ADOPTION OF COMMUNITY HYGIENE STRATEGIES FOR SAFE WATER AND SANITATION AMONG MOTHERS OF UNDERFIVES IN KITUI COUNTY, KENYA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE (COMMUNITY RESOURCE MANAGEMENT) IN THE SCHOOL OF PUBLIC HEALTH AND APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY

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DECLARATION

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

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DEDICATION

This study is dedicated to my parents Mr. and Mrs. Mutie for initiating the academic morale to me at an early age of primary school education level.

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ABBREVIATIONS AND ACRONYMS

ASAL	Arid and Semi-Arid Land
CBOs	Community-Based Organizations
CDC	Centre for Disease Control
CHW	Community Health Worker
CORPs	Community Owned Resource Persons
FAO	Food Aid Organization
FBO	Faith-Based Organization
HBM	Health Belief Model
HMIS	Health Management Information System
KCSE	Kenya Certificate of Secondary Education
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MoH	Ministry of Health
NGO	Non-Governmental Organization
PHO	Public Health Officer
SDG	Sustainable Development Goal
SPSS	Statistical Package for Social Science
SSA	Sub-Saharan Africa
UN	United Nations
UNICEF	United Children's Fund
WASH	Water Hygiene and Sanitation
WHO	World Health Organization

OPERATIONAL DEFINITIONS OF TERMS

Adoption- refers to choosing to take up or follow an idea, method, attitude, position or course of action.

Community hygiene strategies -refers to sanitation facilities and practices used by mothers of under fives to reduce sanitary disease morbidity and mortality among their children.

Community participation- refers to combined efforts of the wider community members in a society who actively participate towards adoption of safe community hygiene strategies and practices.

Rural people- refer to a population living in a place, town or village which is not part of an urban area.

Safe hygiene- refers to general health risk free environment, living conditions and community safe health practices that involve use of treated drinking water and proper sanitation facilities, washing hands before and after visiting the latrines, eating hot food among others.

Safe water- refers to treated drinking water, from a health risk free source against predisposing the community members to waterborne diseases.

Sanitation- refers to proper and safe disposal of human excreta free of health risk of predisposing the community to food borne and waterborne diseases.

Stakeholders-refers to individuals and organizations who make collaborative effort towards behaviour change of mothers of under fives to safe hygiene strategies and practices.

Under five year olds-refer to all children from birth to 60 months old who are under the care and physical protection of their mothers.

ABSTRACT

Inadequate access to safe drinking water, sanitation and hygiene constitutes a serious global threat to health accounting for approximately 4 billion cases of illness annually. Children under five years in the developing world are most affected, where nearly 1.6 million deaths are recorded annually due to diarrhea alone. This accounts for 15% of all deaths among under fives. Poor sanitation and hygiene practices are among the main factors associated with sanitary diseases. The purpose of this study was to analyze the adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County, Kenya. Objectives guiding the study were: to determine adoption of community hygiene facilities for safe water and sanitation among mothers of under five year olds, to examine the prevalence of common sanitary diseases among children under five years old and to assess the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds within Migwani Division, Kitui County. The study adopted a descriptive survey research design. A sample of 94 mothers of children under 5years old, 3 public health officers and 57 community health workers was used for the study. The total number of respondents was 154 and the response rate obtained was 89%. Data was collected using interview schedules, questionnaires and observation checklists. Quantitative data was coded to develop code sheet quantitative data. Qualitative data was thematically categorized and analyzed using Statistical Package for Social Science Version 20. Statistical analysis involved determination of percentages, means, standard deviation and logistic regression. The results of the study show that only 50.6% of the mothers had access to treated piped water with the rest using pond water, stream water or harvested rain water. More than 40% of the mothers used untreated water sourced from open wells, which increased water borne diseases among children. Toilets were observed in 89.9% of the homesteads with 10.1% practicing open defecation. Common sanitation and water borne diseases reported were worms, amoeba, diarrhea, and dysentery. Mothers who used both open well water and stream water were more likely to have children suffer from diarrhea compared to those who used piped water (9. 37 for stream water, 9.42 open wells and 5.42 for piped water-$p<0.05$). Amoeba prevalence was 82.6% among children whose mothers were using untreated water. Majority of mothers (76.4%) lived more than 10km from water sources therefore forced to use unsafe water. Hand washing at critical times was at 94.4% meaning hygiene awareness was high, evidenced by 61.8% of homesteads with hand washing facilities outside toilets. High level of adoption of safe water and sanitation practices were: Availability and use of toilets, hand washing facilities, hand washing and treating drinking water. Medium level was access to safe water and participation in health programmes. Low adoption was evidenced by prevalence of sanitary diseases and long distances to water sources. Therefore, Community hygiene strategies and practices have great influence on levels of adoption of safe water and sanitation practices among mothers of children under five years old. Recommendations of the study are: community involvement in assessing their health, training of community health workers on concepts of health care and development, change in human behavior in community response towards disease outbreaks and emergencies and poverty alleviation in order to improve adoption of community hygiene strategies for safe water and sanitation.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Internationally, rural people tend to have relatively poor living conditions and health status compared to general population of the countries in which they live (Skinner, 2009). About 61% of global population is able to access proper sanitation facilities, which leaves 2.6 billion people worldwide without properly hygienic improved human disposal facilities (World Health Organization [WHO], 2012). This number includes nearly 70% of the sub-Saharan (SSA) African population; Kenya included (United Nations Children's Fund [UNICEF], 2012). Children under the age of 5 years in developing countries suffer mostly from diarrhoea, where every episode reduces calorie and nutrient uptake, reducing growth and development for those affected (Mutungi, 2012).

Lack of access to safe drinking water and inadequate sanitation and hygiene practices are overwhelmingly associated with 1.8 million deaths globally and cause approximately 4 billion cases of illness annually (WHO, 2007). Presence of adequate sanitation facilities is often taken for granted in most of the developing countries, yet about 2.5 billion people among these countries still do not have access to adequate and improved sanitation (WHO/UNICEF, 2012). In developing countries, there still exists high prevalence of water and sanitation related diseases especially among the under five year olds (UNICEF, 2012).

In Africa, it is estimated that at least 300 million people lack access to safe drinking water supply where as 33 million lack access to basic sanitation. As a result, waterborne diseases present a major burden to human health with 1.8 million people losing their lives every year of which 1.5 million are children aged below five years (WHO, 2012). One of the Millennium Development Goals (MDGs) target was to half the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015, likewise, Sustainable Development Goal (SDG) 6 aim is to ensure availability and access to water and sanitation for all by 2030.Yet, most African countries lag behind, especially those in sub-Saharan Africa (WHO/UNICEF, 2015).Going by WHO standards on access to connected sewage system in Kenya the proportion of rural households connected to a sewage system by 2012 was 7.5%.In Kenya the proportion of rural population with access to clean and safe water was 9.4% by 2012(WHO/GoK, 2012) and 45% had access to clean and safe hygienic sanitation facilities (UN, 2012). Kitui County is classified as arid and semi-arid land (ASAL) and experiences prolonged spells of inadequate water supply and limited access. In Kitui about 6% of the inhabitants have access to safe drinking water (Borst & De Haas, 2006). Water scarcity in the county forces women and girls to walk up to 20 kilometers during the biannual dry seasons of the year {January-March and June-October} to get the drinking water from the water sources such as springs and scooped holes within the sand on river-beds of dry seasonal rivers, man-made dams and shallow wells. These sources of water are likely to be contaminated due to common use by both humans and animals (FAO, 2005).

Due to poverty, very few people in rural Kitui County would afford to buy safe water from the sparsely distributed boreholes. Most of these people would rather get water from the free contaminated sources at no cost (Borst & De Haas, 2006).

In Migwani Division the proportion of rural population with access to clean and safe water was 6.0% by 2012. Very few people in the Division can afford to buy safe water from safe water sources due to poverty (Mutungi, 2012). The poor rural population lives below the poverty line which is defined by spending less than 1.2 U. S Dollars per day (WHO, 2012). Majority (66%) of the people in Migwani Division of Kitui County prefer getting unsafe water at no cost from contaminated sources from distances ranging between 20-30 kilometers away from their homesteads (Mutungi, 2012).

Just like many other economically disadvantaged parts of Kenya, Migwani Division has experienced an increasing number of child mortality of under five year olds that are related to unsafe hygienic practices among mothers of under five year olds (MoH, 2013). Therefore, it is against this background that there is need to investigate the adoption of community hygiene strategies among mothers of under five year olds in Migwani Division of Kitui County, Kenya.

1.2 Statement of the Problem

Sanitation and hygiene are important to child survival, development and growth especially in the developing world where about 120 million children are born annually. It is estimated that 88% of diarrhea related cases of children under five years result from poor hygiene and lack of access to improved sanitation (WHO,

2012). Poor water quality, sanitation and hygiene account for about 1.7 million under 5 year deaths worldwide annually.

Community hygiene strategies and practices significantly contribute to the growth and stability of low income rural population in many ways. Despite marked health progress in the world, Kenya continues to grabble with preventable diseases and unresolved issues of community public health service delivery (UNICEF, 2012). In view of the issues of community public health related problems, Kenya has embarked on the implementation of community health strategies and practices as an intervention measure in order to uplift the standards of safe water, sanitation and hygiene practices especially among children aged under five years (GoK, 2012). Water scarcity and low quality influences the level of health status in many households owing to poor sanitation and hygiene practices, especially those related to excreta disposal and hand washing (Kariuki, 2013).

Despite the basic knowledge of inadequacy of water and hygiene sanitation and practices among rural community; water supply, sanitation and basic household hygiene practices in Migwani Division lack priority from the government in relation to health, economic and environmental burden it places on the people in the Division (Mutungi, 2012). Therefore, despite the many initiatives made by the government through the Ministry of Health and Sanitation, most people, especially mothers of under five year olds continue to adopt unsafe hygiene practices despite an array of diversified efforts put towards adequate sanitation. Approximately 49% of the total population in Migwani Division does not have access to adequate sanitation such as safe, hygienic, easily accessible, acceptable and affordable system of disposing

human excreta, waste water and household refuse (Mutungi, 2012). The unhygienic practices affect quality of life, cause diseases hence place burden on families and increased risks to personal safety. In Migwani Division, diseases associated with water, sanitation and hygiene practices are leading causes of children mortality rate which stands at 1.95 per 1000 per day (HMIS, 2016).

Thus, this study focused on the adoption of community hygiene strategies as an intervention to safe water and sanitation among children under five years old in Migwani Division, Kitui County, Kenya.

1.3 Purpose of the Study

The purpose of this study was to analyze adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County, Kenya.

1.4 Objectives of the Study

The study intended to achieve the following objectives:

i. To determine adoption of community hygiene facilities for safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County.
ii. To examine the prevalence of common sanitary diseases among children under five years old in Migwani Division, Kitui County.
iii. To assess the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County

1.5 Research Questions

This study was guided by the following questions:

i. What are the community hygiene facilities among mothers of under five year olds in Migwani Division, Kitui County?
ii. What is the prevalence of common sanitary diseases among children under five years old in Migwani Division, Kitui County?
iii. What is the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County?

1.6 Significance of the Study

The findings of this study will contribute to the field of knowledge in the area of sanitation and hygiene. The study gaps identified in this study will form a basis for further research in the field of sanitation and hygiene. Key findings will stimulate intellectual debate on how best sanitation and hygiene practices especially in rural sub-Saharan Africa can be managed to reduce child morbidity.

1.7 Scope of the Study

The study was conducted in Migwani Division, Kitui County. It focused on the adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds. It involved mothers of under five year olds, public health officers and community health workers. Mothers of under-fives are directly involved in attending the under five year olds and in the county, public health officers and community health workers are the focal persons for community health.

1.8 Limitations of the Study

Migwani Division is a semi-arid region with harsh climatic conditions, poor infrastructure and community health centres are sparsely distributed thus accessibility to some health facilities was a great challenge. Literacy levels among the mothers were poor hence hindering communication. This was resolved through translation of data collection tools to the local language. Observation was also used where applicable. Due to suspicion some study respondents concealed confidential data and this affected response.

1.9 Assumptions of the Study

This study assumed that there is homogeneity in socio-economic status of the households to be studied. It was also assumed that nutrition and feeding practices of the children under five years who were under study were the same.

1.10 Theoretical Framework

This study was based on the Health Belief Model (HBM) (Croyle, 2005). It's one of the first theories of health behaviour developed in 1950s by a group of United States of America (U.S.A) public health service social psychologists who wanted to explain why so few people were participating in programs to prevent and detect diseases. The model proposes that a person's health-related behaviour depends on the person's perception of four critical areas: the severity of a potential illness, the person's susceptibility to that illness, benefits of taking a preventive action, and the barriers to taking that action (Croyle,2005).

The model postulates that health-seeking behaviour is influenced by a person's perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat. HBM addresses the common type of a person's beliefs and behaviours. It provides a way to understand and predict how clients will behave in relation to their health and how they will comply with health care therapies. It is a model for addressing problem behaviours that evoke health concerns for example, high-risk hygiene behaviour among mothers with children under five years and the possibility of these children contracting diarrhea (Croyle, 2005). The theory has been chosen to guide this study in that, it explains a person's hygienic behaviour due to perceived susceptibility and severity. For instance, the perception that a health problem is personally relevant and perceives diagnosis of the illness as being accurate.

Action is taken after perception of the severity is seen to be high that is, to have serious organic or social complications. A person's hygiene behaviour is acquired due to perceived benefits and costs; like the patient's belief that a given treatment will cure the illness or help to prevent it. A person's hygiene behaviour due to motivation and modifying factors is the desire to comply with a treatment and the belief that it is correct. The modifying factors are personality variables, patient satisfaction and socio-demographic factors (Croyle, 2005).

1.11 Conceptual Framework

The conceptual framework is based on the objectives of the study. The independent variables are: community hygiene facilities, prevalence of common sanitary diseases

and community hygiene practices. Extraneous variables are age of mothers and government health policies. The dependent variable is levels of adoption of safe water and sanitation practices. The presence of hygiene facilities, reduction on prevalence of sanitary diseases and proper hygiene practices can lead to different levels of adoption safe water and sanitation practices among mothers of under fives. This can also be influenced by age of mothers and the government health policies.

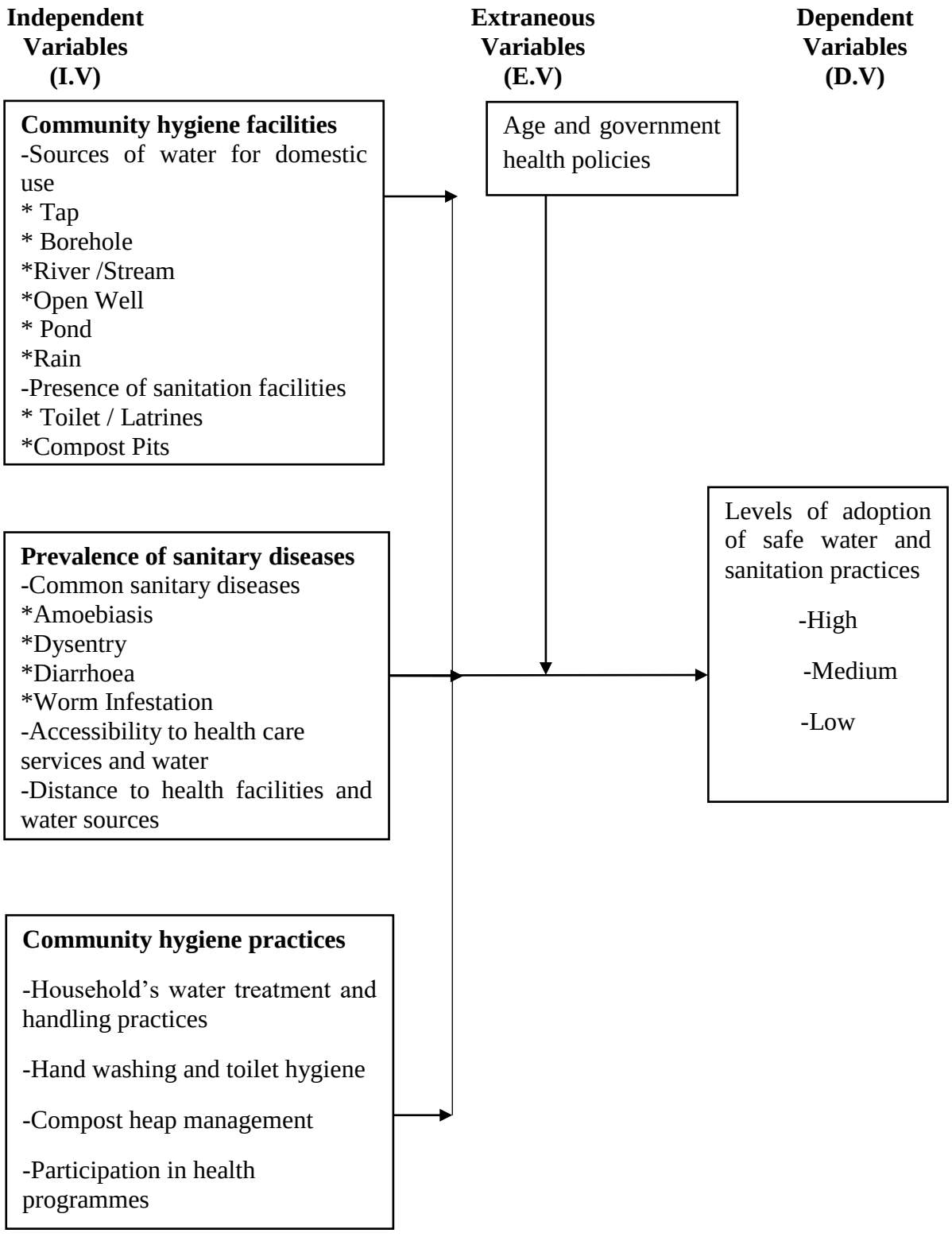

Figure 1.1: Relationship between community hygiene facilities, prevalence of sanitary diseases, community hygiene practices and levels of adoption of safe water and sanitation practices among mothers of under fives

CHAPTER TWO: LITERATURE REVIEW

2.1 Community Hygiene Facilities

Rural people tend to have relatively poor living conditions and health status compared to general population of the countries in which they live (Skinner, 2009). This is associated with experiencing disadvantages across generally recognized social determinants of health as well as the consequences of acculturation and the loss of cultural cohesion (Lanata & Black, 2008). Native children are particularly vulnerable to malnutrition and infection that only affects their growth and development, but also their cognitive development, educational outcomes, health and wellbeing throughout life (Cabral, 2010). Only 61% of global population use improved sanitation facilities, leaving out 2.6 billion people without proper sanitation with sub-Saharan African population accounting for 70% (WHO/UNICEF, 2012). A comprehensive integrated approach to a multidimensional health program helps ensure that communities access the needed services. Health promotion programs with activities such as outreach to school sports venues, faith based organizations such as churches and Mosques can reach and motivate more community members through innovative means such as Health Action Days and educational theatre (GoK, 2012).

The United Nations Children's Fund (2006) observed that, whereas appropriate hygiene education can bring about the intention to change people's hygienic behaviour, in most cases, appropriate water and sanitation hygienic facilities are needed to allow people to transform intended behavioral change into a real safe water and sanitation hygienic practices (UNICEF, 2006).Irena, Wambazi

and Lenga (2011) observed that access to water and sanitation hygienic (WASH) facilities is a pre-condition for people to acquire good health, well-being and even benefit from economic development. Without it, the increasing rate of population and economic growth tend to negatively affect the most vulnerable segments of population in society such as: women, children and marginalized communities. The same position is echoed by Lanata and Black (2008) who note that, in order to reduce infant and child mortality, improve quality of life and reduce poverty, greater efforts and investment are needed to increase safe water, affordable hygienic sanitation and adequate hygiene promotion. Improvement of water, sanitation and general household hygiene promotion provides a range of benefits for people's well-being, particularly the poor and marginalized.

Consequently, improved sanitation and promotion of hygienic behaviour reduces health risks, and eventually contribute to the socio-economic development of a country (Lanata & Black, 2008). Safe drinking water access is estimated by the number of the population using proper drinking water sources. Properly constructed drinking water source is adequately protected from contamination with disease causing pathogenic micro-organisms and also from the water contamination in particular with open defecation-human and other animals' faecal matter (WHO/UNICEF, 2010). Improved sanitation facilities hygienically separate human excreta from human food and drinking water's contact with the open defecated-human faecal matter. Also, safe drinking water should be provided in sufficient quantities to enable proper community health hygiene. Hands should be washed immediately after defecation, after handling babies' faeces, before preparing food and before eating (CDC, 2016).

Water, sanitation and hygiene improvements can be categorized into two interventions (CDC, 2016) which are: Improved water source and/or distribution, as piped water and standpipes, provided either at public safe water stand point-of-use sources or household safe water stand point-of-use source levels; and the provision of improved means of public or household excreta disposal systems, through hygienic public sanitation facilities and hygienic household sanitation facilities. All should be connected to public sewerage system designed by the local government in case of urban dwellers or the community in case of rural community settlements (WHO/UNICEF, 2010). In the 1990's the Kenyan Government, through the Ministry of Health had started water supply campaign initiatives and it had promised all Kenyans that by the year 2000 every household both rural and urban will have access to safe water stand point-of-use source at individual household level. However, by having access to safe water stand point-of-use source at individual household level is still a dream to many of the income-poor rural and urban slum dwellers population in the country.

Although the number of people defecating openly has decreased in the world, by the end of 2011 open defecation was still practiced widely in most of the developing countries (WHO, 2011). For example, in Southern Asian countries open defecation was still practiced by 44% of the population, who were mainly from the rural/urban low income level population. And in the sub-Saharan African countries Kenya included, by the end of 2011, open defecation was still practiced by 27% of its total population. However, majority of this (27% SSA's population) is mainly those who belong to the rural/urban settlements of the income-poor population (WHO, 2011).

In the sub-Saharan African region, Kenya included, the substantial increase in absolute number of people without an improved domestic water source was estimated to have increased by 190 million people in between 1990-2006 due to high population growth rate (WHO, 2008). The SSA's population represented 23% of the increase while population without sanitation increased by over 30% within the same region (WHO, 2011).

Therefore, unless huge efforts are made, the SSA countries miss out in attaining the UN's SDG 6 targets. Most of the reasons leading to this off-track course are characterized by the regions chronic slow economic growth that has undermined their situation of attaining this goal (UN, 2016). In recent past, several projects on improvement of hygiene and sanitation have been initiated in Kenya by the Government (Mutungi, 2012). Majority of these projects do not target assessment of adoption of intervention programmes like community health strategy on safe water, sanitation and hygiene practices and the prevalence of related diseases among children aged under five years. The projects largely focus on the processes and the direct outputs of the projects with little regard to actual impact on the burden of the related diseases (Mutungi, 2012). Aloo (2012) observed that community participation in community health matters is key to creating self-reliant and empowered communities for collective action and decision making. It is also believed to be instrumental in addressing marginalization and inequality through elucidating the desires, priorities and perspectives of different groups within a project area (Aloo, 2012). Similarly, O'reilly (2012) observed that the Government of Kenya needed to involve the community to participate in strengthening community hygiene strategies at different geographical regions. This has however,

created the need for investigation of community hygiene strategies and practices in Migwani Division of Kitui County.

2.2 Sanitary Diseases among Children Under Five Years

The disease burden from the risk factors of unsafe water and sanitation hygiene (WSH) was for the first time estimated at the global level in 1990 (Mokomane *et al*.,2017). This assessment did not take into account various other disease outcomes from the other risk factors apart from those of unsafe water, sanitation and hygiene practices (Mokomane *et al.*,2017). According to Morpeth, Habib, Ramadhani, and John and Crump (2009), disease risk factors are defined as to include multiple factors, namely the ingestion of unsafe water and food, lack of water linked to inadequate hygiene, poor personal and domestic hygiene and agricultural practices, contact with unsafe water, and inadequate development and management of water resources or water systems (Morpeth *et al*., 2009).

In many developing countries, there exists a high prevalence of water and sanitation related diseases especially among children aged less than five years old. In most of the developing countries the rural poor live on less than 1.25 dollars per day, which is below the poverty line limiting their access to proper sanitation (WHO, 2012). Global evidence has shown that nearly nine million children aged less than five years die annually from largely preventable diseases such as malaria, pneumonia, diarrhea and malnutrition (UNICEF, 2012). According to a study by Irena, Wambazi and Lenga (2011) lack of access to improved water supply and sanitation services is the main source of many food borne and waterborne diseases. Most of the food and waterborne diseases may cause death, lower human dignity and thwart the socio-

economic progress of a country. Children especially under the age of 5 years mostly in developing countries suffer from diarrhea, where every episode reduces calorie and nutrient uptake, reducing growth and development for those affected (Kariuki, 2013). Lack of access to safe drinking water and inadequate sanitation and hygiene practices are overwhelmingly associated with 1.8 million deaths globally and cause approximately 4 billion cases of illness annually among children aged less than five years (WHO, 2007). Despite advances in cases of management of diarrheal diseases, the diseases are a major cause of morbidity and mortality among children less than five years in developing countries. Diarrhea accounts for the deaths of nearly 1.6 million children aged less than five years annually or almost 15% of all deaths in this segment of the population (WHO, 2003).

Sanitation and human health are closely connected as lack of appropriate hygiene policies and disposal of human excreta can lead to transmission and spread of diseases that cause diarrhea (Kariuki, 2013). Contaminated water and indiscriminate disposal of faecal matter account for 5.7% of diarrhea amongst children less than five years. Poor sanitation and hygiene has been associated with diarrhea, worm infestation, and eye and skin infections. Out of all the sanitation and hygiene related diseases; diarrhea disease is the most deadly especially for children less than five years (Pruss, *et al.,* 2008). The burden of illness for children under five years of age that arises from diarrheal diseases linked to inadequate water, sanitation and hygiene is up to 240 times higher in Africa than in high income Nations (Prusset *et al*., 2002). It is estimated that 94% of these diarrheal cases are preventable through modification of the environment, including interventions to increase the availability of clean water and improvement in sanitation and hygiene (Ustun & Corvalan,

2006). Improvement in environmental sanitation has significant positive impact on environmentally related diseases such as malaria, diarrhea, skin and eye infections and the overall dignity and well-being of the populations (Harvey & Reed, 2004). Improved access to safe water supply is attributable to reduction of diarrhea incidences by about one fifth and the number of deaths due to diarrhea by more than half (Black & Fawcett, 2008a).

In many developing countries, inadequate sanitation is associated with several public health problems and several infectious, faecal-oral -related diseases such as cholera and diarrhea. Over 2.2 million people die each year from diarrhea related diseases with more than 70% being children under five years of age (Black & Fawcett, 2008b). Access to safe water and sanitation stimulates changes in hygiene behaviour, hence a key reason for investing in hygiene and sanitation services. Starting at household level, people are most likely at risk of contamination especially where they spend most of their time. Health benefits are accrued to families who have latrines even where neighbours do not; additional benefits then accrue as coverage extends to the whole neighborhood (IRC & WEDC, 2002).

Improved sanitation and hygiene are critical for improvement of child health through reduction of diarrhea, worm infestation, and eye and skin infections. According to WHO reports, more than three million children die from diarrhea each year, and over 500 million children are infected with common worms, approximately six million people become blind due to trachoma as a result of poor access to safe water, sanitation and hygiene (Schmidt & Caincross, 2009). Access to quality healthcare among mothers of children aged less than 5 years is therefore critical in most of the

developing countries. The mothers also need to be trained so as to be able to identify the possible risks to the health of these children that emanate from poor hygienic household living standards (Adekunle, Adetunji, Gbadebo & Banjoko, 2007). Water-borne diseases represent a major burden on human health worldwide. Every year, 1.8 million people die from diarrheal diseases, of which 1.5 million are children under the age of 5 years (WHO, 2007). Access to safe drinking water, basic sanitation and proper hygiene education (WSH) could not only prevent diarrheal diseases by nearly 90% (UN, 2010), but lead to improved health, poverty reduction and socio-economic development as argued by Fewtrell *et al.,* (2005). A community household water management approach is the best short term intervention for sustainable and safe drinking water, sanitation and good hygiene for the third world countries to attain this millennium development goal by 2015 (Fewtrell *et al.,* 2005; Mintz, Bartram, Lochery & Wegelin, 2001).

The intention of the Government Community Health Strategy is to formalize people's power to determine their own health priorities and link them to the formal health system in order to reflect their decisions and actions in the health plans. The aim of Community Health Strategy is to support household-based caregivers through a range of community-owned resource persons (CORPs) who are experienced in many aspects of community healthcare services to bring health services closer to the people in their local community village family household levels (GoK, 2011). Community response to disease outbreaks and emergencies calls for changes in human behaviour. Basic skills on safe hygiene would equally equip mothers of under five year olds to avoid the dangers associated with health related diseases (WHO/UNICEF, 2012).Although diarrheal diseases respond readily to changes in

human behaviour with simple safe hygienic measures where theoretically the community is capable of stopping the diarrheal infectious agents of transmission, Mokomane (2017) observes that diarrhea alone is responsible for the death of over 3 million children aged under five years annually in Africa.

Due to ineffective response to disease outbreaks, the Kenya Demographic Health Survey related that 30.7 % children aged less than five years are stunted. Out of these children, only 2.6% are in exclusive breastfeeding at six months while 56.8 % are still breastfeeding by the end of the 23rd month (GoK, 2010). However, 61.5% of under-five had child health cards, only 59.2 % of the children who were in their second year were fully immunized, 4.3 % of the under five and 4.5% of pregnant mothers were sleeping under insecticide treated nets. Only 40.8 % of deliveries were conducted by a health professional while 30.4 % occurred in health facilities hence need for change in health seeking behaviour (WHO, 2012). Several countries in Africa are not on track to meeting the four healthcare related SDGs by their targeted dates (WHO, 2015). To this end the Government of Kenya (GoK) needs to do more to improve the enabling environment to facilitate increased investment in the health sector to meet these SDGs' targets. The presence of sanitation facilities is something often taken for granted in most parts of the developing countries, yet about 2.5 billion people still do not have access to improved sanitation (WHO/UNICEF,2012). The consequences of this situation are manifested in disease, lack of education, poor economy and lack of dignity (WHO, 2012). Sanitation has a direct effect on the health and wellbeing of individuals. As a key component to prevention of diarrheal diseases, improved sanitation, properly maintained operated pit latrines can reduce illness and deaths caused by diarrhea and sanitation related diseases in the country (Irena *et al*., 2011).

2.3 Influence of Community Hygiene Practices on Safe Water and Sanitation

Globally, improved water sources use is up to 87% worldwide, but still 884 million people lack access to safe drinking water (WHO, 2011). About 340 million of these people, which is a bit more than one third of them live in SSA, Kenya included (WHO/UNICEF, 2010). Drinking water coverage and sanitation is lowest in the SSA's population. Improved water supply, proper sanitation and adequate hygiene practices are important for sustaining high water quality and reducing water borne diseases among children aged less than five years (WHO/UNICEF, 2010). One of the most important public health issues is drinking - water- safety. It is mostly affected by emergencies and natural disasters that mothers of children under five years need to know so as to take precautionary community health measures against the likelihood of the outbreak of communicable diseases. Some of these diseases include food borne, waterborne, malnutrition-related diseases (WHO, 2008).

The greatest waterborne health risk in most emergencies is the transmission of faecal pathogens, due to inadequate sanitation, hygiene and protection of water sources. Different types of disasters affect water quality in different ways. When people are displaced by conflict and natural disaster, they may move to an area where unprotected water sources are contaminated. When the population density is high and sanitation is inadequate, unprotected water sources in and around the temporary settlements are highly likely to become contaminated (WHO, 2008). Malnutrition increases the risk of waterborne disease's outbreak. The quality of urban drinking-water supplies is particularly at risk following earthquakes, mudslides and other structurally damaging disasters. Sewers and water transmission pipes may be

broken, causing contamination of drinking-water in the distribution system. Floods may contaminate wells, boreholes and surface water sources with faecal matter washed from the ground surface or from overflowing latrines and sewers. During droughts, people may be forced to use unprotected water supplies when normal supplies dry up; as more people and animals use fewer water sources, the risk of contamination is increased (WHO, 2008). Others who are affected by these emergencies and natural disasters include people living in places with unfavorable geographical conditions especially in the most adversely affected geographical landscapes with unsafe human life conditions (Sachs & McArthur, 2005). Some of the unfavorable geographical conditions for human habitation include: landlocked and mountainous regions, which may attract high cost of transport, for example water landlocked areas like an islands and how people living in these islands maintain the community health among their ecological niche, or how people living on the slopes of a mountain maintain safe community health hygiene standards (Sachs & McArthur, 2005).

Adverse disease ecological natural conditions that mothers of children under five years need to know include: high disease burden of tropical diseases such as malaria, and areas with adverse conditions for sustainable agriculture related disease outbreaks: for example dependency on rain fed agriculture in tropical humid and sub humid or tropical arid and semi-arid lands (ASAL) and arid regions are associated with diseases' outbreak like bilharzias, cholera, and diarrheal-related diseases among the entire population and more severe among the children aged less than five years (Sachs & McArthur, 2005).The continual donation of drugs and treatment could control many waterborne diseases effectively by 2015, which is an intervention for

attaining SDG 6 (UN, 2016). However, disease transmission will still continue unless we tackle the root causes of these diseases, which are poor access to safe water and basic sanitation. Supplying basic sanitation is neither difficult nor costly, especially in rural areas, but the key requirement is sustainability of these basic sanitation facilities. After the donors provide these water and sanitation facilities the community need to have been capacitated to monitor and manage the community safe water and sanitation services at local level to ensure sustainability. In this way the same community safe water and sanitation services should still work in over 10-20 years and beyond. Therefore, the local community ownership of water and sanitation initiatives by the community health strategy should include the local community needs through the local community participation, which should be encouraged by Donors and the Government (WHO/UNICEF, 2006).

If the local community people can afford to pay, even a small amount towards the provision of safe drinking water and hygienic sanitation facilities, they are supposed to be encouraged by the Donors and the Government to do so. The local community is likely to look after these facilities in the long-term after the Donors and the Government leaves these facilities under the community management. Similarly, it is important for the community people in charge to get incentives to enable such safe water and sanitation systems to properly run, be repaired and well maintained. (WHO/UNICEF, 2006). Interventions in water and public sanitation services management should be focused on local community's capacity to manage boreholes and wells rather than the community's passive attitude on allowing the government, donors and NGO's to step in and do the job, for them since empowering local authorities sustainability is ensured (Skinner, 2009).

In developing regions, 88% of the rural population lack improved water sources. In Africa, women and girls are burdened with water collection. Walking distances increase especially if there are break downs, unsafe and nonexistent water supplies. Alternative water from rivers and marshes is usually contaminated. Little water compromises family hygiene, leads to wastage of productive time and energy, school dropouts and absenteeism. Therefore, the provision of safe water constitutes the basis of human development (Adekunle *et al*., 2007). Access to quality healthcare among mothers of children aged less than 5 years is therefore critical in most of the developing countries. The mothers also need to be trained so as to be able to identify the possible risks to the health of these children that emanate from poor hygienic household living standards (Adekunle *et al.*, 2007).

Chronic political conflicts, natural disasters, disparities in urban-rural settings and rapid population growth rates are only some of the obstacles to accelerating the rate of progress for African populations (WHO/UNICEF, 2006; WHO, 2008). In rural Africa, 2 out of 3 people do not have access to improved water supply (WHO, 2008). Adverse disease ecological natural conditions that mothers of children under five years need to know include: high prevalence of tropical diseases such as malaria, and areas with adverse conditions for sustainable agriculture related disease outbreaks: for example dependency on rain fed agriculture in tropical humid and sub humid or tropical arid and semi-arid lands (ASAL) and arid regions are associated with diseases' outbreak like bilharzias, cholera, and diarrheal-related diseases among the entire population and more severe among the children aged less than five years (Sachs & McArthur, 2005). Santosham (2010) notes that community strategies in

the United States of America (USA) focuses on promoting and understanding how diseases are transmitted. Promoting essential hygiene practices such as washing hands, using latrines and preventing the contamination of safe water during access, transport, storage and use are key to achieving this goal. The health strategy involves hand washing at critical times, open defecation free communities and keeping water safe (Cabral, 2010). High levels of poverty underlie the health problems in rural and urban poor communities (Santosham, 2010). In Australia for instance, native children living in rural areas experience relatively high rates of poor growth, common childhood infections and diseases like acute rheumatic fever, rheumatic heart disease and trachoma compared to their non-rural poor peers living in North America and New Zealand (Santosham, 2010).

The aim of the community hygiene strategies is to support household-based care givers through a range of community owned resource persons (CORPs) who are experienced in many aspects of community health care services to bring such services closer to the people in their local community, village and family household levels (GoK, 2012). Mutungi (2012) observed that community hygiene strategies and other community based health care providers are resilient and resourceful. Maintaining stability requires dedication in managing costs and improving efficiency in the face of challenging economic environment. Therefore, adoption of community hygiene strategies and practices is paramount in ensuring safe hygiene practices.

2.4 Summary of Reviewed Literature and Gaps Identified

A bulk of the sub-Saharan Africa population lack proper sanitation facilities and hygiene strategies. Effective third world governments' implementation of Community Health Strategy by working simultaneously and in parallel to end the poverty traps among their rural and urban income-poor communities (UN, 2009) is to make the necessary investments in health, education, and basic infrastructure (Bartram & Cairncross, 2010). The key to unlock these countries from this dilemma of unsafe drinking water and poor unhygienic sanitation facilities is in the implementation of Community Health Strategy (UN, 2009). A multidimensional and integrated health promotion program involving stakeholders from various sectors of society is essential in the promotion of essential hygiene and sanitation strategies and practices. This would include religious, non-religious, governmental and non-governmental agencies.

The presence of sanitation facilities is something often taken for granted in most parts of the developing countries, yet about 2.5 billion people still do not have access to improved sanitation (WHO/UNICEF,2012). The consequences of this situation are manifested in disease, lack of education, poor economy and lack of dignity (WHO, 2012). Sanitation has a direct effect on the health and wellbeing of individuals. As a key component to prevention of diarrheal diseases, improved sanitation, properly maintained operated pit latrines can reduce illness and deaths caused by diarrhea and sanitation related diseases in the country (Irena *et al*., 2011). The community should be involved in the processes of assessing their health situations dialogue with them on causes, and current actions in order to identify gaps

that may require additional knowledge and skills and thus influence improvement of health practices and therefore health status (Kumar, 2002).

The community should be trained in the concepts of community health care, development and principles of community health and its implications to the general socioeconomic growth and development of the community. They should also know how the two aspects are related to adoption of hygiene strategies and practices of the mothers and their children aged less than 5 years. The underlying philosophy of Community Hygiene Strategies and practices should be that the approaches used in the facilitation of the community health services provided must be participatory (UN, 2009). Successful initiative involves the actual participation in sanitation and hygiene practices at household level. Community participation is aimed at increasing the sense of ownership over the water supply and sanitation hygiene within community members. A history of top-down service delivery by governments and NGOs frequently leaves a legacy of dependency in the community on external assistance. Consequently, in the event of a failure in the water supply the villagers do not make any attempt to the repairs as it is not perceived to be their responsibility (Kumar, 2002).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

The research adopted a descriptive survey design. A descriptive design involves the collection of data through multiple sources such as verbal reports, personal interviews and observation (Kothari, 2004). Descriptive study is concerned with answering questions such as who, what, where, when and how (Cooper & Schindler, 2011).

3.2 Measurement of Variables

The variables are operationalized in Table 3.1. Data was obtained through interviews, questionnaires and observation checklists as per the research objectives. It was analyzed using various statistical methods.

Table 3.1: Operationalization of variables

Variable (s)	Objective	Data	Measurement scale	Statistics and analysis
1) Community hygiene facilities	Community hygiene facilities for safe water and sanitation	Sources of water for domestic use - Piped water -Rain water -River/stream water -Open well -Pond Presence of sanitation facilities -Compost heaps -Latrines -Hand washing facilities at toilets/latrines	Nominal & Ordinal scales	Sums, Means, percentage
2) Prevalence of common sanitary diseases	Prevalence of common sanitary diseases	Prevalence of sanitary diseases -Amoebiasis -Dysentery -Diarrhea -Worm infestation Accessibility of health care services and water -Distance to health facilities and water sources	Nominal scale	Means, logistic regression , sums
3) Community hygiene practices for safe water and sanitation	Influence of community hygiene practices on safe water and sanitation	Household water treatment and handling practices Hand washing and toilet hygiene Compost heap management Participation in health programmes	Nominal & Ordinal scales	Sums, means, logistic regression , standard deviation

3.3 Location of the Study

This study was conducted in Migwani Division, Kitui County. The county is arid and semi-arid, thus it receives erratic and unreliable rainfall for subsistence and commercial farming. The Division is dry and hot with temperatures ranging between 14°C during the coldest months (July-August) and 34°C during the hottest months (January-March). The study was carried out in September before the rainy season as water borne disease prevalence increases during wet seasons. Access to improved water and sanitation is one of the obstacles to good health especially for children aged below five years (Mutungi, 2012). There are three administrative locations namely Central Location, with a population of 28,169 and an area of 685.10 km2, Nguutani Location, with a population of 27,265 and an area of 209.70 km2 and Kyome/Thaana Location with a population of 22,442, and an area of 308 km2 (GoK, 2012).

3.4 Population of the Study

Population of the study comprised of all the mothers who had children aged below five years from Migwani Division. There was a total of 1,458 mothers with children aged below five years in the Division based on the statistics provided from the Sub-County Records office during the study period (HMIS, 2015). The targeted population also included 135 community health workers and 3 public health officers.

3.5 Sampling Techniques

The research study employed probability sampling methods to select respondents for the study. In probability sampling, large units have higher chances of selection compared to smaller units. The three locations in the Division were used as cluster

sampling points. According to Kothari (2004), clustering can be defined by a location, social entity or institutions where the population frame units are not available or costly to obtain. After selecting the cluster points, random sampling was used in each of the locations to identify 94 mothers of children under 5 years old. Census sampling was used to pick the three public health officers from the three locations to get a sample of 3 public health officers. Simple random sampling method was used to select a sample of 57 community health workers. The total sample size was 154 study participants. Mugenda and Mugenda (2010) noted that a sample size above 10% from a large target population is representative of the population, thus a sample size of 10.6% was assumed to be adequate and representative for this study.

3.6 Sample Size

The main respondents for the study were mothers whose children were aged below five years. Public health officers and community health workers were also included in the study. A total of 94 mothers, 57 community health workers and 3 public health officers were sampled for this study as shown in Table 3.2. The sample of mothers was obtained using the following formula by Tracy. M. (2009).

$$n = \frac{N}{1 + Ne^2}$$

Where; n=Sample size

N=Total population

e=Level of precision

$$n = \frac{1458}{1+1458(0.1)2}$$

$$= 94$$

The same formula was used to determine the number of community health workers who took part in the study. The sample of community health workers was obtained as shown:

$$n = \frac{135}{1+135(0.1)2}$$

$$= 57$$

Table 3.2: Sampling frame

Category	Population (N)	Sample (n)	Percent (%)
Mothers	1458	94	61
CHWs	135	57	37
PHOs	3	3	2
Total	1596	154	100

The total number of respondents sampled for the study was 154 representing 94 mothers, 57 health workers and 3 public health workers. The respective percentage proportions were 61% for mothers, 37% for community health workers and 2% public health officers. The response for mothers was 89, representing a response rate of 94.7%, 45 for CHWs representing 78.94% and 100% for PHOs. These rates were considered good for analysis and reporting.

3.7 Data Collection Instruments

The researcher used three instruments to obtain data from the respondents, an interview schedule for mothers of under five years old children, questionnaires for

the public health officers and community health workers and an observation checklist.

3.7.1 Interview Schedule

An interview is an oral administration of one face-to-face encounter. It allows the interviewer to follow up the respondents' answers to obtain more information and clarify vague statements (Orodho, 2009). The researcher used this method to seek clarification on the adoption of community hygiene strategies and practices among mothers of under five year olds.

3.7.2 Questionnaire

Questionnaires have the ability to collect a large amount of information in a reasonable quick span of time. Kothari (2004) observes that questionnaire is free from bias of the respondents who are not easily approachable and can be reached conveniently. This method of data collection has the following advantages: use of closed -ended questions and open – ended questions which permit greater depth of response and are easier to formulate mainly because the researcher doesn't have to labour to come up with appropriate response categories (Kothari,2004). Two sets of questionnaires were developed using literature review materials and scoring was done using weighting and likert scale. They were administered to community health workers and public health officers. The questionnaires had both open ended and closed questions, the open-ended questions allowed these respondents to express their views freely. The public health officers and the community health workers were given the questionnaires of which they returned them after one week.

3.7.3 Observation checklist

An observation checklist was used to record what the researcher observed during data collection. Observation enables the observer to not only observe the behaviour but also to evaluate it (Mugenda,2010).

3.8 Pre-Testing of Research Instruments

Pre-testing of the instruments was done in Mwingi Central Division, Kitui County because it has similar characteristics with Migwani. It involved two locations which were randomly selected. This small representative sample of 10% of the total sample to be studied was identical to the population under study, but was not involved in the actual study. It comprised of 1public health officer, 5 community health workers and10 mothers of under five year olds. Pre-testing enabled the researcher to check whether research instruments used were valid and reliable and corrected misunderstandings, checked language level and any ambiguity. This also elicited comments from respondents which helped in the improvement of the instruments by modifying and making clear instructions given in order to avoid misinterpretation during the actual data collection.

3.8.1 Validity

Kothari (2004) states that validity indicates the degree to which an instrument measures what it is supposed to measure and the extent to which the instrument reflects true differences among those who are being tested. This tests the degree to which data obtained from an instrument is meaningful and accurately reflects or represents a theoretical concept. Orodho (2009) contends that validity concerns the

accuracy with which the item generated measures what is supposed to measure. Churchill (2004) adds that valid instruments are reliable. Predetermined criteria of evaluation was used to ensure validity of the study by pre- testing the instruments on a small representative sample which was not included in the group that was involved on the actual study. After the instruments were found to cover the required content then were assumed to be good enough for data collection.

3.8.2 Reliability

Reliability is the consistency in producing reliable results (Mugenda and Mugenda, 2008). The test-retest technique of establishing reliability was used where by the instruments were administered twice to the same group of subjects. Pre-testing was done to ensure that the items consistently measured the required content. The instruments yielded the same results on the repeated trials therefore considered good to be used in the actual data collection.

3.9 Data Analysis

Quantitative data was coded to develop code sheet quantitative data. Qualitative data was thematically categorized and analyzed descriptively. The findings were processed using Statistical Package for Social Science (SPSS) version 20. The statistical analysis involved determination percentages, means, correlation analysis, odds ratios, logistic regression and chi square. The results were presented using tables, charts and graphs.

3.10 Logistical and Ethical Considerations

A permit was obtained from National Commission for Science and Technology, Kitui County Education office and clearance letter from Kenyatta University Ethical Board before carrying out the research in the targeted area. The researcher gave brief introductory remarks concerning the nature of the study in each research instrument to indicate that this study was mainly for academic purposes only. Confidentiality, informed consent to participate and privacy was ensured to all the respondents.

CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the socio demographic details of respondents and the findings of the research study based on the study objectives.

4.2 Socio Demographic Characteristics of Respondents

The social demographic details of respondents were considered important for the study. The respondents were therefore required to indicate their details in the tools used for data collection.

4.2.1 Gender of Community Health Workers

Gender of community health workers involved in implementing community hygiene programmes in the Division is as presented in Table 4.1. The findings from the study revealed that there were 29 male and 16 female community health workers. Therefore, it was evident that there were more male community health workers than females, an indication that males are more active in community health issues than women.

Table 4.1: Gender of community health workers

Gender	Frequency	Percent (%)
Male	29	64.4
Female	16	35.6
Total	45	100

4.2.2 Age of Community Health Workers

Age is an indication of general maturity, exposure and experience in handling issues that relate to community sanitation and hygiene. The age of community health workers was distributed between 25 and 50 years as shown in Table 4.2. There were 17.8 % of the CHWs who were aged between 25 and 30 years. Those CHWs aged between 31 and 35 were 26.7%. The majority of the CHWs were aged between 36 and 40 years. The youngest CHW was aged 25 years, while the oldest was aged 50 years. The findings indicated that the level of maturity was high enough to understand issues that affected health hygiene strategies and practices.

Table 4.2: Age of community health workers

Age	Frequency	Percent (%)
25-30	8	17.8
31-35	12	26.7
36-40	15	33.3
41-45	6	13.3
46-50	4	8.9
Total	45	100

4.2.3 Age of Mothers

The age of mothers will determine the level of care given to the under fives. The findings were tabulated in Table 4.3. Majority of the mothers were aged between 31-50 years. Mothers aged below 25 years were 2.2%, an indication that there are few young mothers in the Division. Maturity is a sign of experience and exposure in handling child care issues.

Table 4.3: Age of mothers of under fives

Age	Frequency	Percent (%)
25 years and below	2	2.2
26-30	8	9
31-35	12	13.5
36-40	20	22.5
41-45	28	31.5
46-50	14	15.7
51-55	5	5.6
Total	89	100

4.2.4 Education Qualification of Mothers

Education qualification of mothers of children under five was considered for the study. Educated mothers would better understand the causes of child morbidity and mortality hence being able to reduce the risk factors associated with sanitary diseases. The findings were as shown in Table 4.4. The study revealed that 37.1% of the mothers had education up to primary level and 11.2% had not gone to school. This implies that there are low literacy levels among mothers hence need for education on hygiene and sanitation.

Table 4.4: Education qualification of mothers of under fives

Education qualification	Frequency	Percent (%)
Primary	33	37.1
Secondary	25	28.1
College	16	18
University	5	5.6
Not gone to school	10	11.2
Total	89	100

4.2.5 Qualifications of Community Health Workers

This was important for the study because the level of education influences efficiency on work performance for the CHWs. Community health workers need to be fully informed on the issues of sanitation and hygiene and able to read and write in order to adequately address concerns on the same. The findings were presented in Table 4.5. The study revealed that 37.8% of the community health workers were certificate holders in health related field. They had short course certificates in nursing, public health, nutrition, community development and health. CHWs who had secondary education were 28.9% while 22.2% had KCSE certificates. Only 11.1% of the CHWs had not completed Primary education but could read and write. These qualifications were considered quite sufficient for the CHWs to execute their duties effectively. It was also noted that all the CHWs who had certificates were in health related fields which was relevant to sanitation and hygiene.

Table 4.5: Qualifications of community health workers

Qualification	Frequency	Percent (%)
Certificate in health related field	17	37.8
Secondary education	13	28.9
Primary education up to class eight	10	22.2
Primary education below class eight	5	11.1
Total	45	100

4.2.6 Professional Qualifications of Public Health Officers

Professional qualifications of public health officers were considered important in the study. This was because of the supervisory duties they under take over community health workers and the community health projects. Their qualifications were therefore considered critical in the success of health, sanitation and hygiene programmes and activities in the Division. This was tabulated in Table 4.6. The findings revealed that there were two diploma holders and one graduate public health officer in the Division. The qualifications were considered adequate to address issues of sanitation and hygiene in the Division. The study revealed that the least qualification possessed by the PHOs was diploma 66.7%, while bachelors were 33.3%. Therefore, the officers had the requisite qualifications needed to effectively and efficiently manage hygiene and sanitation programmes.

Table 4.6: Professional qualifications of public health officers

Qualification	Frequency	Percent (%)
Degree	1	33.33
Diploma	2	66.67
Post graduate	0	100

4.2.7 Length of Stay at Current Station for Community Health Workers

This was to establish how conversant the CHWs were with the locality and the issues of concern to the study. The findings were presented as shown in Table 4.7. According to the results, 44.5% of the CHWs had served in their current working area for 4-5 years, 24.4% for 2-3 years, 20 % for over 6 years and 11.1% for less than a year. The duration of working at the current station was considered to be long enough to enable them have sufficient information on water, sanitation and hygiene issues in the region therefore, giving reliable information.

Table 4.7: Length of stay at current station for CHWs

Work experience (years)	Frequency	Percent (%)
0-1	05	11.1
2-3	11	24.4
4-5	20	44.5
Over 6	09	20
Total	45	100

4.3 Community Health Workers' Views on Community Hygiene Strategies and Practices

General views of CHWs on community hygiene strategies and practices were summarized as shown in Table 4.8. The study revealed that there was need to increase sanitation facilities in the Division since the proportion of mothers using unsafe water was more than half and the proportion with hand washing facilities was a quarter. Latrine coverage and hand washing at critical times was in more than three quarters of the mothers interviewed.

Table 4.8: CHW's views on community hygiene strategies and practices among mothers of under fives

Parameter	**Population estimate**
Proportion with safe drinking water	Less than half population
Toilet coverage	More than three quarters of the mothers
Proportion with waste disposal facilities at home	More than three quarters
Proportion using unsafe water	More than half of the mothers
Proportion with hand washing facilities outside toilets	One quarter of the mothers
Proportion washing hands at critical times	More than three quarters of the mothers

4.4 Community Hygiene Facilities

The determination of community hygiene facilities in households of mothers who had children aged below five years was one of the objectives of the research study. There were two main categories of parameters that were considered important for the study and these were the source and kind of water that was used for domestic purposes and the presence of sanitation facilities. The sources of water that were of interest to the researcher were piped water, rain water, bore hole, river/stream water. Sanitation facilities that the researcher was interested in were the kind of latrines that were in use, hand washing facilities and the nature of compost heaps that were being used for waste disposal.

4.4.1 Sources of Water for Mothers of Under Fives

Source of water for domestic use was considered as an important component of hygiene. Use of water from contaminated sources is a leading cause of water borne diseases that contribute to increased infant mortality rates. Lack of safe drinking water is a common problem among rural households and is a contributory factor to ill health witnessed among children aged below five years. At this age water usage tends to be comparatively higher because of the need to wash and cook for the children. The participants were therefore requested to indicate whether water used in the household was from tap, rain, stream, open well, pond any other source. The findings were tabulated and presented as shown in Table 4.9. The findings from the study revealed that mothers used different sources of water depending on availability and accessibility, majority of the households (79.8%) used harvested rain water. There were 50.6% households that used piped water while 40.4% of the households used stream water since they were either not accessible to piped water or open wells. There were 25.8% mothers who used water from ponds or other sources. The high reliance on rain water was due to the unreliability of other sources and the distances involved in collecting water from wells. The high number of mothers who used water from ponds and open wells posed an increased risk to water borne diseases for children under five years.

Table 4.9: Source of water for domestic use among mothers of under fives

Source of water	Frequency	Percent (%)
Piped water	45	50.6
Rain water	71	79.8
Stream water	36	40.4
Pond water	23	25.8
Open well water	25	28.1
Other sources	23	25.8

4.4.2 Presence of Sanitation Facilities

The availability of sanitation facilities is a critical factor in controlling the spread of diseases which affect children aged below five years. The study sought to know if there existed sanitation facilities in the homesteads which were sampled. The facilities considered for the study were; toilets, compost bins/heaps and the availability of hand washing facilities at toilets. The collected data relating to toilets was analyzed and presented in Table 4.10.

The findings from the study revealed that 10.1% of the households surveyed did not have toilets, 21.3% used flush/septic tank toilets while the remainder used pit latrines in their homesteads. Failure to use toilets is a serious health risk to a home and neighboring homesteads since some disease outbreaks are prone to areas without toilet facilities. The availability of flush toilets can equally be a health risk to children under five years if not kept clean.

Table 4.10: Presence of toilets at homesteads of mothers of under fives

Type of toilet	Frequency	Percent (%)
Flush /septic	19	21.3
Flush /latrine	14	15.7
Improved pit latrine	23	25.8
Pit latrine	24	27.1
No toilet	9	10.1
Total	89	100

4.4.3 Hand Washing Facilities outside Toilets

Hand washing facilities outside toilets ensure that hands are free of germs and contamination which would later be passed on to food and children. Observation was used to check presence of hand washing facilities outside toilets. The findings were presented as shown in Table 4.11. The findings from the study revealed that more than half of the homesteads had hand washing facilities outside toilets. This implied that there was fairly good knowledge on the need to wash hands after visiting toilets. The 38.2 % of homesteads without hand washing facilities is an indication that there is need to carry out sensitization on the need to observe hygiene after visiting the toilet.

Table 4.11: Hand washing facilities outside toilets in homesteads of mothers of under fives

Presence of hand washing facilities outside toilet	Frequency	Percent (%)
Yes	55	61.8
No	34	38.2
Total	89	100

4.4.4 Compost Heaps

The use of compost heaps is an important factor in combating sicknesses among children under five years. The researcher was therefore interested to know if there were compost heaps for domestic waste disposal and whether they were covered or not. The data collected was presented as shown in Table 4.12. The findings from the study revealed that 40.4% of the households surveyed did not have compost bins/heaps for household waste, compared to 50.6% of that had improvised tins used as compost bins. Therefore, majority of the households understood the need for hygiene at their home steads. Besides 47.2 % of the households used covered compost heaps compared to 46.1% of the respondents who had open compost heaps.

Table 4.12: Compost bins/ heaps in homesteads of mothers of under fives

Compost heap management	Frequency	Percent (%)
Improvised tins	45	50.6
Compost is covered	42	47.2
Compost is open	41	46.1
No compost heap	36	40.4

4.4.5 Sharing of Toilets

The usage of the toilet facilities in comparison with type of housing was important for the study because the researcher was keen to know if there were homesteads that shared toilets in cases where they had not constructed their own. It was also to enable the researcher understand the level of hygiene from the use of toilets. Shared or communal toilet facilities are more prone to spread sickness especially when there are no proper arrangements for cleaning.

As shown in Table 4.13, sharing of toilets was highest among houses that were temporal (90.9%). Sharing of toilets amongst houses that were permanent was found to be 68.8% and in semi-permanent houses it was 61.5%. In overall there were 78.7 % of households that shared toilets. This implied that there was lack of knowledge in spread of disease and a high poverty rate as some of the homesteads were not able to construct toilets of their own.

Table 4.13: Sharing of toilets at households with children under five years

Toilet sharing	Permanent house		Temporal house		Semi-permanent house		Total	
	F	%	F	%	F	%	F	%
Shared	22	68.8%	40	90.9%	8	61.5%	70	78.7%
Not shared	10	31.2%	4	9.1%	5	38.5%	19	21.3%
Total	32	100.0%	44	100.0%	13	100.0%	89	100.0%

F= No. of families

4.5 Prevalence of Common Sanitary Diseases

The second objective of the study was to examine the prevalence of common sanitary diseases among children below five years. This was done by asking mothers to indicate if any of their children had contracted any sickness at least in the last one month and that could be associated with hygiene in order to determine sickness risk prevalence in the region, with the view of making corrective strategies. Respondents were further asked about prevalence of diarrhea among their children in the last two months. The diseases considered were: amoeba, dysentery, worm infestation and diarrhea, with findings summarized in Table 4.14.

The study revealed that worms and amoeba were common sicknesses among children less than five years as 65.2 % and 60.7% of parents reported their children having had cases of worms and amoeba respectively. Cases of diarrhea and dysentery were reported at 39.3 % and 11.2% respectively. All mothers reported that their children had an episode of diarrhea in the last two months. Therefore, the level of infections was relatively high, an indication that level of contamination and hygienic practices need to be addressed to improve the health conditions of children less than five years.

Table 4.14: Disease prevalence among children under five years in Migwani Division

Sickness type	Frequency	Percentage (%)
Amoeba	54	60.7
Dysentery	10	11.2
Diarrhea	35	39.3
Worm infestation	58	65.2
Diarrhea in last two months	89	100

4.5.1 Sanitary Diseases and Safe Water

The risk factors associated with use of different sources of water is the focus for this section. This is important for the study as it determines the most appropriate strategies necessary for minimizing the effect of water borne diseases in the region. The analyzed data was presented as shown in Table 4.15.

The findings revealed that amoeba was more prevalent among children whose mothers were using pond (82.6 %) water compared to those children whose mothers were using other water sources. Worm infestation was also noted to be higher

among children whose parents were using pond water compared to those mothers who were using other sources of water such as boreholes and rain water. There were 77.8% of the children who were reported to have suffered from amoeba with their parents using stream water which was lower than those children whose mothers were using rain water. Diarrhea and amoeba was also noted to be high at 63.9% among children whose mothers were using stream water.

Table 4.15: Disease prevalence of water borne diseases among under-fives in Migwani Division

Water source /disease	Amoeba	Dysentery	Diarrhoea	Worms
Stream water (%) of users	77.8	13.9	63.9	63.9
Pond water (%) of users	82.6	21.7	56.5	78.3
Rain water (%) of users	57.7	14.1	18.3	69.0

4.5.2 PHOs Views on Prevalence of Water Borne Diseases among Children less than Five Years

PHOs gave the prevalence of waterborne diseases among children under than five years in the division as shown in Table 4.16. They indicated that diarrhea was a common water related disease which affected more than half of the children. Worm infestation was also noted to be a serious cause of sickness since it affected more than three quarters of children under five. Amoeba was also reported to be high at above 50 %. This implied that either parents lacked clean and safe water or failed to observe basic hygiene and sanitation in their homes. Dysentery and cholera were considered less frequent among children under five years. The prevalence was reported to be at less than 20 % and 10 % respectively.

Table 4.16: Prevalence of water borne diseases

Water borne disease	**Prevalence among children under five (%)**
Diarrhea	More than 50%
Worms	More than 75 %
Amoeba	More than 50 %
Dysentery	Less than 20%
Cholera	Less than 10%

4.5.3 Accessibility to Health Care Services and Water

The perceived risks of disease contraction have an influence on avoidance and preventive strategies. When the risks of morbidity and mortality arising from contracting sickness are perceived to be high, mothers will be more careful. If the distance to health facilities is long, mothers will take precautions to ensure that their children do not contract sickness by taking appropriate sanitation related strategies. Likewise, the distance to water sources can lead to compromised hygiene practices. The study therefore, sought to find out from the mothers who were interviewed the accessibility to medical facilities and water sources. The findings in Table 4.17 indicate that majority of the respondents (40%) lived within a distance of 6 to 10 kilometers from the nearest health facility. There were 32.6 % of mothers who live within a distance of between 11 and 20 kilometers. Those mothers who were more than 21 kilometers from health facilities were 5.6 %. Living a distance of more than five kilometers from health facilities was a challenge that hindered access to medical services since the region is not well served with good communication therefore mothers have to walk with children on their back. There were 38.2 % of the

mothers that were more than 11 kilometers from health facilities hence a problem in ease of access to treatment.

In Table 4.18 it is an indication that majority of the mothers 60.7% sometimes had to get water from distances that were more than ten kilometers. There were 4.5 % of mothers who were able to access water from distances less than five kilometers. These included those who had access to wells and boreholes in their homes. There were 15.7 % homes that were more than 16 kilometers from water sources. Those homes that were 6-10 km from water source were 19.1%. The findings indicate that access to water was a major handicap towards the implementation of a sound water and sanitation strategy to control sickness and disease.

Table 4.17: Distance to health facilities from homes of mothers with children under five years

Distance from health facility (km)	Frequency	Percentage (%)
0-5	19	21.3
6-10	36	40.4
11-20	29	32.6
Above 21	5	5.6

Table 4.18: Distance to water sources from homes of mothers with children under five years

Distance (km)	Frequency	Percentage (%)
0-5	4	4.5
6-10	17	19.1
11-15	54	60.7
More than 16	14	15.7
Total	89	100.0

4.5.4 Views of CHWs on Accessibility to Health Services

Availability, affordability and quality of health care services are critical in reduction of child morbidity. The views of CHWs are as shown in Figure 4.1. CHWs views on how affordable treatment among majority of mothers was considered important for the study. Prohibitive medical treatment costs increase the risk of morbidity among children. Primary health care strategies according to WHO 2012 emphasize on affordability as an essential strategy in reducing morbidity of children under 5 years. The CHWs were asked if the cost of treatment was prohibitive to mothers and they disagreed. Those who disagreed strongly were 40%, while 60 % disagreed. This would be explained by the fact that medical treatment at public health is highly subsidized by the government.

Distance to health facilities was also considered important in influencing risks of child morbidity and mortality. The findings revealed that the distance covered by majority of the mothers was long. Long distances discourage mothers from seeking treatment especially if they have to use money for transport. The view of CHWs was that distance was long enough to interfere with accessibility of health services as indicated by 66.7 % who strongly felt that distance was long.

The study also sought to find out if health facilities sometimes lacked essential drugs for the treatment of water borne diseases. The responses obtained indicated that there were stock outs most of the times. 77.8% of the CHWs said essential drugs were not always available while 22.2% of the CHWs indicated that shortage of drugs was a problem. In staff adequacy, majority of the community health workers 62.2% disagreed, implying that mothers had to wait for hours to be served. The number of respondents that disagreed strongly was 22.8 % which implies that the

opinion of the community health workers was that time spent waiting to be treated was sometimes longer than would be expected in a well-staffed health facility.

Proper diagnosis of sickness is essential for effective treatment. The researcher therefore sought to find out from the CHWs if the health facilities were adequately equipped to carry out the required laboratory diagnostic services on children before medication. Majority of CHWs (55.6%) were of the opinion that health facilities in the region did not have adequately equipped laboratories. Those who disagreed strongly were 44.4%, which was evident that there was need to improve on the quality of laboratory services by supplying the necessary equipment.

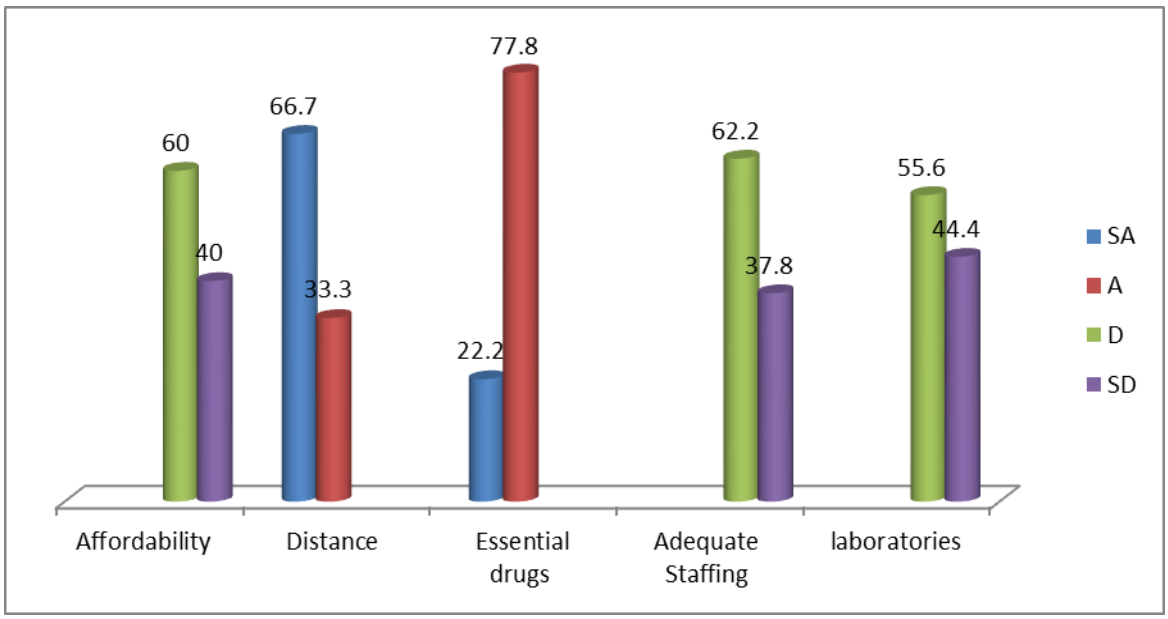

Figure 4.1: Accessibility of health services to mothers of under fives

4.5.5 Diarrhoea and Safe Water

One of the symptoms of water contamination is diarrhea of children under five years. A logistic regression analysis was done to establish the relationship of diarrhoea and safe water according to source since every mother reported of their

children having an episode of diarrhea within the last two months. A confidence interval of 95 % was used and the results are as shown in Table 4.19.

Table 4.19: Logistic regression relationship between diarrhea and safe water and sanitation among children under five years

Variables in the Equation		B	S.E.	Wald	D f	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1a	Piped water	1.554	.668	5.416	1	.020	4.728	1.278	17.497
	Stream water	2.758	.901	9.367	1	.002	15.775	2.696	92.286
	Rainwater	.920	.896	1.055	1	.304	2.509	.434	14.523
	Pond water	.425	.648	.430	1	.512	1.530	.429	5.450
	Open well	2.619	.854	9.419	1	.002	13.728	2.577	73.138
	Other water sources17	-1.420	.777	3.344	1	.067	.242	.053	1.107
	Constant	-10.001	2.780	12.943	1	.000	.000		

a. Variable(s) entered on step 1: piped water, stream water, rainwater, pond water, open well, other water sources 17.

The findings revealed that the relationship between diarrhea and the kind of water used in the house holds was statistically significant among mothers who reported using piped water, stream water, and open wells. The Wald scores obtained for these sources are 9.37 for stream water, 9.42 open wells and 5.42 for piped water. Therefore, mothers who used both open well water and stream water were more

likely to have children suffer from diarrhea compared to those who used piped water.

4.6 Community Hygiene Practices

Community hygiene practices are important factors that influence the morbidity and mortality of children under five years. The study therefore, sought to find out from mothers the practices they used to combat sanitation related sicknesses. The factors considered for the study were water treatment and handling practices, hand washing and toilet hygiene, compost heap management and participation in health programmes.

4.6.1 Water Treatment and Handling Practices

Water treatment and proper handling practices reduces chances of contamination. Mothers of under-fives were asked how they handled and treated water. The results were summarized in Table 4.20. The study revealed that 40.5% of the mothers were boiling drinking water, 22.4% treating with chemicals while 37.1% were using untreated water. This implied that mothers were knowledgeable on water treatment although there was need to sensitize those who never treated water on the importance in order to reduce sanitary diseases. Water handling practices were fair at 69.7% and 79.8%.

Table 4.20: Water treatment and handling practices among mothers of under fives

Practice	Frequency	Percent (%)
Boiling water	36	40.5
Chemical treatment	20	22.4
No treatment of water for drinking	33	37.1
Covering water for drinking	62	69.7
Clean water containers	71	79.8

4.6.2 Hand Washing and Toilet Hygiene

To manage water borne diseases, hand washing and toilet hygiene is important. The hygiene practices include hand washing at the four critical times using soap, drying of hands after washing and keeping the toilet clean. These are important strategies used to reduce chances of children less than five years contracting sickness associated with poor sanitation practices. The results were presented in Table 4.21. The findings revealed that majority of mothers (94.4%) washed their hands at the four critical times. The researcher was keen to know if washing was accompanied by use of soap and drying. Of those who washed their hands, 25% used water only, 55% used soap, while those who dried their hands after washing were 48%. Use of soap in hand washing and drying reduces chances of transmitting and spreading germs. The maintenance of proper toilet hygiene reduces the spread of sanitation related diseases to children. These diseases include diarrhea, cholera, gastroenteritis, worms, amoeba and dysentery. The study sought to know if there were attempts to manage hygiene of toilets through proper cleaning, covering and disinfection to keep off flies which are carriers of germs and disease causing bacteria. The findings

revealed that 64% of the homes under study had clean toilets while 60.7% were noted to be covering toilets to keep off flies. The general cleanliness was equally considered an important practice in sanitation and hygiene. It was observed that the general toilet compound hygiene was good in 75% of the homes under study. Therefore, in order to reduce sanitary diseases, there is need to strengthen hand washing and toilet hygiene in all homes.

Table 4.21: Hand washing and toilet hygiene among mothers of under fives

Practice	Frequency	Percent (%)
Washing hands at the four critical times	84	94.4
Use of soap when washing hands	55	61.8
Use of water only to wash hands	25	28.1
Drying of hands after washing	48	53.9
Well maintained toilet compound	75	84.3
Covering toilets	54	60.7
Clean toilets	57	64.0

4.6.3 Compost Heap Management

Domestic waste generated from kitchen, food remains and wastes can be a source of diseases for children under five years. The practices considered include use of compost heaps, covering of pits/bins and general disposal as shown in Table 4.22. The study revealed that there were deliberate efforts to manage domestic waste. The strategies included use of covered dustbins (41.6%), covered compost pits (27.0%) and use of improvised tins as compost heaps. There were 46.1% of the homes surveyed that had open composts. This implies that there was need to improve and

strengthen the strategies and practices employed in the management of domestic waste.

Table 4.22: Compost heap management

Practice	Frequency	Percent (%)
Covered dustbin	37	41.6
Covered compost pits	24	27.0
Improvised tins for compost	45	50.6
Open compost	41	46.1

4.6.4 Participation in Health Programmes

Participation in community health programmes was considered an important practice in managing and reducing sicknesses that affect children under five years. The study therefore sought to find out the level of participation of the mothers who had children less than five years in health programmes. The data was presented as shown in Table 4.23. The study revealed that less than half of the mother's usually participated health programmes. There were 49.4% of the mothers with children aged less than five years who participated in health programmes. These programmes included health education forums, immunization and open defecation free campaigns. This implied that the knowledge of mothers on adoption of safe sanitation and hygiene strategies and practices would improve if they actively took part in these programmes.

Table 4.23: Participation of mothers of under-fives in health programmes

Participation in health programmes	Frequency	Percent (%)
Yes	44	49.4
No	45	50.6
Total	89	100

4.6.5 Community hygiene practices to safe water and sanitation

Adoption of community hygiene practices determines the knowledge of the community members on safe water and sanitation. Therefore, the study sought to know if there existed any significant relationship between community hygiene practices and safe water and sanitation. A logistic regression analysis was done since the variables were dichotomous in nature. The variables included in the regression equation were boiling of water, treatment of water using chemicals, covering of drinking water, hand washing and covering of toilets. The findings revealed that adoption of community hygiene practices was significantly related safe water and sanitation knowledge. The coefficients in the regression equation which were statistically significant were covering drinking water and toilets with $p<0.05$. The coefficient for covering toilets was 2.805 implying that mothers who had knowledge on safe water and sanitation were less likely to leave toilets uncovered. Covering drinking water was also significantly related to safe water and sanitation knowledge, $p<0.01$. The data is as shown in Table 4.24.

Table 4.24: Adoption of community hygiene practices to safe water and sanitation among mothers of under-fives

Practice	B	S.E.	Wald	Sig.	Exp (B)
Boiling water(1)	.714	.859	.692	.405	2.043
Water treatment using chemicals(1)	1.188	.787	2.280	.131	3.281
Drinking water covered(1)	-2.708	.810	11.187	.001	.067
Hand washing with water only(1)	-24.512	13298.158	.000	.999	.000
Covering toilet(1)	2.805	.873	10.317	.001	16.531
Hand washing with Soap(1)	22.423	13298.158	.000	.999	5473020863.895
Constant	-25.201	13298.159	.000	.998	.000

Variable(s) entered on step 1: Boiling water, water treatment using chemicals, drinking water covered, hand washing with water only, covering toilets and hand washing with soap

Key: boiling -1, not boiling- 0, chemical treatment -1, not treating- 0, covering toilet-1, not covering toilet -0, hand washing with soap-1, hand washing without soap -0

4.6.6 Stake holder Participation in Health and Hygiene

The role of stake holders in sanitation and hygiene is critical in the success of community hygiene programmes. The major stakeholders considered in the study were the National Government, CHWs, County Government (MoH&S), NGOs,

Religious organizations and Public health officers. The role played by National and County Governments include the construction of health facilities and drainage systems, recruitment of health staff, water supply and policy development. NGOs and churches provide supportive roles which include education, training, sensitization on health and hygiene strategies and practices that help in the management of water borne diseases.

A likert scale was used to measure the perceived level of participation and involvement. The highest perceived level of involvement was 1 while the least perceived level of involvement was 5. The findings were presented in Table 4.25.

The perceived level of involvement among the community health workers was noted to be very high (m=1.39, std =0.49), followed by NGOs (m=1.49, std=0.59). The perceived involvement by the County Government (MoH) was observed to be high (m=1.7, std =0.46). The mean score obtained for perceived involvement with public health officers was also high (m=1.81, std = 0.78). The stakeholders rated least in the ranking were the National Government (m=2.67, std=0.94) and the religious organizations (m=2.7, std=1.01). The perceived involvement in hygiene and sanitation is an indication of their active participation and involvement with the local community.

The low rating obtained for the National Government would be related to the fact that health is a devolved function of the County Government. The low standard deviation obtained on the mean score was an indication that the two entities were together actively involved in the provision, support, and strengthening hygiene and sanitation practices.

Table 4.25: Participation of stakeholders in hygiene and sanitation

Stakeholder	N	Maximum	Minimum	Sum	Mean	Std Deviation
National Government	89	1	4	237	2.66	0.904
Community Health workers	89	1	2	124	1.39	0.491
County Government (MoH&S)	89	1	2	151	1.70	0.462
NGOs	89	1	3	133	1.49	0.59
Religious Organizations	89	1	4	240	2.70	1.02
Public health officers	89	1	4	161	1.81	0.782

CHAPTER FIVE: DISCUSSION OF FINDINGS

The purpose of this study was to analyze the adoption of community hygiene strategies to safe water and sanitation among mothers under five years in Migwani Division, Kitui County, Kenya. The findings revealed majority of the mothers had a problem in accessing clean water forcing them to use water from open wells, streams or ponds. There were 28.1% of mothers that used water from open wells, 40.4% relied on water from streams, and 25.8 % relied on water from other sources which included buying from water vendors. These findings agree with a World Bank survey report (World Bank, 2010) which indicated that about 43% of Kenyan people do not have access to clean water. According to the report less than half of the rural population has access to clean water implying that either pond water or stream running water relied on is used for cooking and drinking.

The study further reveled that there was lack of adequate sanitation facilities in the Division. There were 90.9% of the mothers with temporal houses where it was observed that toilets were shared while sharing among mothers with semi-permanent houses was 61.5% and 68% for semi-permanent houses. Lack of proper sanitation increases the risk of contaminating water sources such as streams. Some of the diseases arising from the use of contaminated water include amoeba, dysentery, diarrhea and worm infestations which are leading killer diseases for children under 5 years. According to the WHO and CDC report 2011, infections among children 80 % of the diseases are WASH related. The study revealed that there was need to sensitize mothers on hand washing strategies to minimize disease

contraction among children. This is due to the fact that despite about 90% of them washing hands before feeding children and after toilet visits, only 61.8% used soap while those who dried their hands were 53.9%. Appropriate WASH strategies include having hand washing facilities outside toilets or latrines. Among the mothers who took part in the study,38.2% didn't have hand washing facilities outside toilets. Diarrhea which is the second leading cause of child morbidity in world is highly correlated with hand washing strategies (Bhutta *et.al*, 2013).

Boiling of water before drinking reduces the odds of water borne disease contraction. The study revealed that 62.9 % of the mothers treated water for drinking. According to Wright (2004) even drinking water which is considered safe at the source is subject to frequent and extensive faecal contamination during collection, storage and use in the home. Other strategies observed included the general compound hygiene and the use of improved toilets. Compound hygiene contributes to risk of diarrhea infection. Improvement in sanitation is key to reduction in disease causing pathogens affecting children's health. Observing general compound hygiene where children usually play can reduce chances that infections occur. Close to half of the mothers surveyed did not have compost heaps in their compounds while 46.1% of the surveyed households had open compost disposal pits. Open compost heaps encourage flies which are disease vector carriers.

Consequently, improved sanitation and promotion of hygienic behaviour reduces health risks, and eventually contribute to the socio-economic development of a country (Lanata and Black, 2008). An improved drinking water source by the nature of its construction adequately protects the water source from contamination with

disease causing pathogenic micro-organisms and also from the water contamination in particular with open defecation-human and other animals' faecal matter (WHO/UNICEF, 2010). Adoption of hygiene practices was found to relate to safe water and sanitation knowledge. It was evident from the findings that those mothers who had knowledge on hygiene were likely to practice it. The logistic regression analysis revealed that adoption of community hygiene practices was significantly related to safe water and sanitation knowledge. Boiling of drinking water, covering of toilets, washing hands with soap were positively related to the knowledge mothers had about safe water, sanitation and hygiene. According to Kariuki 2013, hand washing after visiting toilets and change of nappies for children was not always done by mothers in Nairobi Kibera slums because of water shortage. The findings also agree with the literature review where Santosham (2010) observes that when mothers have knowledge on the need to wash hands at critical times, they are likely to practice it as a way of reducing infections.

Accessibility to medical services and facilities is critical in reduction of child morbidity especially among children under five years. One of the key finding of the study from CHWs was that majority of mothers had to walk long distances to access treatment from health facilities. According to Bour (2002), distance is a main determinant in the utilization of health services. Therefore, mothers are not able to comfortably afford the cost of travelling to be attended by health personnel. The level of utilization which is the frequency of visits to a health facility relative to distance reveals that people who are far from a health facility are less likely to visit it for treatment compared to those who are near. The decrease in health utilization with increasing distance is well documented and often referred to distance decay

effect (Gething *et al*., 2004). Although medical services are free, their utilization is affected by the distance. The effect of this will be that mothers will visit health facilities when sicknesses of their children have advanced beyond recovery. According to health belief model a person's health-related behaviour depends on the person's perception of four critical areas: the severity of a potential illness, the person's susceptibility to that illness; benefits of taking a preventive action, and the barriers to taking that action (Croyle, 2005). The findings from the study seem to agree with the model given that the proportion of mothers who treated water for use remained above 60%. This would be explained by the fact the majority of mothers appreciate the role of preventive strategies for disease control.

The study sought to find out the quality of health services provided to mothers by seeking to establish from the CHWs if health facilities had well equipped diagnostic laboratories. The findings indicated that health facilities lacked adequate laboratory facilities to diagnose sanitation and hygiene related sicknesses. Lack of adequate and relevant laboratory equipment is an impediment to provision of quality health services. Lack of relevant equipment for diagnosis implied that the quality of health care as a strategy of meeting health needs of children under five was compromised hence being a barrier to taking action. Availability of essential drugs in public hospitals and health centers form an important aspect of health care for children under five years. Majority of CHWS indicated health centers and hospitals in the region did not always have an adequate stock of essential drugs. This implied that mothers of children under five years had to purchase drugs from private chemists. Lack of essential drugs in public hospitals has been noted to be a serious threat to the health and survival of children under five years especially in Africa (Hafele-

Abah, 2010). Lack of essential drugs is not only a Kenyan problem but rather a global concern. Policy interventions are therefore necessary to reverse child morbidity through the provision of essential drugs.

Participation in health programmes was observed to be an important strategy for health among mothers of children under five years. The findings agree with Mutungi (2012) who noted that it is important to use community owned resource persons (CORPS) experienced in aspects of community health care to bring services closer to people. The findings of the research study indicated 49.4% of the mothers participated in community health and hygiene programmes. Therefore, high participation rate was instrumental in the success of sanitation and hygiene programmes in the Division.

The involvement of stake holders in hygiene and sanitation programmes is a critical success factor of hygiene and sanitation strategies and practices. This is because of increased synergy achieved through a multi-sectoral approach. The findings indicated that community health workers played the most significant role in the implementation of sanitation and hygiene strategies among mothers with children less than five years. The findings indicated that the level of participation as perceived by the mothers was least from the National Government based on the mean rating of 2.66 compared to that of CHW which was 1.4 and PHOs which was 1.8. The researcher therefore concluded that greater participation by the government was needed to achieve improvement in the hygiene and sanitation programmes.

In recent past, several projects on improvement of hygiene and sanitation have been initiated in Kenya by the Government (Mutungi, 2012). Majority of these projects

do not target the assessment of adoption of interventions like community health strategy on safe water, sanitation and hygiene practices and the prevalence of related diseases among children aged under five years but largely focus on the processes and the direct outputs of the projects with little regard to actual impact on the burden of the related diseases (Mutungi, 2012).That is why this study focused on adoption of community hygiene strategies and practices as an intervention on safe water, sanitation and the prevalence of related diseases among children aged under five years in Migwani Division.

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents summary of the research findings, conclusion and recommendations for further research. The summary and recommendations are based on the objectives of the research study.

6.2 Summary of the Study

The purpose of the study was to analyze adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division of Kitui County. The study was guided by three main research objectives; to determine adoption of community hygiene facilities for safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County. To examine the prevalence of common sanitary diseases among children under five years old and to assess the influence of community hygiene practices on safe water and sanitation among mothers of under five year olds in Migwani Division, Kitui County.

The research adopted a descriptive survey design approach with the respondents targeted for the study being 94 mothers with children aged below five years, 57 community health workers and 3 public health officers. The overall response rate obtained was over 89% which represented 89 mothers, 45 CHWs and 3 PHOs. This response was considered adequate for analysis and reporting. The main research instruments used for data collection were interview schedules, questionnaires and observation checklists which were administered to mothers, PHOs and CHWs.

6.2.1 Community hygiene facilities

The study revealed that there were various sources of water which included open wells, streams, ponds, rain water and piped water. The majority, 79.6% of the mothers interviewed used harvested rain water because piped water was unreliable. About half of the mothers did not have access to piped water at all. The acute shortage of water was noted in that about 25 % of the mothers used pond water. The findings revealed that the use of pond water and stream were highly correlated. The correlation coefficient between the use of pond water and stream water was 0.5. About 40 % of the mothers used stream water which underscores the need to increase access to safe, quality and clean drinking water. Open wells were popular means of water provision with as high as 40% of the mothers reporting that they used water from open wells. The study revealed that at least 89.9 % of mothers taking part in the study had toilets. There were 21.3% of mothers who had improved toilets, with the same number having pit latrines. It was also noted that there were 15.7 % of mothers who used latrines.

6.2.2 Common sanitary diseases

The study revealed that amoeba, dysentery, worms and diarrhea were common water borne diseases among children under five years. The mean scores for the infections were worms (1.35), amoeba (1.39), diarrhea (1.69) and dysentery (1.89), based on a score of 1 for infection and 2 for no infection. The infection was more pronounced among children from mothers who used untreated and unsafe sources of water. Mothers using pond water reported higher risks of infection compared to those who used piped or rain water. Amoeba was noted to be as high as 82.6%. Distance from

water sources was found to be a great obstacle to good hygiene and sanitation. Majority of mothers (76.4%) were more than 11 kilometers from water sources. The distance to water sources increased disease prevalence because mothers were forced to use unsafe and unclean water. Secondly, distance to health facilities that was found to be long that is; 40% of the respondents' distance to health facilities was 6-10 km. This could lead to mothers taking time to seek for health services hence worsening the baby's condition in terms of morbidity. Lack of relevant equipment in the health facilities for diagnosis of sicknesses and the continuous drug stock outs implied that the quality of health care as a strategy of meeting the health needs of children under five was compromised.

6.2.3 Community hygiene practices

Various community hygiene and sanitation practices were identified among mothers. The practices included sharing of toilets for those homesteads that would not afford their own toilets, drinking water treatment and handling, hand washing, use of compost bins or pits and home cleanliness. The study revealed that parents washed their hands before feeding their children as well as washing hands after toilet visits. Hand washing was practiced by 94.4% of the mothers sampled in the study. Boiling of water was also used as a strategy for minimizing water borne diseases. Mothers who had hand washing facilities outside toilets were 61.8%. 49.4% of the homesteads surveyed revealed that mothers participated in community hygiene programmes to learn how to reduce sanitation and hygiene related sicknesses and diseases.

6.3 Conclusion

The levels of adoption of safe water and sanitation practices was determined by availability of community hygiene facilities, prevalence of common sanitary diseases and community hygiene practices. The study revealed high levels of adoption in the availability and use of sanitation facilities in 89.9% of mothers who had toilets, hand washing at 94.4%, availability of hand washing facilities outside toilets at 61.8% and 62.9% of mothers treating water for drinking. Medium level of adoption was evidenced by lack of access to safe drinking water sources; about half of the mothers didn't have access to piped water. There was also medium participation in community hygiene programmes at 49.4%.

In this study all participants had agreed that children under five years old suffered from some waterborne and sanitary diseases in the three locations of Migwani Division. The common types of sanitary diseases that children under five years old suffered from were mainly amoeba, dysentery, diarrhea and worms. Mothers using pond water reported higher risks of infection compared to those who used piped or rain water. Amoeba prevalence was 82.6% among children whose mothers were using untreated water. Majority of mothers (76.4%) lived more than 10km from water sources therefore forced to use unsafe water. However, all these diseases could be prevented and treated through safe drinking-water and adequate hygiene and sanitation practices. Most of the mothers of children under five years old had low literacy levels. Most of the mothers of children under five years old had very little knowledge concerning the government's policy on community hygiene strategies and practices. This was perceived to have partly contributed to the low level of adoption of safe water and sanitation practices. Therefore, Community

hygiene strategies and practices have great influence levels of adoption of safe water and sanitation practices among mothers of children under five years old.

6.4 Recommendations of the Study

The following recommendations were suggested out of the study findings and conclusion. The community should be involved in the process of assessing their health situations, dialogue with them on causes, and current actions in order to identify gaps that may require additional knowledge and skills and thus influence improvement of health practices and therefore health status. The community health workers should be trained in the concepts of community health care and development, principles of a healthy community and its implications to the general socioeconomic growth and development of the community, and how the two aspects are interrelated to hygienic care of the mothers and their children aged less than 5 years. The underlying philosophy of the Community Health Strategy should be that the approaches used in the facilitation of the community health service provider must be participatory. Coordination of all public community health stakeholders at all levels should be followed relentlessly (O'Reilly *et al*., 2012). To this end the government of Kenya is on track when it is seeking the implementation of the community health strategy. Improved hygiene practices are essential if transmission routes of water and sanitation related diseases are to be completely abated. Community response towards disease outbreaks and emergencies calls for change in human behaviour. Basic knowledge on safe water and sanitary hygiene would help the mothers of under five years old to avoid unsafe water and sanitary health related diseases. Therefore, there is need for hygiene awareness workshops to address

cleanliness, collection of waste, safe disposal of faeces, food storage, disease prevention, sanitation facilities and erection of toilets.

Improvement of living standards, availability of basic needs, poverty alleviation and community participation in sanitation programmes and political commitment can improve adoption of community hygiene strategies and practices among mothers with children under five years old. Creation of community demand for health services requires a multidimensional approach. Health-promotion programs can reach and motivate more community members if outreach activities take place in schools, in sports venues, in faith-based organizations (including churches and mosques), and through innovative means such as Health Action Days and educational theatres. The sustainability of community-based initiatives depends on both partnering with and strengthening the abilities of community-based organizations. By the same token, health programs should ensure strong, ongoing links between CBOs and regional structures connected to the Ministry of Health and Sanitation, including health facilities.

6.5 Suggestions for Further Studies

Comparative studies could be carried out on interventions that do not utilize the safe water, hygiene and sanitation knowledge, to weigh the effectiveness of community hygiene strategies and practices among mothers of children under five years old.

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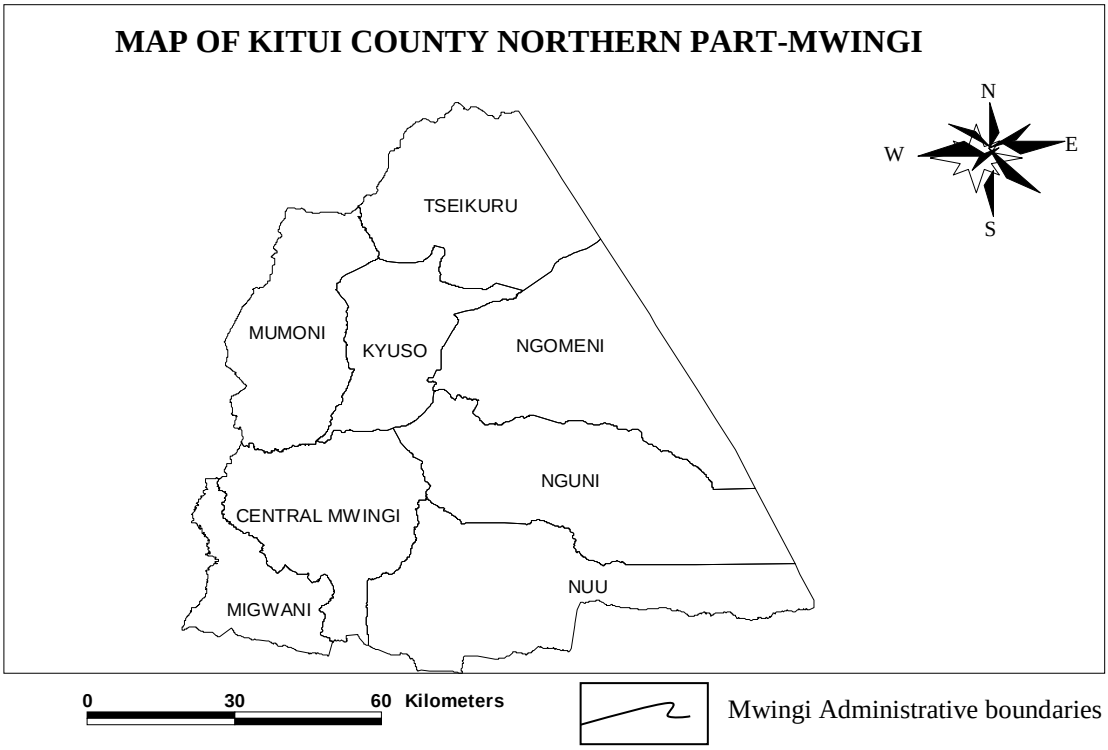
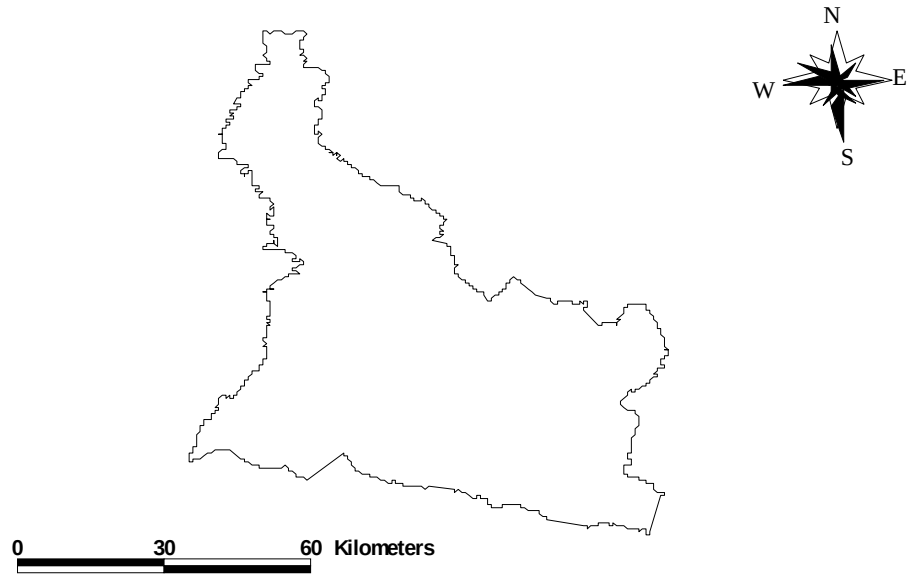
APPENDICES

APPENDIX A: Maps of kitui County Northern Part and Migwani Division



Migwani Division in Mwingi West Sub County



Migwani Division

APPENDIX B: Participants' Consent Form

Adoption of Community Hygiene Strategies for Safe Water and Sanitation among mothers of under fives in Kitui County, Kenya

I am a master's student at the department of Population, Reproductive Health and Community Resource Management of Kenyatta University. This study seeks your response to questions related to the topic under study. The information gathered will remain confidential and be used for academic purposes only. Your participation is however voluntary.

Thank you.

Sign_____ Date_____

Lydia Mbeti Mutie

Participant:

I have understood the purpose of this study. I hereby voluntarily consent to participate in the research.

Participant's Signature _____Date_____

APPENDIX C: Interview Schedule for Mothers of Under fives

This interview aims at analyzing the adoption of community hygiene strategies to safe water and sanitation among mothers of under five year olds in Migwani Division. As a parent, please respond to every question as required. For confidentiality purposes, do not write your name or that of your child.

SECTION A: Demographic information

1. Age

15- 20 ( ) 21-25 ( ) 26-30 ( ) 31-35 ( )

36-40 ( ) 41-45 ( ) 46-50 ( )

2. Education qualification

(a) Primary ( )

(b)Secondary ( )

(c) College ( )

(d) University ( )

(e) Not gone to school ( )

3. Type of house

(a) Permanent ( ) (b) Semi-permanent ( ) (c) Temporal ( )

SECTION B: Community hygiene strategies

Sources of water

S/No	Source of water	Yes	No
1.	Piped water		
2.	Stream water		
3.	Rain water		
4.	Pond water		
5.	Open well		
6.	Other sources of water		

SECTION C: Prevalence of Sanitary diseases

Disease prevalence

S/No	Disease contraction risks	Yes	No
1.	Child had diarrhea in last two months		
2.	Child had diarrhea in last one month		
3.	Dysentery contraction in last one month		
4.	Amoeba contraction in last one month		
5.	Worms infestation in last one month		

Distance to health facilities

(Less than 5km), (6-10 km), (11-20km), (Above 21km)

Distance to water sources

(Less than 5km), (6-10 km), (11-15km), (Above 16km)

SECTION D: Community hygiene practices

S/No	Hygiene practices	Yes	No
1.	Boiling water		
2.	Treatment of water using chemicals		
3.	Covering of toilet		
4.	Toilet is shared		
5.	Compost heap open		
6.	Covered compost heap/bin		
7.	No compost heap in compound		
8.	Hand washing with soap		
9.	Hand washing with water only		
10.	Drying hands after washing		
11.	Drinking water is covered		
12.	Participation in health programmes		

APPENDIX D: Questionnaire for Community Health Workers

This questionnaire aims at analyzing the adoption of community hygiene strategies for safe water and sanitation among mothers of under five year old children. As a Community Health Worker, your resourcefulness in this study is very important. Your responses will be treated with a lot of confidentiality and will only be used for the purpose of this study.

SECTION A: Demographic Information

Please fill in the blank spaces or tick (√) in the spaces provided.

1. Age

15- 20 ( )	21-25 ( )	26-30 ( )	31-35 ( )
36-40 ( )	41-45 ( )	46 and above ( )	

2. Highest Professional qualifications

Certificate in health related field	( )
Secondary education	( )
Primary education up to class eight	( )
Primary education below class eight	( )

3. Gender

Male	( )
Female	( )

4. Work experience (years)

0-1 ( ), 1-2( ), 3-4 ( ), Over 5 ( )

SECTION B: Community hygiene strategies and practices

Please indicate the coverage in adoption of community hygiene strategies and practices among mothers of under fives in the division.

No	Parameter	Population estimate			
		¼	<½	½	¾
1.	Proportion with safe drinking water				
2.	Toilet coverage				
3.	Proportion with waste disposal facilities at home				
4.	Proportion using unsafe water				
5.	Proportion with hand washing facilities outside toilets				
6.	Proportion washing hands at critical times				

Accessibility to health services

Please indicate the extent to which you agree with the following statements as relates to the management of water borne diseases in your division. The scale of agreement is as shown:

SA - Strongly Agree

A - Agree

N - Neutral

D - Disagree

SD - Strongly Disagree

S/No	Parameter	SA	A	N	D	SD
1.	Majority of mothers cannot afford cost of treatment at health centes					
2.	Distance to health centers is too long					
3.	Sometimes the health centers lack essential drugs for water borne diseases					
4.	There are enough workers in the health centers, mothers don’t have to queue for hours to be attended					
5.	There are well equipped laboratories for diagnosis of water borne diseases on children					

APPENDIX E: Questionnaire for Public Health Officers

This questionnaire aims at analyzing the adoption of community hygiene strategies for safe water and sanitation among mothers of under five year old children. As a public health officer your resourcefulness in this study is very important. Your responses will be treated with a lot of confidentiality and will only be used for the purpose of this study.

SECTION A: Demographic Information

Please fill in the blank spaces or tick (√) in the spaces provided.

1. Highest Professional qualifications

Diploma ( )

Degree ( )

Post graduate ( )

SECTION B: Community hygiene strategies and practices

Prevalence of sanitary diseases

Indicate disease prevalence among children under five years

No	**Disease**	**0-10%**	**11-20%**	**21-30%**	**31-40%**	**41-50%**	**51-60%**	**61-70%**	**71-80%**	**81-90%**	**91-100%**
1.	Amoeba										
2.	Dysentery										
3.	Diarrhea										
4.	Worm infestation										

SECTION C: Stakeholder participation

On a scale of 1 to 5 where 1 is very strong, 2 is strong, 3 not sure, 4 weak and 5 very weak, please rate the participation of the stake holders in health and hygiene programmes.

Stakeholders	**Very strong-1**	**Strong-2**	**Not sure-3**	**Weak-4**	**Very weak-5**
i) Public Health Officers					
ii) Religious Organizations					
iii) NGOs					
iv)County Government(MOH&S)					
v) CHWs					
vii)National Government					

APPENDIX F: Observation Checklist

Community hygiene strategies

Type of toilet

S/No	Type of toilet	Yes	No
1.	Flush/Pour flush to septic tank		
2.	Flush/Pour flush to pit latrine		
3.	Ventilated improved pit latrine		
4.	Pit latrine with slab		
5.	Pit latrine without slab/open pit		
6.	No facility/bush		

Availability of hand washing/waste disposal facilities

S/No		Yes	No
1.	Water outside toilets		
2.	Compost heap/bin available in the compound		

APPENDIX G: Approval Letters

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Email: chairman.kuerc@ku.ac.ke
secretary.kuerc@ku.ac.ke
ercku2008@gmail.com
Website: www.ku.ac.ke

P. O. Box 43844 - 00100 Nairobi
Tel: 8710901/12
Fax: 8711242/8711575

Our Ref: KU/R/COMM/51/469

Date: 27th April, 2015

Lydia Mbeti Mutie
Kenyatta University,
P.O Box 43844, Nairobi

Dear Ms. Mutie,

APPLICATION NUMBER PKU/327/I 302- "ADOPTION OF COIMMUNITY HYGIENE STRATEGIES AND PRACTICES AMONG MOTHERS OF CHILDREN UNDER FIVE YEARS IN MIGWANI DIVISION, KITUI COUNTY, KENYA" – VERSION 2.

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic, **"Adoption of community hygiene strategies and practices among mothers of children under five years in Migwani Division, Kitui County, Kenya,"** version 2 received on 27th April 2015.

2. APPLICANT
Lydia Mbeti Mutie

3. SITE
Migwani Division, Kitui County, Kenya.

4. DECISION
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines **AND APPROVED that the research may proceed for a period of ONE year from 27th April, 2015.**

5. ADVICE/CONDITIONS
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines, and is of the view that against the following elements of review,

(i) Scientific design and conduct of study,
(ii) Recruitment of research participant,
(iii) Care and protection of research participants,
(iv) Protection of research participant's confidentiality,
(v) Informed consent process,
(vi) Community considerations.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

KENYATTA UNIVERSITY OFFICE OF THE CHAIRMAN 27 APR 2015 ETHICS REVIEW COMMITTEE P.O. BOX 43844 - 00100 NAIROBI

PROF. NICHOLAS K. GIKONYO
CHAIRMAN: KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE

I Lydia Mbeti Mutie accept the advice given and will fulfill the conditions therein.

Signature..... Dated this day 11 of May 2015.

cc. Vice-Chancellor

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No.

Date: 22nd May, 2015

NACOSTI/P/15/5137/5069

Lydia Mbeti Mutie
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Adoption of community hygiene strategies and practices among mothers of children under five years in Migwani Division, Kitui County,"*** I am pleased to inform you that you have been authorized to undertake research in **Kitui County** for a period ending **30th September, 2015.**

You are advised to report to **the County Commissioner and the County Director of Education, Kitui County** before embarking on the research project.

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

DR. S. K. LANGAT, OGW
FOR: DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Kitui County.

The County Director of Education
Kitui County.

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
State Department for Education

Telegrams "EDUCATION" Kitui
Telephone: Kitui 22759
Fax :04444-22103
E-Mail : cde.kitui@gmai.com

When replying please quote;

REPUBLIC OF KENYA

COUNTY EDUCATION OFFICE
KITUI COUNTY
P.O BOX 1557-90200
KITUI

Ref. No: KTIC/ED/RES/22/72

Date.0607/2015

Lydia Mbeti Mutie,
Kenya Univesity,
P.O Box 43844 -00100
NAIROBI.

RE:RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ``**Adoption of community hygiene strategies and practices among mothers of children under five years in Migwani Division, Kitui County** I am pleased to inform you that authority has been granted.

COUNTY DIRECTOR OF EDUCATION
KITUI COUNTY
P. O. Box 1557 - 90200, KITUI.

P.M.MAKITE
COUNTY DIRECTOR OF EDUCATION
KITUI COUNTY