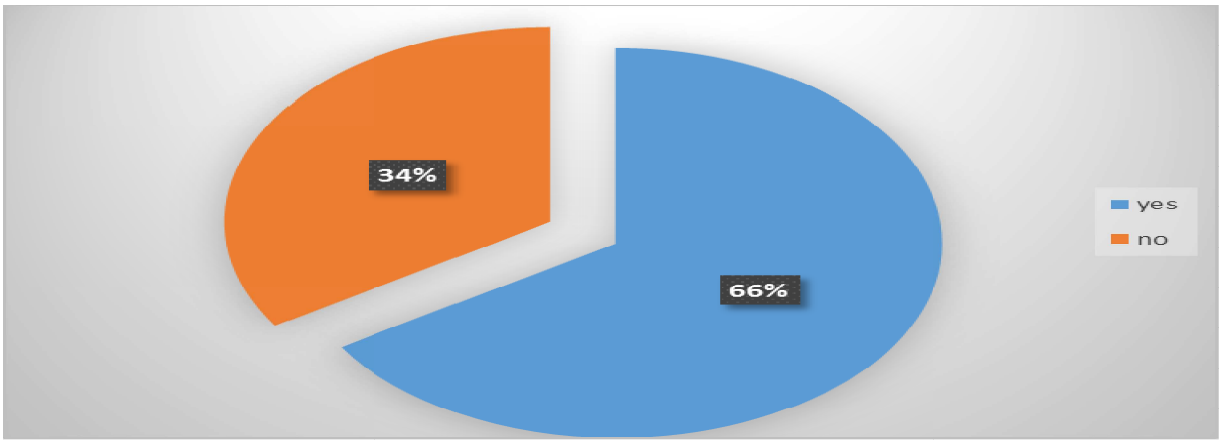


Figure 4.26: Whether the storage container had a cover lid or cap

The study sought to establish the manner in which water was commonly retrieved from storage facility. From figure 4.27, the researcher observed the 44% pour water directly from container 36.0% of the respondents dipped directly into storage container whereas 20.0% tapped water directly from the tap. This implies that most of the households in Kamukunjiuse unhygienic

process to retrieve water from storage containers. This increases the risk of water related diseases amongst the children.

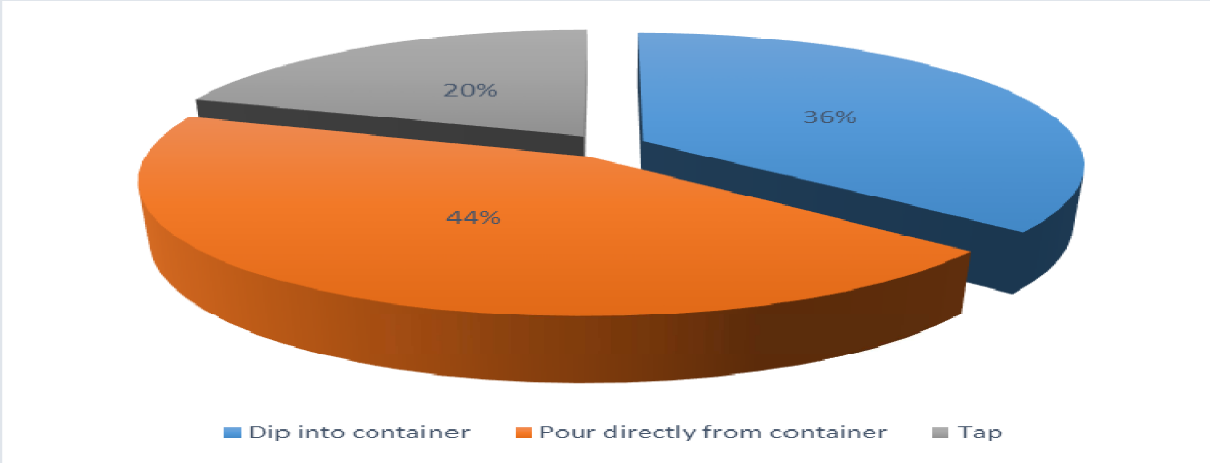


Figure 4.27: Retrieving of water from storage facility

The study sought to determine the family member responsible for collecting water on behalf of the family. Results in figure 4.28 show that in most of the households, water collection duty was bestowed on women as was indicated by 54%, while 46% of the respondents indicated that it was a duty for children. This implies that in most of the households, the water collection duty was a responsibility of either children or women.

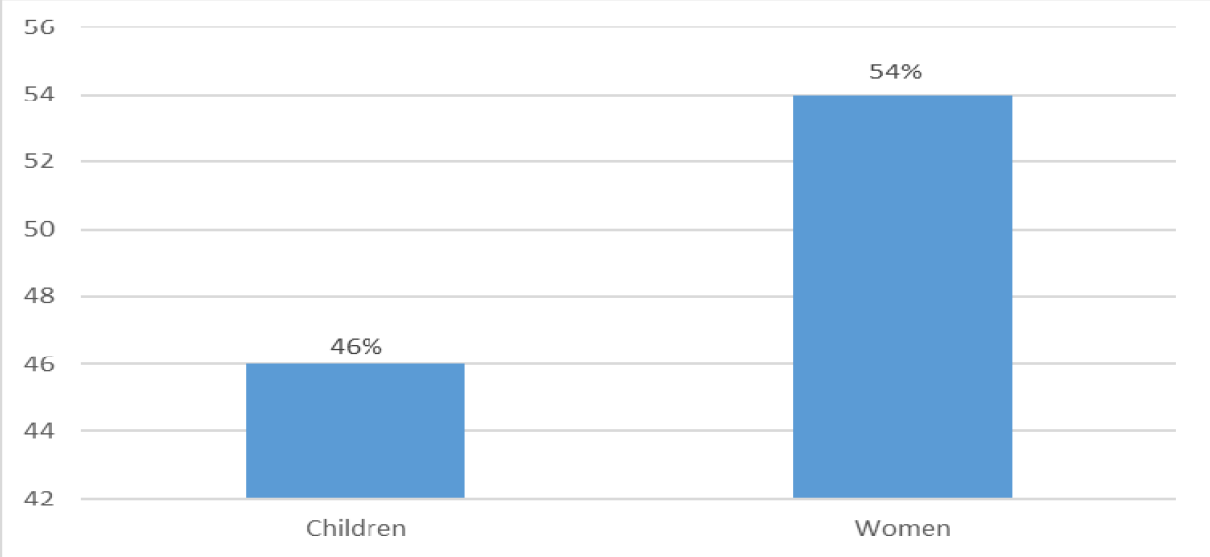


Figure 4.28: Water collection duty

4.6 Diseases of under-fives

The study sought to determine the diseases which children under-five suffered for the last six months. From the findings on figure 4.29, majority of the respondents as shown by 82.0% indicated that the children were suffering from diarrhea, 14.0% of the respondents indicated that the children were suffering from intestinal worms whereas 4.0% of the respondents indicated that the children were suffering from respiratory infections. This implies that in the last six months' majority of children under five years were suffering from diarrhea.The study findings agree with those of (Lopez et al., 2001). He asserted that diarrhea is a major cause of death and disability in the developing world with morbidity related to diarrhea being very high.

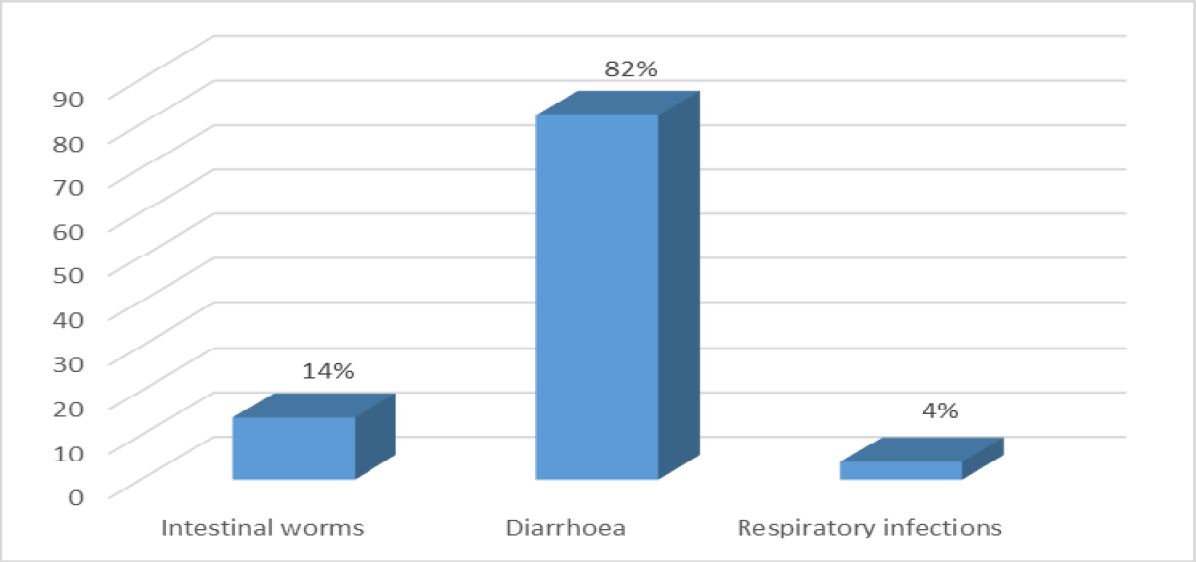


Figure 4.29: Diseases which children under-five suffered for the last six months

From figure 4.30, majority of the respondents as shown by 62.0% indicated that the children were suffering from diarrhoea, 28.0% of the respondents indicated that the children were suffering from coughing whereas 10.0% of the respondents indicated that the children were not suffering from any disease. This implies that majority of the children under five years in Kamukunji are suffering from diarrhea.

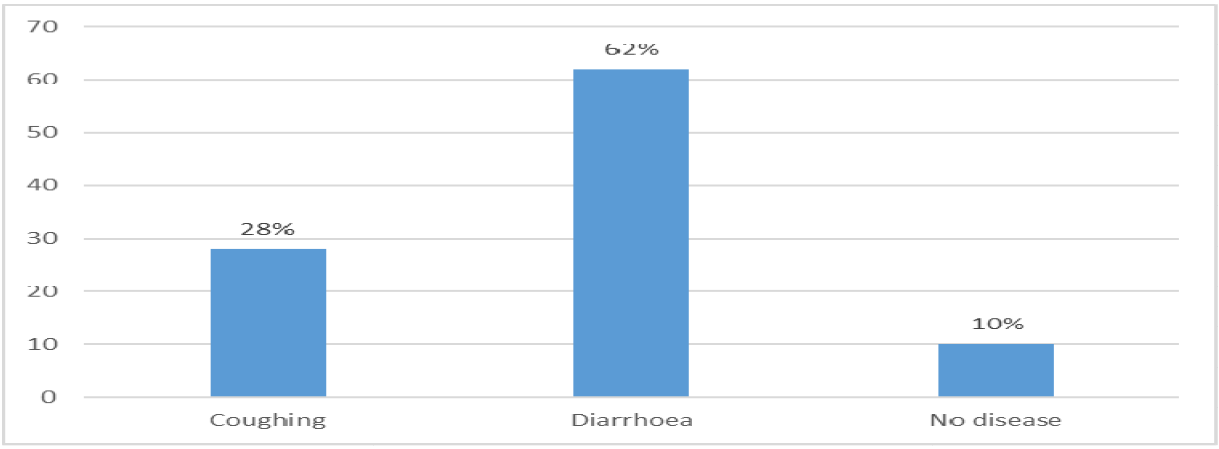


Figure 4.30: Type of disease children under-five were suffering from

The study sought to establish whether respondents knew the cause of the disease affecting the family. From figure 4.31, majority of the respondents as shown by 68% indicated that they never knew the cause of the disease while 32.0% of the respondents indicated that they were aware. This implies that majority of the people in Kamukunjido not know the cause of the disease affecting them.

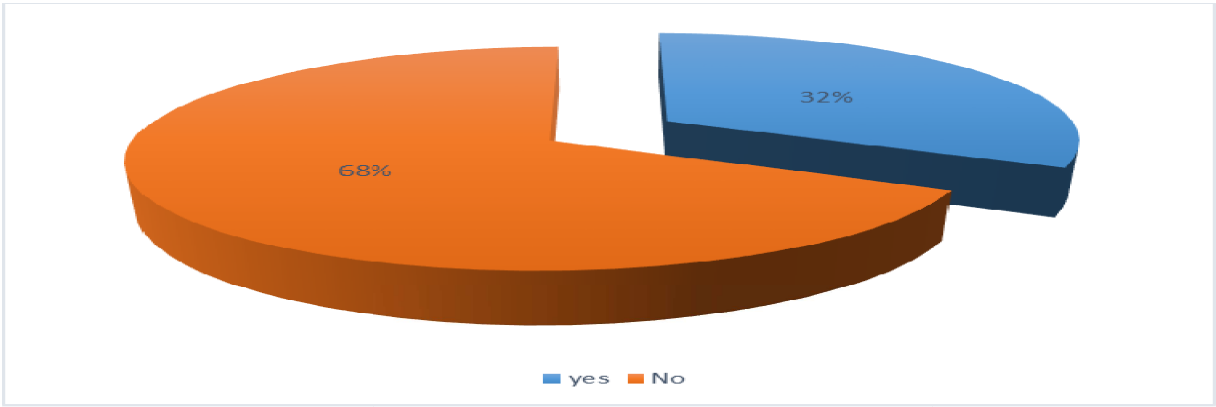


Figure 4.31: Knowledge of disease cause

Respondents were requested to indicate the places they sought treatment once they fell ill. From figure 4.32, majority of the respondents as shown by 62% indicated that they bought medicine from shops or chemists while 38% indicated they visited hospital for treatment. This implies that majority of the residents of Kamukunjibuy medicine from shops or chemists while a few visited hospitals for treatment.

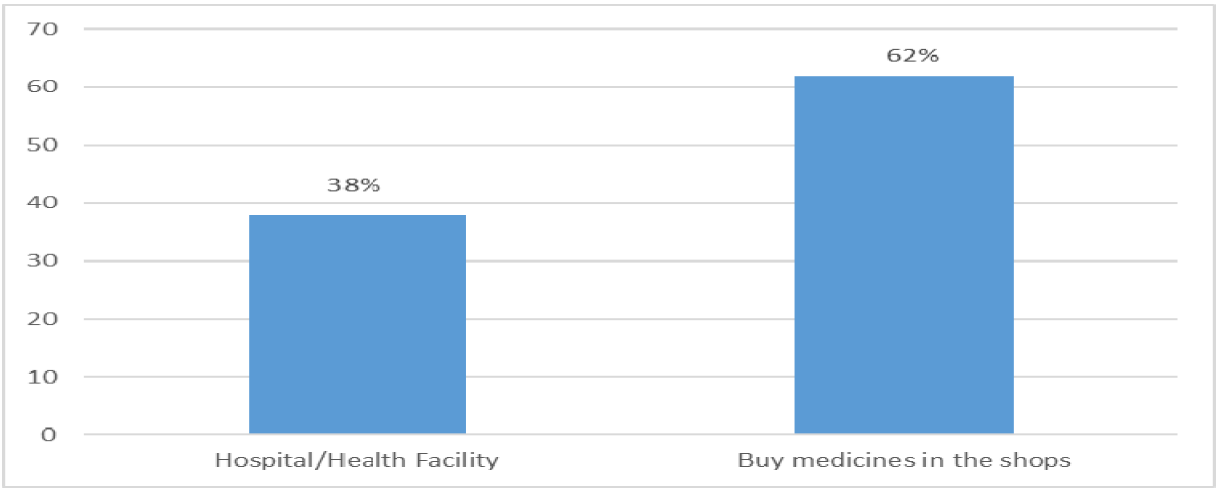


Figure 4.32: Where respondents sought treatment from

4.7 Attitude towards WASH interventions

The study found that the interviewees indicated that the knowledge of the mothers in Kamukunji had improved towards Water, Sanitation and Hygiene (WASH) after the interventions. This was due to workshops and seminars organized for the mothers to inform them of the various strategies they can use to ensure improved hygiene and health. From table 4.24, the Pearson Chi-square Value was 4.678 and the associated P- value (Asymptote Significant Value) was 0.036. This value is less than 0.05 indicating that there is evidence that there was change in knowledge of mothers after WASH interventions in Kamukunji.

Table 4.24: Chi- Square for knowledge of mothers

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	4.678	49	.017

On whether behaviourpractices, had improved the knowledge of mothers of under-fives after the WASH intervention, the findings indicated that the knowledge had increased. This was due to change in the mind of the mothers towards hygiene. From table 4.25, the Pearson Chi-square Value was 5.901 and the associated P- value (Asymptote Significant Value) is 0.031. This value is less than 0.05 indicating that there is evidence that there was improved WASH behaviour and practices after interventions.

Table 4.25: Chi- Square testing for WASH behaviour and practices

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	5.901	49	.031

On whether diarrhea problems or cases had reduced in Kamukunji in children less than five years, the study established that the interviewees indicated that the cases had reduced. However, a good number of them indicated that despite the cases reducing the change was small as a high number of cases has been reported in the area. On the disease the under-fives suffered from, the study found that the interviewees indicated that the children suffered from diseases ranging from typhoid, cholera, malnutrition, kwashiorkor, diarrhea and malaria. On the diseases accrued to drinking contaminated water the interviewees indicated that they knew such diseases as diarrhea, typhoid and cholera. The interviewees indicated that the hand washing practice reduced the spread of diseases in their area.From table 4.26, the Pearson Chi-square Value was 4.231 and the associated P- value (Asymptote Significant Value) was 0.033. This value is less than 0.05 indicating that there is evidence that diarrhoea prevalence changed among under-fives after WASH interventions.

Table 4.26: Chi square Testing for Diarrhoea prevalence in under fives

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	4.231	49	.033

On the change in the mothers' behaviours due effectiveness of WASH interventions, the study found that the behaviour of the mothers had changed positively due to the interventions. They had started adopting various strategies in order to improve the hygiene and health of their household members especially children.From table 4.27, the pearson chi-square value was 11.024 and the associated P- value (Asymptote Significant Value) was 0.026. This value is less than 0.05 indicating that there was improved mothers' hygiene behaviour and improving child health after WASH interventions in Kamukunji.

Table 4.27: Chi- Square Testing for hygiene behaviour and child health

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.024	49	.026

On whether the mothers who had children less than five years had changed their attitude towards Water, Sanitation and Hygiene (WASH) in Kamukunji, the study established that the interviewees indicated that the attitude had changed due to the interventions in the area. The attitude had changed positively with the mothers adopting WASH interventions towards improved hygiene and health in their households. From table 4.28, the pearson chi-square value was 16.524 and the associated P- value (Asymptote Significant Value) was 0.022. This value is less than 0.05 indicating that there is evidence that there was increase in WASH interventions in Kamukunji sub- county.

Table 4.28: Chi- Square Testing for WASH interventions

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	16.524	49	.022

4.8 Observations

The respondents were requested to indicate whether there is evidence of faecal contamination within the compound. From the findings the study respondents indicated that there was evidence of faecal contamination within the compound. Respondents were requested to indicate the type of toilet facility in the compound. From the findings on table 4.29, 60% of the respondents indicated that there is traditional pit latrine, 16% of the respondents indicated that there is modern pit latrine whereas 8% of the respondents indicated that there is no toliet they use bush or field. Thus the study indicates that majority of the residents of Kamukunji have a traditional pit latrine. This may create a challenge for the members of a household to dispose their waste accordingly which may create hygiene issues.

Table 4.29: Type of toilet facility in compound

Type of toilet facility	**Frequency**	**Percent**
Traditional Pit latrine	30	60.0
Modern Pit Latrine	16	32.0
No toilet	4	8.0
Total	**50**	**100.0**

The respondents were requested to indicate the distance of the latrine from the dwelling house. From the findings on figure 4.33, 52% of the respondents indicated that the distance of the latrine

from the dwelling house was more than 20 metres, 26% indicated 10 to 20 metres whereas 22% indicated less than 10 metres. This indicates that most of the residents' of Kamukunji latrine distance from the dwelling house is more than 20 metres. People may dispose waste behind the house in the night due to the distance.

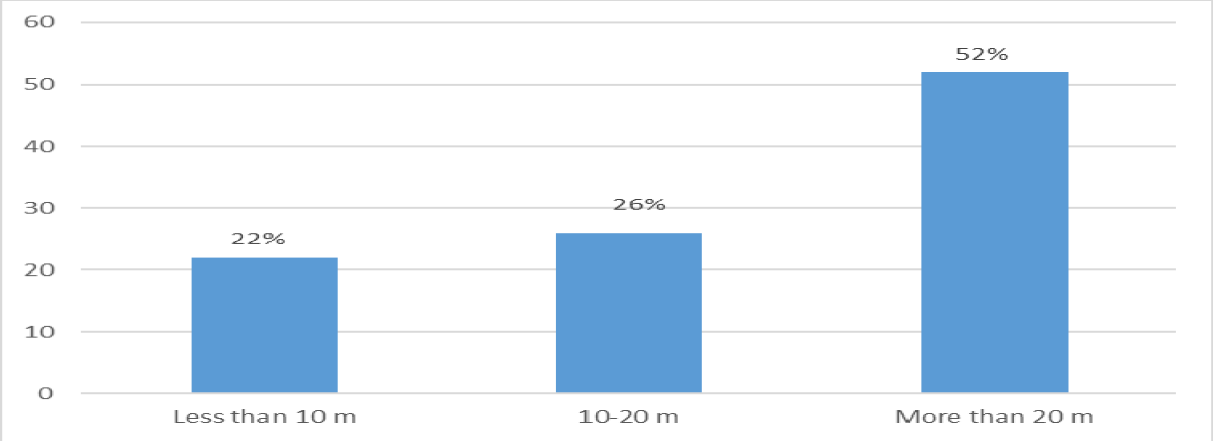


Figure 4.33: Distance of the latrine from the dwelling house

The respondents were requested to indicate the conditions of latrine. From table 4.30, on the condition that the latrine contains concrete slab; 66% of the respondents indicated that slab is absent whereas 34% of the respondents indicated that slab is present thus the study indicates that majority of the latrines have no slab that is concrete. Regarding the smell of the latrine as a condition of the latrine; 74% of the respondents indicated that there is smell outside latrine whereas 26% of the respondents indicated that there is smell inside the latrine thus the study on the smell of the latrine indicates that the latrines do smell both inside and outside with majority of them smelling from outside. On the condition of cleanliness; 68% of the respondents indicated that there is the presence of faeces in the latrine, 16% indicated that the latrine is clean and also a similar percentage of 16% indicated that the latrine was slightly dirty thus the study indicates that majority of the latrines have presence of faeces thus unclean.

On the flies; the table shows that 72% of the respondents indicated that the latrines have many flies whereas a few flies 28% indicated that the latrine has a few flies thus the study on condition about flies indicates that the latrines have many flies. Regarding superstructure the study indicated that 50% of the respondents indicated that the latrine had cracks, 32% of the respondents indicated that there were visible holes and 18% indicated that there are no cracks. Thus the study indicates majority of the respondents' latrines had cracks. On the conditions of

slab the study indicated that 40% of the respondents indicated that there are cracks, 36% of the respondents indicated that the slab have visible pits whereas 24% of the respondents indicated that the slab have no cracks, thus the study indicates that most of the slabs have cracks. With the condition of the door the study indicated that 62% of the respondents indicated that the door closes but not completely, 26% indicated that the door closes completely whereas 12% of the respondents indicated that the latrine have no door. Thus on the condition of the latrine door the study indicates that majority of the doors closes but not completely.

Table 4.30: Latrine conditions

		Frequency	Percent
Contains concrete slab.	Present	17	34
	Absent	33	66
	Total	50	100
		Frequency	Percent
Smell	smell inside	13	26
	Smell outside latrine	37	74
	Total	50	100
		Frequency	Percent
Cleanliness	clean	8	16
	slightly dirty	8	16
	Presence of faeces	34	68
	Total	50	100
		Frequency	Percent
Flies	a few flies	14	28
	many flies	36	72
	Total	50	100
		Frequency	Percent
Superstructure	No cracks	9	18
	Crack s	25	50
	Visible holes	16	32
	Total	50	100
		Frequency	Percent
Condition of slab	No cracks	12	24
	Crack s	20	40
	Visible pits	18	36
	Total	50	100

		Frequency	Percent
Door	completely closes	13	26
	Does not completely close	31	62
	Absent	6	12
	Total	50	100

The respondents were requested to indicate if they knew the importance of using a latrine. From figure 4.34, 84% of the respondents agreed that they know the importance of using a latrine whereas 16% of the respondents were of the contrary opinion. Thus the study indicates that majority of the respondents do know the importance of using a latrine.

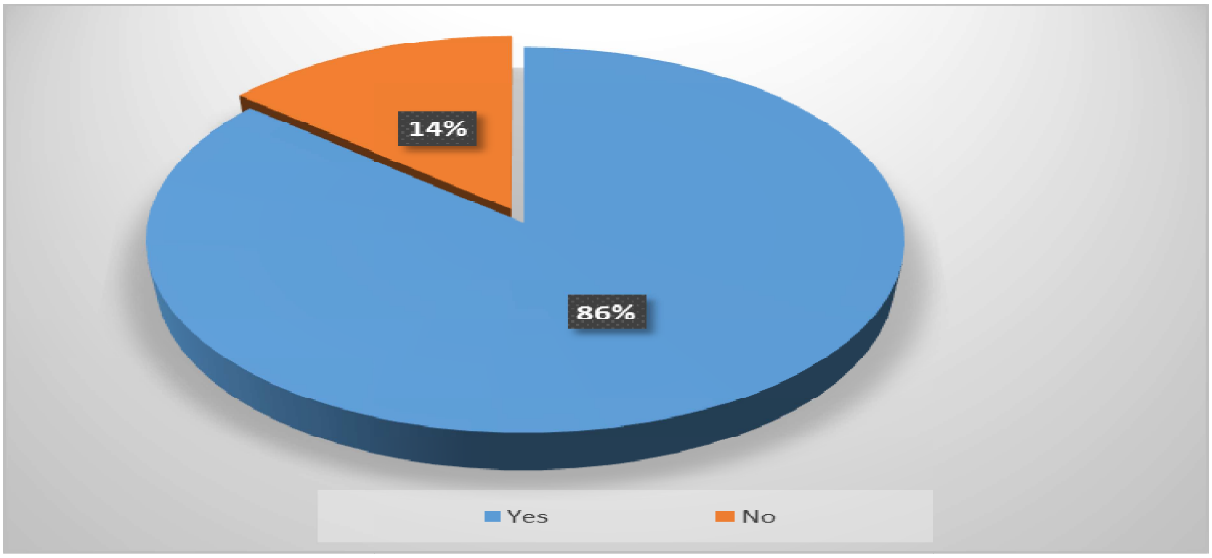


Figure 4.34: Knowledge on the importance of using a latrine

From figure 4.35, the study indicated that of the respondents who had agreed that they knew the importance of using a latrine indicated it was because it prevented diseases as shown by 58.1%, whereas 41.9% indicated that it was because of privacy. Thus the study indicates that majority of the residents of Kamukunjiuse a latrine for prevention of diseases.

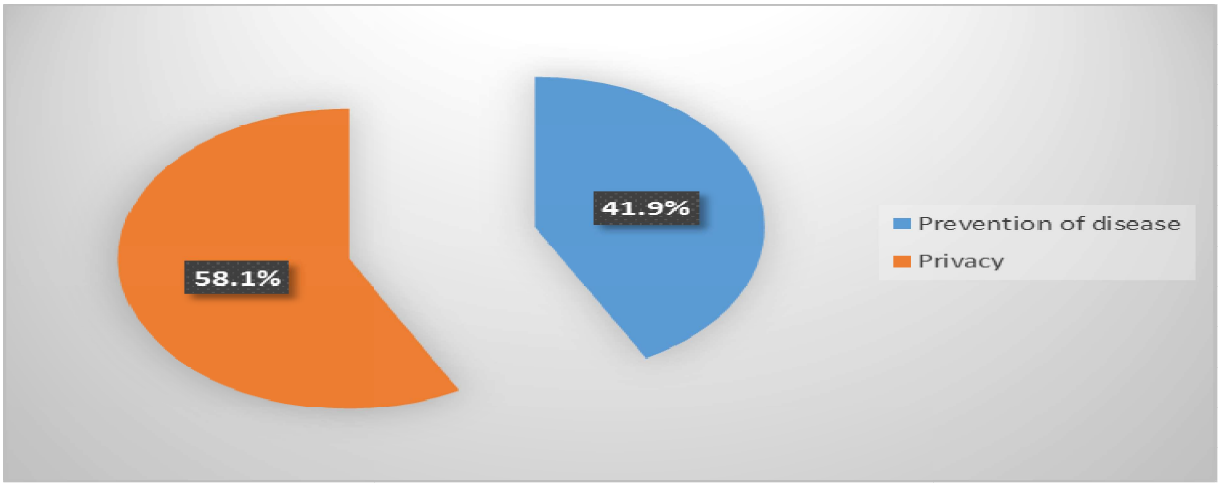


Figure 4.35: The importance of using a latrine

The study research requested the respondents to indicate their opinion if they knew diseases related to using latrine. From figure 4.36, 86% of the respondents agreed that they knew diseases related to using a latrine whereas 14% of the respondents were of the contrary opinion. Thus majority of the residents of Kamukunji agreed that they knew diseases related to using latrine.

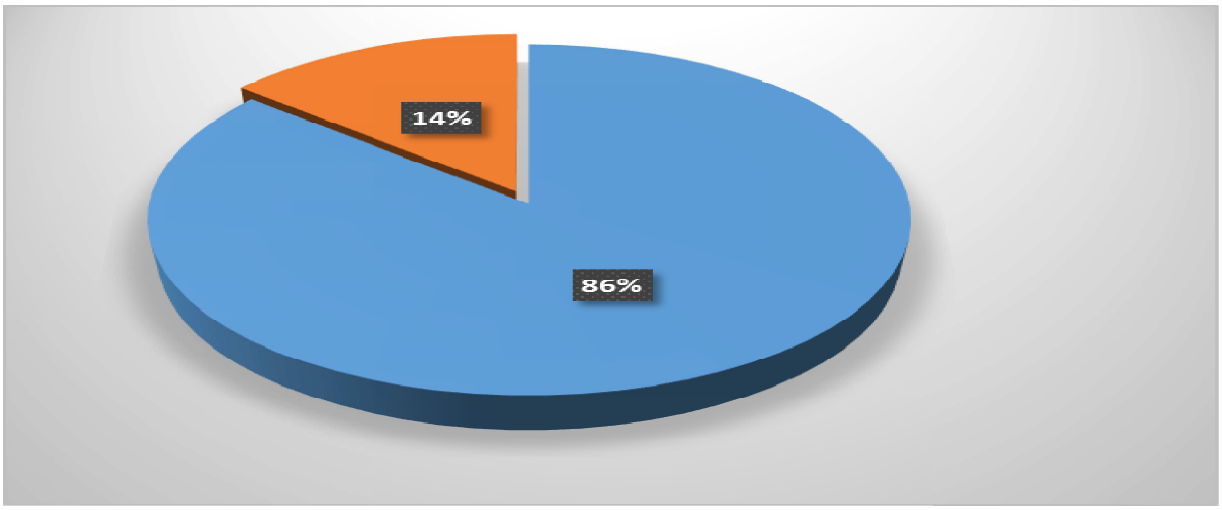


Figure 4.36: Diseases related to using latrine

The respondents who agreed that they know the diseases related to using latrine were requested to indicate the diseases names. From table 4.31, 40% of the respondents indicated that cholera is a disease related to using latrine, 26% indicated that typhoid is disease related to using latrine whereas 20% indicated that diarrhoea is a disease related to using latrine. Thus in Kamukunji, there are diseases related to using latrine.

Table 4.31: Names of diseases related to using latrine

Disease	Frequency	Percent
Typhoid	13	30.2
Cholera	20	46.5
Diarrhea	10	23.3
Total	**43**	**100.0**

Respondents were asked to indicate the ways in which they can prevent the diseases related to using latrine which they had stated. The findings are presented in the table 4.32.From the table 36% of the respondents indicated that there is need to treat water, 28% of the respondents indicated that they can prevent the diseases related to using latrine by use of pit latrine, 12% indicated that they should cover food, 6% indicated that they can prevent the diseases related to using latrine by washing of hands whereas 2% of the respondents indicated that by going to hospital they can prevent the diseases related to using latrine.

Thus diseases related to using latrine can be prevented. The study findings agree with those of Aiello and Larson, (2002).

Table 4.32: Prevention of diseases related to using latrine

Method of prevention	Frequency	Percent
use of pit latrine	14	32.6
Treat water	18	41.9
wash hands	3	7.0
Cover food.	6	14.0
Go to hospital	2	4.7
Total	**43**	**100.0**

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings, conclusions and recommendations for practice and further research on the problem.

5.2 Summary of the Key Findings

This presents the summary of the objectives of the study as brought out by each of the objective.

5.2.1 Sanitation

The study revealed that majority of the households had a toilet in their compound and that the house hold that did not have a toilet was because that the toilet had collapsed. Also the study established that most of the respondents who don't have a toilet at their residence use the neighbor's toilet and that those who do not have a latrine at home make short call behind the house in most cases. The study also revealed that in most cases the number of currently functioning latrines were two in households.

Regarding the sharing of the latrines the study indicated that majority of the respondents do share the latrines with other households and also that most homes with a toilet share the toilet with other two households and above. Further the study revealed that majority of the households have a member who does not regularly use the latrine and this include even the children who are less than 2 years. In addition, the study revealed that the residents did not use the toilets for reasons such as;latrines were not well kept, fear or dislike and also that the children were too small. Mothers indicated that they dispose the faeces of their children who are below five years in the latrines. The study also revealed that majority of residents of the area cleans their toilets when it is dirty and that majority of the respondents do not have a refuse pit but they dispose of their refuse in open land, toilets or by burning.

5.2.3 Water Sources Handling, Storage and Treatment

Regarding the water sources handling storage and treatment the study found out that the source of water used by the householdsthroughout the year was from the public tap outside the school, open well in the compound or an open public well also the study indicated that the respondents use minutes to get water to their homes with majority of families fetching more than 20 litres of water on a daily basis. On the rainy season the study revealed that majority of families

approximate number of litres of water they use for drinking daily was more than 5 litres. The study also revealed that water that families collects from the sources was insufficient for their drinking needs.

Regarding the availability of water the study revealed that the water was always available from the source during the rainy season but at times water was available from the source during the rainy season for several hours per day or was at times infrequently during rainy season. Further the study indicated that the water is used for washing clothes/cleaning compound, bathing/Hygiene/hand washing, cooking and for animals and agriculture. Also the study indicated that respondents pay for water they fetch from their sources with majority of them paying one shilling per litre. Also the study indicated that the source of water used most frequently during the dry season is the public tap (outside school). Also the study indicated that in most cases the water was available infrequently from the source during the dry season with the water being used to wash clothes and cleaning the compound.

Further the study indicated that water which was being got from the source would be considered unsafe for drinking, but majority of the respondents treated it to make it safe for drinking. The water was treated through boiling, using the household filters and by the use of water guard.

5.2.4 Hand Washing Practices

The study revealed that respondents washed their hands after visiting latrine/toilet, every time when they had touched something dirty, before feeding baby, before eating meal or before preparing food. Also the study revealed that majority of the respondents were able to pose the right skills for hand washing also the study revealed that some household had no hand washing facility. Further the study indicated that households were using various types of hand washing facilities. Also the study indicated that there is a considerable number of households that have no soap in the house though majority of the residents had soap in their houses. Also the study indicated that majority of the households used a plastic jerry can to store the drinking water and that majority of them have a cap but others do not have.

Further the study revealed that most of the households were using unhygienic process to retrieve water from storage containers and that water collection duty was a responsibility of either children or women. Also the study revealed that in the last six months' majority of children under five years were suffering from diarrhea. Also the study revealed that respondents knew the

cause of the disease affecting them and for treatment they bought medicine from shops or chemists while a few visited hospitals for treatment.

5.3 Conclusion

The study concludes that majority of the households in Kamukunji sub county have latrines and those who do not have they use neighbour's facility. Further the study concludes that family members never use latrines regularly because of small age in case of children, poor latrines maintenance and the fear of the latrines.

The study concludes that the compounds in Kamukunji sub countyhad signs of contamination.Further the study concludes that there are traditional pit latrines and ventilated improved pit latrine in the area.Some households lack facilities and so help themselves in the field and bushes. Further the study concludes that the conditions of latrines in Kamukunji are not good, as they smell, have cracks on slab and lack doors.

The study research concludes thatdespite water being treated the water is unsafe for drinking. The study concludes that despite the children in Kamukunji washing their hands,the washing was not highly adopted in the area.

5.4 Recommendations

5.4.1 Sanitation

Regarding sanitation, the study found out that some family members do not use the latrines regularly. Thus the study recommends that the heads of households should ensure that the latrines are kept clean by washing regularly with detergents in case the toilets have slab and cleaning if they lack slab. The study further recommends that the pit latrines should be well constructed to eliminate the users fear and guarantee their confidence while using the latrines.

The study recommends that the house heads should undertake to construct better modern latrines so as to avoid cracks on slabs and smell both inside and outside the toilet. Also the study recommends that the government through the ministry of health should assist in teach the public on importance of using latrines.

The study recommends that the house heads should ensure they get water from the sources that are pure and also treat the water to avoid diseases that may arise as a result of using the

contaminated water. Also the study recommends to the government through ministry of county government to ensure that the citizens have access to piped clean water in their location.

5.4.2 Water handling

The study recommends that the house heads should preserve clean containers to store clean water and also have a lid over the containers. Also the study recommends that the government should be in frontline to conduct public awareness on importance of preserving clean water and its storage to curb any outbreak that may happen due to contaminated water.

5.4.3 Hand washing

On the hand washing practices, the study recommends that the government in conjunction with other concerned parties organize workshops and seminars to train mothers on the need for hand washing. Mothers should ensure that their children wash their hands always to ensure that they do not get sick.

5.5 Areas for Further Studies

The study recommends that a similar study should be conducted in any other county.

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