ASSESSING THE NATIONAL SCHOOL HEALTH POLICY ON THE STATUS OF WATER, HYGIENE AND SANITATION IN PRIMARY SCHOOLS OF SABATIA, VIHIGA COUNTY, KENYA

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THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTERS IN PUBLIC HEALTH IN THE DEPARTMENT OF COMMUNITY HEALTH, SCHOOL OF PUBLIC HEALTH OF KENYATTA UNIVERSITY

MARCH 2016
Declaration

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

Signature:…………………………                Date: ………………………………………

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Dedication

I wish to dedicate this work to my wife Janet Kishasha, children Vanessa Kishasha, Sonia Kishasha and David Kishasha. To my late father Jamin Kijungu who taught me how to raise money to pay for High school fees by baking and selling bricks, my late brother Julius who I loved most and Benjamin Munzatse my last born brother who i never knew where he went nor why he took so long to return.
Acknowledgement

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Finally, I give my highest praise and thanks to my mother, Rosalida Kaisha Kijungu, who recognized my loneliness because of the absence of my family from the country, prayed for me in the moment of my injuries and studies without betraying her emotions.

This research work could not have been produced with such quality in a timely fashion without the hard work and dedication of all those who contributed to this effort. Thanks to all of you. God bless you.
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<td>Area Education Officer</td>
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<td>AIDS</td>
<td>Acquired Immune Deficiency syndrome</td>
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<td>AMREF</td>
<td>African Medical Research Foundation</td>
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<td>BCC</td>
<td>Behavior Change Communication.</td>
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<td>Community Based organizations.</td>
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<td>DEO</td>
<td>District Education Officer</td>
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<td>DMOH</td>
<td>District Medical Officer of Health</td>
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<td>DPHO</td>
<td>District public health officer</td>
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<td>DPHN</td>
<td>District public health nurse</td>
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<tr>
<td>GOK</td>
<td>Government of Kenya</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>ICRC</td>
<td>International Conventions on the Right of the Child</td>
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<td>IEC</td>
<td>Information Education and Communication</td>
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<td>IPT</td>
<td>Intermittent Presumptive Treatment</td>
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<td>KEPI</td>
<td>Kenya Expanded programme of Immunization</td>
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<tr>
<td>LLITNS</td>
<td>Long lasting Insecticide Treated Nets.</td>
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<td>MDGS</td>
<td>Millennium Development Goals</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>MOMs</td>
<td>Ministry of Medical Services.</td>
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<td>MOPHS</td>
<td>Ministry of Public Health and Sanitation.</td>
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<td>NGO</td>
<td>Non-Governmental Organization.</td>
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<td>NHSSP II</td>
<td>National Health Sector Strategic Plan II.</td>
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<td>NSHG</td>
<td>National School Health Guidelines.</td>
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<td>NSHP</td>
<td>National School Health Policy.</td>
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<td>SCHP</td>
<td>Social Health Programme</td>
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<td>SMC</td>
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<td>Acronym</td>
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<td>UN</td>
<td>United Nations</td>
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<td>UNESCO</td>
<td>United Nations Educational Scientific and Cultural Organization.</td>
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<td>UPE</td>
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<td>United States Agency for International Development.</td>
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<td>World Bank.</td>
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<td>World Food Programme.</td>
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Definition of Operational Terms

Abstract: The summary of a research paper commonly found at the beginning of the document.

Active consent: The signing of a consent form by a parent or legal guardian of a child research subject allowing the child’s participation in a research study.

Adolescent: Any person aged 10-19 years

Child: Any person less than 18 years of age

Concepts: The individual components or building blocks of a theory.

Consent: A written document informing participants of the specific details of the study, such as the purpose, expectations and the risks and benefits of participating in the research.

Cross-tabulation: A type of analysis that examines the distribution of at least two variables at the same time and usually presents them in a table.

Ethical conduct: The carrying out of an intervention in a way that treats with respect and causes no harm to them or the community.

Focus groups: A method of data collection in qualitative research where small groups of six to twelve participants are brought together to share their opinion about a defined topic.

The group discussion is facilitated by a moderator who is part of the research team.

Health: A state of complete physical, mental, social and spiritual well being and not merely the absence of disease or infirmity

Informed consent: A research subject’s agreement to participate in a study based on a clear understanding of the nature of the study and what the individual will be asked to do.

Internal Validity: The idea that any effects observed following an intervention were caused by the intervention.
Key informants: Individuals in the community who occupy leadership roles and can provide insight into the needs of the target population, their reactions to particular interventions and the impact of the interventions on the community.

Programme: Activities and services designed to promote the optimal, physical, mental, social, spiritual and educational development of students and to improve the health of the community.

Questionnaire: A research tool used to gather information from respondents.

Reliability: The ability of an instrument or set of items to consistently measure the same construct each time it is used.

Sample size: The number of participants on which data analysis is based.

Sample: A section or part of the population for which data is collected and analyzed.

School health: An integrated set of planned school-based strategies, activities and services designed to promote the physical, mental, social, spiritual and educational development of students and to improve the health of the community.

School: An institution authorized by the Ministry of Education in which pupils receive regular instructions or an assembly of not less than ten pupils for the purpose of receiving instructions.

Theoretical Framework: A suggested structure for how data fit together to explain or predict a dependent outcome; an organized way to think about behavior; change and view of the set of relationship between a health problem, target population and program components and results.

Theory: An organized way to understand, explain or predict relationships, behavior or outcomes.

Variable: An attribute that allows the measurement of a construct of a theory.

Youth: Person aged 15-24 years
Abstract

School Health began in Kenya in 1960’s as an initiative of UNESCO and FAO as an intervention tool to encourage attendance and reduce malnutrition in school-going children. The introduction of free, Universal Primary Education (UPE) in 2003 increased pupil enrolment from 5.9 to over 7.8 million thus overstretching water, hygiene and sanitation facilities hence necessitating for a policy. In 2009, the Kenya Government developed the National School-based health program with its policy in eight health thematic areas whose goal was to enhance the quality of health in school communities by creating a healthy and friendly environment for teaching and learning. One of the key areas addressed by the program was water, hygiene and sanitation in primary schools. The purpose of this study was therefore to assess the current health status on water, hygiene and sanitation in primary schools of Sabatia District based on this policy and its guidelines. The target population consisted of all the 102 primary schools in Sabatia district. Thirty one (31) schools were clusterly and randomly selected for study. The objectives of the study were to describe the current health status of the schools by determining the risk factors for disease transmission and identifying the measures that are in place for prevention and control of the diseases related to water, hygiene and sanitation in the schools. The study employed a cross-sectional research design that utilized both quantitative and qualitative paradigms. Probability sampling design was used which employed both cluster and simple random sampling techniques in the selection of the schools and the study participants respectively. The study captured a randomly selected sample size of 31 out of 102 schools in the district for study. Structured, non-structured questionnaires, focus group discussions (FGDs), key informant interviews (KII) and observational checklist were employed to collect data. All the 31 schools were assessed on the compliance to national school health policy and guidelines; 31 FGDs and 3 KII were undertaken to identify barriers to implementing good hygiene, sanitation and provision of safe water for use in schools. The study identified gaps with regards to the status of water, hygiene and sanitation. There was insufficient (3%) quality surveillance and monitoring for water safety in schools. The pupil-toilet ratio was grossly inadequate at 50:1 against the recommended 30:1 for schools. Forty percent of the toilets were found to be dirty. There was significant statistical association between sources of water and diarrhea diseases among pupils in schools (p<0.0019). However, the following were identified in FGDs and KII: insufficient supervision by health and water authorities, lack of partnerships with local businessmen, local community and politicians to help build enabling structures for school health. The research concluded that there were potential risks for disease transmission in schools given the current status of water, hygiene and sanitation. The study therefore rejected the null hypothesis and that there was no existence of the policy document in all schools. The study recommended that there was dire need for schools to liaise with the national and county governments to develop and form an effective implementation Board that would oversee and enforce the national school health policy and programs. The key contribution of this study was to provide baseline data on school health for future planning, interventions and facilitate sound policy implementation of the National Comprehensive School Health Program.
CHAPTER ONE - INTRODUCTION

1.1 Background information to the study

Globally, school health program began in 1790 in the city of Munich in Germany initially as health feeding program (Meckel and Richard, 2013). The concept was adopted by the French’s and the Britons in 1849 and later popularized by the Americans to this date in many countries of the world. This concept has been expanded to include universal primary education and adopted by many countries of the world in 2000 under the millennium development goals (MDG) that addressed illiteracy and child rights.

Worldwide, more than 10.5 million children die every year from diseases associated with lack of access to clean safe drinking water, basic hygiene, unsanitary facilities and the know-how,(unicef, 2010). According to Dragert (2010), International Red Cross, IRC, (2004) and Unicef (2010) the majority of these preventable diseases are characterized by diarrhoea, worm infestations, iron deficiency anaemia, chronic under nutrition and growth retardation among-school going children. The World Food Program, WFP, (2009), recognizes that school-based health programs are helping eliminate preventable diseases related to water, hygiene and sanitation for millions of children around the globe and is contributing to future productivity as adults.

In Kenya, school health program started in 1960’s as school feeding program through the initiative of the United Nations Education Scientific Cultural Organization (UNESCO) in conjunction with Food Agricultural Organization (FAO) as an intervention tool to encourage attendance and reduce malnutrition among school-going children. A new program was later re-developed and transformed into a comprehensive Kenya National
school Health program with its policy and guidelines (KNSHP, 2009). Therefore, in 2009 the ministry of education in conjunction with the ministry of public health and sanitation initiated the National School Health program complete with clear policy and guidelines for primary schools in eight thematic areas. The fourth thematic area was on water, hygiene and sanitation which are the subject of this study. The goal of the policy was to enhance the quality of health in school communities by creating a healthy and child friendly environment for teaching and learning.

The currently high and ever increasing enrolment at school since 2003 in the country as a result of the universal primary education has made water, hygiene and sanitation issues of national importance and urgency (MOE, 2008). This has resulted in overcrowding in schools thus overstretching water, hygiene and sanitary facilities. Therefore the provision of safe water and sanitary facilities in schools is an important component in improving learning outcomes. According to the ministry of education national school water, sanitation and hygiene strategy, MENSWSHS, (2008), good facilities need to be linked with an improvement in crucial behavior change particularly hygiene and latrine maintenance behaviours for it to be effective and sustainable. Rukungu (2001) explains that diseases related to water, hygiene and sanitation are preventable. In this case, sanitation involves prevention strategies such as awareness creation, good housing and providing a clean environment in which to live in order to break the cycle of diseases while hygiene entails keeping oneself and the environment clean.

The Kenya National School Policy (2009) asserts that children make up 50 percent of the total population many of whom suffer varying but significant degrees of ill health due to risky environment and morbidity related to unsafe water, poor hygiene and sanitation.
This health related concerns, according to the policy, impede effective learning and realization of the children’s full productive potential. This reinforces the fact that healthy children help to realize national development, millennium development goals and other international goals. WHO (2005), noted that improved sanitation alone reduces the rates of diarrhea among school children by 32 percent.

Good health is essential for the implementation of any educational program and vital for the achievement of desirable quality learning outcomes which are attainable with improved opportunities for equal access, retention, inclusion, equity and completion. According to the Sabatia District development and strategic plan (2012), 27 percent of the total school population in the district does not have access to clean and safe drinking water in the schools. Seyrek and Ulukaniligil (2003) asserted that poor access to safe drinking water and inadequate sanitation impacts negatively on learning and its outcomes.

This research work, therefore, assessed the component of water, hygiene and sanitation as the fourth thematic area of the National school-based health to determine their current status in primary schools of Sabatia Sub -county of Vihiga County in Kenya based on the National School Health Policy (2009) and its National Guidelines (2009).

1.2 Statement of the problem

In Kenya, children 5-19 years are of school-going age and constitute 50 percent of the country’s total population, (KNSCHG, 2009). This age group suffers varying but significant degrees of ill health related to unsafe drinking water, poor hygiene and sanitation that unequivocally impede effective learning and realization of their full
productive potential. The current high and ever increasing enrolment in schools since 2003 in the country as a result of the universal primary education has made water, hygiene and sanitation issues of national importance. Over enrolment has resulted in overcrowding thus stretching water, hygiene and sanitation facilities, (MENSWHPS, 2008).

Thirty seven percent of the developing world’s population lack improved hygiene and sanitation facilities (www.unicef.org, March, 2013). In schools, ill health has been associated with poor cognitive performance, absenteeism and high drop out as espoused by WHO report of 2006 on school health. In Kenya the child survival and development strategy, CSDS, report of 2000 - 2015 reveals that 42% of the country’s population had access to safe drinking water, good hygiene and sanitation. According to the Sabatia Sub-County development and strategic plan (2012), over 20 % of the pupils in primary schools record absenteeism yearly occasioned by preventable related diseases on water, hygiene and sanitation. Therefore, knowing the health status of water, hygiene and sanitation in Sabatia primary schools will help design, plan, inform policy change and implement measures that can improve health of the children from preventable diseases to enhanced psychosocial well being of the child.

1.3 Justification of the study

Schools provide an organized structure that is conducive for the provision of health and a key avenue for disease prevention and control. It can promote health and at the same time accelerate the spread of ill health. Schools are therefore ideal settings to implement health programs because they offer substantial opportunities to promote health. These
opportunities are such that schools provide efficient and effective channels to reach large portions of the population for introducing health promotion practices and interventions.

Improved health among school-going children enhances cognitive development, concentration, participation and retention of children in schools. It also reduces absenteeism, increases enrolment and improves academic performance. Schools also admit learners at a very early stage of development when life-long behaviors, values, skills, and attitudes are being formed. School health programs therefore meet a greater proportion of health and psychological needs of the children. Assessing the status of water, hygiene and sanitation in Sabatia schools helped to know how successful the health program was and whether it had been meeting its objectives and its desired goals and outcomes as stated in the national school health policy of 2009. The study also provided baseline information on the National School Health Policy awareness and implementation status in schools.

1.4 Research hypothesis

H0: The National School Health Policy on water, hygiene and sanitation has not made any significant improvement on the health status on water, hygiene and sanitation in schools.

1.5 Research questions

This study formulated and sought to answer the following research questions:

1. What were the socio-demographics of the study participants?

2. What were the risk factors related to water, hygiene and sanitation that could cause the transmission of diseases in school communities?
3. What measures were in place for prevention and control of water, hygiene and sanitation related diseases in schools?

4. What was the level of a awareness of the National School Health Policy in schools?

1.6 Objectives of the study

1.6.1 Broad objective
To assess the National School Health policy on the status of water, hygiene and sanitation in the primary schools in Sabatia Sub-County, Vihiga County of Kenya.

1.6.2 Specific objectives
These are:

1. To determine the socio-demographics of the study participants.

2. To determine risk factors to disease transmission related to water, hygiene and sanitation in the study schools.

3. To identify those measures in place for prevention and control of water, hygiene and sanitation related diseases in the primary schools.

4. To determine the schools’ awareness on the existence of National School Health Policy on water, hygiene and sanitation.

1.7 Significance and anticipated output
Policy change, re-planning, implementation were the anticipated output as well as resultant interventions for improved health on water, hygiene and sanitation issues.
1.8 Delimitation and limitation

The research was limited to the samples schools as representative of the whole and that the researcher had no ability to authenticate the information given by the respondent. The researcher was also be delimited to the calculated sample size of 31 schools out of 102 from the district and the use of check list questionnaires, key informant interviews, use administered interviews and focus group discussion as instruments for data collection.

1.9 Theoretical Framework

The theoretical framework utilized the Health Belief Model (HBM) that was developed in 1960’s by Kurt Lewin, a social psychologist, to explain the lack of public participation in the health screening and preventive programs. The principal tenet of the model was that people cannot participate in health programs until they perceive the problem at hand as posing a threat to their lives. The model explains that individuals must have subjective perception of the risk of contracting a health condition (perceived susceptibility) and the seriousness of contacting an illness or of leaving it untreated (perceived severity) in order for them the to take action. In a nut shell the gist and major contribution of the health belief model is that people will participate in health programs like prevention of diseases if there exist sufficient motivational health concern, the existence of state of vulnerability to their health and the belief that doing something about it would reduce the perceived threat at a subjectively acceptable cost. In 1974, Rosenstock expanded the HBM to include the notion of “self efficacy”, or the belief that one has the ability to implement the behavior required to produce the desired health outcomes.
Figure 1. 1: The Health Belief Model (1956).

Source: Adopted from Rosenstock (1974)

- Perceived benefits
- Barrier to behavioral change

Perceived threats of disease
- Age
- Sex
- Ethnicity
- Social economic

Action
- Participation

Cues to action
- Education
- Symptoms
- Media information

Perceived susceptibility
- Seriousness of disease
The Conceptual Framework Model was based on the National School Health Policy (2009) and its Guidelines (2009) which advocated for Universal Primary Education.

**Independent variables**

**Clean safe water**
- Sources of water
- Water treatment measure
- Proper water storage

**Waste disposal**
- Proper litter bins
- Correct disposal sites
- Pit latrines
- Incineration
- Ablution facilities

**Policy**
- Ministry of health/sanitation
- Ministry of education
- Motivation/ competition prize

**Food safety**
- Storage and hygiene
- Food preparation
- Staff health and hygiene
- Clean & non contamination

**Health Services**
- De worming
- Routine Medical examination/ stool/ blood tests
- Vaccination

**Personal hygiene practices**
- Health education
- Routine hygiene checkups/nails
- /clothes/hair/oral
- Hand & body washing/ sanitation

**Vermin vector control**
- Use insecticides
- Stagnant water drainage
- ITNS/ Traps/ wire mesh

**Dependent variable**
- Improved status of water, hygiene and sanitation in schools

**Outcome**
- Good health for children and Policy Implementation

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**Figure 1.2: Conceptual Framework**
(UPE) whose achievements depend on due attention to the health of the school-age children. The document explains how the health of the children will be addressed through the eight thematic areas that comprise the comprehensive school health package. These eight thematic areas include water, hygiene and sanitation; values and life skills, teenage pregnancy in schools, sexual violence and drug abuse, child rights and protection, nutrition, disease prevention and control, special needs, disability and rehabilitation and school infrastructure and environmental safety. Healthy children develop into productive future citizens and that improved health allows for better physical and cognitive development in children and thereby produces a more productive population.

The conceptual framework lays the skeleton for how improved status of water, hygiene and sanitation can be achieved in the implementation of the National School Health policy.
CHAPTER TWO- LITERATURE REVIEW

2.1 Introduction

This chapter discussed water, hygiene and sanitation and their subthemes on personal hygiene, food hygiene and safety, waste disposal, vermin and vector control, safe clean water, importance of water, hygiene and sanitation in schools and the school health policy.

2.2 Safe Clean Water for schools

Water is an essential resource commodity to life. A healthy and hygienic school environment is actualized by safe, adequate water supply, adequate sanitation and appropriate hygiene promotion, (NSHP, 2009). Water provided in schools should be safe for consumption. According to KNSWS (2008-2015), water provided in schools should be safe and where safe water is not available, appropriate methods for water treatment should be put in place through filtration, chlorination, boiling and or solar disinfection boiling. The strategic blue print advises that chlorination is preferred to other traditional methods as it is reliable and less expensive.

Baffi C (2003) noted that to ensure water safe systems, water systems must be checked and analyzed for coliform bacteria and other contaminants for at least once in a month. In this way measures to control water-washed and water-related diseases can be designed and implemented. The public health Act cap 242 of the laws of Kenya also requires that water brought to schools be done in clean containers to protect children from preventable diseases and that appropriate technology for water storage like plastic tanks, masonry
tanks, ferro-cement tanks, jars, clay pots, ordinary drums and other safe containers can be used.

According to the ministry of education (2008), rain water harvesting facilities of adequate capacities should be developed in schools and where possible be required to connect to the existing network that is run by the authorized water-service providers. Safe drinking water points should also be established in schools. Nordberg (edit) (2006) explains that water from deep wells is usually uncontaminated if the well-heads are protected and if there are no pit latrines nearby. Rukungu G (2003) notes that proper selection, construction of water intake sites, protection, transportation, treatment, storage and supply are critical to ensuring safe drinking water. Therefore prevention of water-borne infection such as paratyphoid, typhoid, amoebiasis and viral diarrhea can be done if water is consumed after treatment.

2.3 Sanitation

The challenges in primary education since the introduction of free primary education involve overcrowding, poor learning environment and lack of appropriate sanitation. NSHP (2009), defines sanitation as the science of preventing and reducing diseases through various strategies such as awareness creation, good housing and providing a clean environment in which to live. These measures are meant to break the cycle of diseases. MOE (2008) cites disposing off or hygienic management of human excreta as well as animal droppings/dung, water waste, and control of disease vectors as some of the measures to achieve good sanitation. Proper storage of food or waste, collection, transportation and disposal bins as well as encouraging recycling where possible can go along way to improve sanitation. Davies B (2005), noted that there are step that can be
used to reduce the chances of disease spread through sanitation measures. These include avoiding indiscriminate disposal of refuse, reduction in overcrowding in housing and sleeping accommodations. Indiscriminate disposal of refuse is unsightly, produces offensive smells, attracts insects and vermin - particularly flies, cockroaches, and rats which are commonly involved in the spread of diseases, cause fire, pollution of air, water and food.

The national school health policy (2009) states that facilities for disposal of waste should be constructed and be friendly for both girls and boys. Therefore provisions should be in schools for waste collection, storage and proper disposal and that general hygiene and sanitation for classes and compound be encouraged.

2.4 Sanitation measures for vermin and vector control in schools.

Davies B (2005) defines a vector as an animal, bird or arthropod which destroys farm, animals or food, and acts as a nuisance as well as transmitting diseases. The author explains that vector borne diseases are limited to areas where suitable conditions exist for vectors and that most vectors have quite specific breeding, feeding and attacking behavior. Nordberg (2007) outlines the principles of controlling vectors. These include reducing the host reservoir, controlling the vector and protecting the susceptible individuals. Control of the vectors may take the form of drainage of the holes, ditches and any accumulation of water around the buildings; clearance of the bushes, interfering with snail habitats by changing water levels, use of molluscides, emptying and disposing water containers. Wood C et al (2008) explains that protecting the susceptible individuals entails the use of insecticides treated mosquito nets, mosquito bed nets, house screens and
long lasting treated mosquito nets (LLTMN), repellants and protective clothing. Rosendaal J (2007) explains that the particular vector control methods to be applied in a community will depend on the local situation and the preference of the local populations. However, he concludes that the control method must take into account the appropriate local technology.

2.5 **Hygiene in schools**

School hygiene and sanitation education is based on the premise that children have a right to basic facilities such as school toilets, safe drinking water, clean environment and information on hygiene, Snell M (2003). The author argues that if these conditions are created then children can come to school enjoy learning, learn better and take back to their families concepts and practices on hygiene and sanitation. In this way investments in education is more productive and that such conditions have even a greater positive outcome for girls who drop out of schools which do not have toilet facilities.

NSHP (2009) policy defines hygiene as the practice of keeping one-self and the surrounding environment clean for the purpose of the well-being of the individual. This definition includes all circumstances and practices, lifestyle issues, premises and commodities that engender a safe and healthy environment. The policy explains that a at a minimum, hygiene promotion at schools should include hand washing with soap after eating, before eating and from the toilets, hygiene lectures, general body hygiene, safe water storage and use in schools.
2.6 Food and personal hygiene

Proper food hygiene is essential for survival, growth, development, energy, physical ability and health, Diana F(2005). Wood C (2008) explains that the aim of food hygiene is to prevent food going bad or becoming contaminated at any stage of production, collection, storage, sale, preparation, or consumption. Therefore the primary objective of any food quality control service is to protect consumers against being offered food that is harmful to health, not fit for human consumption, adulterated or presented in a deceptive manner. Therefore it is imperative for food handlers at school to be free of contamination in handling food and that they must undergo food handlers’ education and medical check ups. Conversely, school children should also take part in hygiene promotion by doing acts like taking regular baths, washing hands with soap before and after eating and after visiting toilets.

2.7 Role of teachers, parents and health sector on water, hygiene and sanitation

According to Wood C (2008), teachers have the opportunity to promote, maintain and improve health and well being of the pupils early in life when attitudes and values are developing or beginning to form. The National School health policy (2009) advocates for teachers to check pupils for such conditions as ring worms, jiggers, scabies, lice, general body hygiene and advise on the measures to be adopted to prevent and treat such parasites. Bergers N (2000) explains that teachers have a duty and a responsibility to promote those practices that will help prevent water and sanitation related diseases as well as promote healthy behaviors in their future generation as adults.
Parents have a responsibility to teach and promote healthy seeking behavior in children such as brushing teeth after meals, eat healthy foods, care for the eyes, ears, nostrils, skin, clothes, grooming, nails and the tongue, Young and Durstan (2009)

The public health Act cap 242 empowers the public health officers to carry out health inspection in schools and recommend the necessary measures for improvement, closure, enforcement and even prosecution.

2.8 Importance of water, sanitation and hygiene in schools.

Good sanitation stimulate learning environment for children. Good sanitary facilities in schools act as a model for pupils to influence communities they come from (Pickford. 2005). Clark and Gundry (2004) noted that improved water supply, sanitation services and promotion of hygiene have the greatest impact on health. WHO (2002) found out that availability and accessibility of water accompanied by hand washing practices reduced diarrheal morbidity and improved excreta disposal and improved hygiene by 47 percent. Pickford (2005) found out that in Bangladesh and Costa Rica improved sanitation reduced mortality, worm infestations and illnesses among children. Overall, in addition to health benefits, adequate sanitation, safe water and good hygiene reduce poverty and improve overall quality of life in human populations. In schools, it reduces absenteeism, enhances cognitive development, concentration, participation, increases pupil enrolment, and improves academic performance and retention of children schools.
2.9. **Policy and guidelines on water, Hygiene and Sanitation in Schools**

According to the National School Health Policy (2009), the school health policy was initiated to fill in the gaps that have always existed where there was no proper coordination needed to achieve effective and efficient delivery of school-based interventions since most of the efforts have been piece-meal and not planned on a sustainable basis. The policy recognizes that District Education Office, other related ministries and key partners need to be quipped to support and provide guidance on good school health management, monitoring and evaluation.

2.9.1 **Policy on water**

Water surveillance is an investigative activity undertaken to identify and evaluate factors associated with drinking water which could pose a risk to health (Afubwa and Mwathi, 2014). The 2009 policy states that water quality surveillance and monitoring should be carried out in schools at least twice per term and sometimes after an outbreak of diseases, after drought and after rains to ensure safety. This therefore means that related ministries or agencies such as health authorities should have decentralized laboratories and other services needed for programs of water supply surveillance by carrying out water sampling and analysis.

The policy also states that schools should have and avail adequate, safe drinking water points or fountains in each school. The policy emphasizes that to ensure that drinking
water is suitable for schools; it must be treated using local, appropriate technology—technology that is accessible, available and affordable.

2.9.2 Policy on Hygiene and Sanitation

Afullo and Afubwa (2014), refer to sanitation as all those conditions that affect health, especially with regard to dirt and infection and specifically to drainage and disposal of sewage and refuse from houses. KNSHG (2009) defines hygiene as…… The policy on sanitation states that school management should provide sufficient and strategically located litter bins, garbage disposal pits, incinerators, and ensure proper management of liquid wastes. In addition, school managements and parents shall be encouraged and empowered to provide adequate ablution facilities for boys and girls as prescribed in the school health Rules and Regulations and must meet the requirements of ‘Building Code’ and the Public Health Act. Effective monitoring shall be inbuilt in each school, zone and district to ensure that the ablution and sanitation facilities are used consistently by pupils and that they are well maintained to help facilitate an on-going hygiene promotion.

The policy states that standards for toilets-latrines and other sanitation facilities shall be observed and regularly reviewed and updated and that they remain relevant to the different geographical conditions in the country and that they are sensitive to varying category of users needs. In addition, where the school has a kitchen, appropriate food safety measures and adequate waste disposal shall be ensured. The policy on hygiene concludes that hygiene promotion will be pupil centered and an on-going process whose spillover effect from schools will positively influence behavior change.
CHAPTER THREE – MATERIALS AND METHODS

3.1 Introduction
This chapter focused on the area of study, research design, study and target population, sample size determination, sampling procedures, study methods and participants, data collection instruments, validity and reliability of the research instruments, data collection techniques, variables, pilot study, inclusion and exclusion criteria, logistical and ethical consideration; and data analysis and management

3.2 The study area
Sabatia District is situated 20 kilometers north of Kisumu city and 10 kilometres south of Kakamega town in Kenya. It is densely populated with over 2,000 people per square kilometer (census, 2009) with a population of 920,000 people. The area has rainfall throughout the year. 85% of the population has access to clean safe drinking water (SDSDP, 2012). There are 95 public and 7 private primary schools with a public enrolment of 19,463 boys and 18,863 girls (DEO records, 2012). There are 436 male and 488 female primary school teachers. Private schools have an enrolment of 767 boys and 771 girls. The district is divided into four Sabatia educational primary zones: East, North, and Chavakhali zones of North and South respectively. There is one District hospital, 5 health centres, 14 dispensaries and several private nursing homes and clinics.

The Sabatia District Strategic Development Plan (2014), report that 27% of the area use treated piped water. The rest of the water for domestic use is obtained from rivers, springs, harvested rain water and boreholes. Solid wastes are collected by the county government and dumped in a specified site from the various collection locations. The report also states that most of the schools have pit latrines for urine and faecal disposal.
3.3 The study and target population
The target population consisted of all the 102 primary schools in Sabatia district. Thirty one primary (31) schools formed the study population following sample size calculation.

3.4 The research Design

This study adopted a cross-sectional study design. The design used both quantitative and qualitative paradigms. The study was cross-sectional because it attempted to collect information from members of a population in order to determine the current status with respect to certain variables in the population at that particular point in time, (Kombo D, Tromp A, 2005). Orodho and Kombo (2002) also assert that cross-sectional surveys are used when collecting information about people’s opinion, practices and attitudes on certain social issues. Ngechu, M (2006) stated that qualitative approaches in research could be used to assess projects and programs.

3.5 Sample size determination

Sample size determination was based on the WHO (2004) formula for community survey in institutions that are clustered- the 30 Cluster techniques. Schools as units of study are clustered in zones across the sub-county. This formula, according to (Wood H, 2008), Nachmias F,( 2004), WHO (2004) and Mugenda and Mugenda (1998) is used in case of a cross-sectional community survey for institutions and mostly in case of cluster sampling . In this case the sample size is calculated by taking thirty percent of the total number of institutions (102 schools) and it must be such that the data provided is statistically valid at 95% confidence limits. Mathematically expressed as: 30÷100 x 102 = 31 schools.
In this case the sample size = 31 schools which formed the units of study.

3.6 Sample size design and sampling techniques

This was a probability sampling design. The design utilized cluster sampling technique for schools at district level. The study used the existing zones as clusters for schools. This was followed by random sampling at zonal level to arrive at the calculated sample size of 31 schools. Cluster sampling is used when it is not possible to obtain a sampling frame because the population is either large or scattered over a large geographical area (Thomas and Nelson, 2005) and Mugenda and Mugenda (1998). In this case the schools are scattered all over the entire district.

Sixty two teachers, out of the total 280, comprising of the head teacher and the school health teacher from each school were purposely selected from the 31 schools to participate in the study. According to Ochola and Mwangi (2000), purposive sampling is mainly used to collect data from those known to have the required information sort by the researcher. In this case, the school health teacher had the required information the researcher was seeking for on school health. Similarly, the head teacher is the embodiment and custodian of all school information.

Three hundred and ten pupils (310) from an estimated total of 3000 pupils in standard 7 and 8 from the 31 schools were randomly selected to participate in the study with each school providing 10 pupils who were later selected through stratified sampling to cater for gender equality basis. The estimated total number of pupils in classes 7 and 8 in 31 sampled schools was 310. Three hundred and ten represented 10 percent of the general total number of pupils in standard 7 and 8 in 31 schools. Therefore each school was
represented by 10 pupil participants in answering questionnaires with 5 pupils from each class. These two senior classes were recruited to participate in the study because the pupils could read, understand and write grammatical correct English as opposed to those in the lower classes as demonstrated during pre-testing of questionnaires.

For focus group discussion (FGD), six to twelve members are recommended (Guttmacher and Kelly, 2010), and are meant to represent the interest of the community. In this case 31 FGD were formed for 31 schools with each group representing one school and was composed of eight members. However, for the Key Informant Interview, one member from each key informant groups was purposively selected.

Table 3.1 shows Sampling procedures

<table>
<thead>
<tr>
<th>Item</th>
<th>Sampling method</th>
<th>Category of sample</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>District level</td>
<td>Cluster</td>
<td>Schools</td>
<td>102</td>
</tr>
<tr>
<td>Location of schools by zonal level</td>
<td>Simple random sampling</td>
<td>Schools</td>
<td>4</td>
</tr>
<tr>
<td>Schools as a unit</td>
<td>Simple random sampling</td>
<td>Pupils Teachers</td>
<td>38,326</td>
</tr>
<tr>
<td>Other participants</td>
<td>Purposive sampling</td>
<td>Key informant interviewee</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Focus group discussion</td>
<td>31 groups</td>
</tr>
</tbody>
</table>
Table 3.2: Shows the various study methods/techniques and the participants

<table>
<thead>
<tr>
<th>Data collection technique</th>
<th>Category of participants</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus group Discussion (FGD)</td>
<td>School management committee</td>
<td>8 per school. Total =248</td>
</tr>
<tr>
<td></td>
<td>Parents teachers association(PTA)</td>
<td></td>
</tr>
<tr>
<td>Key informant interviews(KII)</td>
<td>DPHN</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DPHO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DEO</td>
<td>1</td>
</tr>
<tr>
<td>Structured Questionnaires</td>
<td>Pupils</td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>62</td>
</tr>
<tr>
<td>Observations</td>
<td>Primary schools (water, hygiene, sanitation variables)</td>
<td>31</td>
</tr>
<tr>
<td>Check list questionnaire</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Literature review

3.7 Construction and Research Instruments

Two sets of structured questionnaires were developed and administered to pupils and teachers for data collection. These type of questionnaires have extensively been used in research and have survived cross validation conditions (Greendorfer and Lewko, 2007), and (Synder and Spreitzer, 2003). Focus group discussions and key informant interviews were also developed and used to collect data. The two instruments are very useful because they allow for clarification of points, motivates correspondents, have minimal loss of questionnaires and are helpful in assessing needs and developing interventions, (Borg and Gall, 2003). Cross checking of information from the participants an observational check list questionnaire was developed for use. Pupils were observed during break and lunch time on their hygiene practices like hand washing, wearing of shoes, number and state of sanitary facilities and availability of water.
Various document analyses were done by checking class register to confirm enrolment and absenteeism. Absenteeism was cross-checked and matched with the pupil’s names in the school occurrence book. These two register books assisted to determine reasons for absenteeism and enable calculate pupil- toilet ratio in the schools based on enrolment record.

Five samples (15% of 31 schools) of water were purposively taken as representative samples to the government chemists for test analysis in order to determine their safety, suitability for drinking and to ensure the maintenance of required standards nationally and internationally. Each cluster zone provided a sample for public schools while one sample was taken from one of the private schools. Sterilized bottles, containing MacKonkey broth as a transport medium, from Sabatia health centre were used to collect the samples. Care was taken to prevent contamination by the neck of the bottles during sampling by opening the flow of water to a fine stream and then directing it into the bottle without touching the neck. The ground glass stopper was held by the rim to avoid touching the actual surface with the fingers before replacing immediately the bottle was full. Sampling was done directly from the source. To ensure that the sample was representative especially for river, the sampling print was not taken at the surface, bottom or very near the banks. After the taking the sample, the bottles were immediately sealed or corked and the bottles put in cool container. The samples were transported to government chemists in Nairobi in less than 24 hours for bacteriological, physical and chemical analysis.
Table 3.3: Water for analysis with a sample randomly drawn from one school per zone

<table>
<thead>
<tr>
<th>Divisional zones and total No. of schools (N=95)</th>
<th>Sample school</th>
<th>Sample source</th>
<th>No. of sampled schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabatia East (N=26)</td>
<td>P₁</td>
<td>Tank with tap (Rain water)</td>
<td>1</td>
</tr>
<tr>
<td>Sabatia North (N=28)</td>
<td>P₂</td>
<td>Modern Borehole</td>
<td>1</td>
</tr>
<tr>
<td>Chavakhali North (N=21)</td>
<td>P₃</td>
<td>Spring (tap water)</td>
<td>1</td>
</tr>
<tr>
<td>Chavakhali South (N=20)</td>
<td>P₄</td>
<td>River water</td>
<td>1</td>
</tr>
<tr>
<td>Private school (N=7)</td>
<td>P₅</td>
<td>Tank with tap (Rain water)</td>
<td>1</td>
</tr>
</tbody>
</table>

3.8 Validity and reliability of the research tools
Random sampling, triangulation of multiple sources of data such as use of interviews and focus group discussion was used to enhance accuracy and reliability. Pre-test of the research tools in a different environment for suitability ensured the validity of the research instruments. Use of the supervisors to assess the context used in questionnaires and the training of two research assistants also ensured validity of the tools. The researcher trained the two research assistants in data collection methods through simulation and role play and tested them to see if they understood before he supervised them during pre-testing of the research instrument.
3.9 Pre-Testing of the study

The researcher trained two research assistants who were allowed to pre-test the research tools in a school environment outside Sabatia district in order to determine their suitability with a view to making adjustments to ensure control for internal and external threats and influence that can affect the testable variable. Class 7 and 8 pupils were able to read, understand and write English correctly as opposed to lower classes. Based on these pre-test results the study therefore opted to use the two classes to fill in the answers in the questionnaires.

3.10 Variables

3.10.1 Dependent variable

The dependent variable was the national school health policy on the status of water, hygiene and sanitation in the schools. This is usually the outcome variable which the researcher attempts to predict (Kombo, Tromp, 2006).

3.10.2 Independent variables

These included safe clean water, personal hygiene practices, ratio of male/female to number of toilets, waste disposal methods and vermin and vector control provisions. Kombo and Tromp (2006) assert that these are the explanatory factors which the researcher thinks explain variation in the dependable variable.
3.11 **Logistical and ethical considerations**

Obtaining informed consent, practicing confidentiality and justice prior, during and after the research was the norm rather than the exception to the research participants. The researcher assured the stakeholders that future findings are shared with the participants and stakeholders through seminars, academic forums, scientific conferences, workshops and education offices. Protocols in obtaining authority to conduct research were followed starting with Kenyatta University’s Ethics Review Committee and then the National Commission for Research Science and Innovation from the ministry of education.

The language of interaction was English, Kiswahili and the Maragoli local dialect. The researcher trained two research assistants to carry out data collection.

3.12 **Data analysis and management**

Data generated by the research instruments was collected, cleaned and coded. Quantitative data was analyzed using SPSS version 17 while hypothesis testing and associations between variables was done using chi-square at a P-value 0.05. Frequencies, percentages, mean and standard deviations were analyzed using descriptive statistics. Data from focus group discussion was transcribed and analyzed by content analysis. Data was then presented in tables, pie charts, diagrams and graphs.
CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

The aim of this chapter was to present the data, interpretation and discussion of the findings generated based on the objectives of the study. It also presented observations from other related studies. The study focused on the predictor variables that explain variations in the status of water, hygiene and sanitation. Predictor variables included social demographics of the participants, sources for water, safe storage of water in schools as well as the state of the toilets, their adequacy, personal hygiene and methods of solid waste disposal. All these were examined as explanatory variables that could help determine the current status of water, hygiene and sanitation. The study was carried out between October 2013 to March 2014.

4.2 Social Demographics

4.2.1 Demographic data of the study participants

The sample population consisted of 31 primary schools of which 29 were public and 2 private. Three hundred and ten (310) pupils participated in the study with a near equal population of gender balance. The total pupil enrolment of the sampled schools stood at 12,116 with 49.26 and 50.74.2 % boys and girls respectively. Sixty two (62) sampled teachers, 31 focused discussion groups (FGD) and three key informant personalities participated in the study. The results for the focused groups (FGD) and key informant interviews (KII) were recorded and subjected to content analysis.
4.2.2. Overall socio-demographics of the sampled Schools

Social –demographic characteristics of the 31 sampled schools are presented in Table 4.1. The results indicate that 93.5% of the schools were of public status. Overall, the total pupil enrolment stood at 12,116 with a near gender ratio of 1:1. The mean age of the pupil recruited in the study was 15 years in the 31 schools. The general pupil – teacher ratio stood at 44:1.

Table 4.1: Shows the socio-demographics of the sampled schools.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of elements</th>
<th>%</th>
<th>Other findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age stratum is Years (N=310 pupils)</td>
<td>310</td>
<td>100%</td>
<td>Mean age=15 years</td>
</tr>
<tr>
<td>12 - 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (N=310 pupils)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>155</td>
<td>50</td>
<td>Male-female ratio=1:1</td>
</tr>
<tr>
<td>Females</td>
<td>155</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Type of school attended, N= 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public (N= 29)</td>
<td>290 pupils</td>
<td>93.5</td>
<td></td>
</tr>
<tr>
<td>Private (N=2)</td>
<td>20 Pupil</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Total Pupil enrolment (n= 12,116 pupils in 31 schools).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>5,968</td>
<td>49.26</td>
<td>Male-Female ratio=1:1</td>
</tr>
<tr>
<td>Females</td>
<td>6,148</td>
<td>50.74</td>
<td></td>
</tr>
<tr>
<td>Total number of teachers (N=280)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>133</td>
<td>47.5</td>
<td>Pupil-teacher ratio=44:1</td>
</tr>
<tr>
<td>Females</td>
<td>147</td>
<td>52.5</td>
<td></td>
</tr>
</tbody>
</table>

4.3 Overall water, hygiene and sanitary facilities in sampled schools.

Table 4.2 shows the general status of water, hygiene and sanitary facilities in the 31 sampled schools. The study established that 32.26% of the schools demonstrated the
presence of hand washing facility. School register attendance records were used to capture pupil absenteeism from school. The results from the table indicate that 27% of the pupils recorded absenteeism (occurrence register) from school due to preventable diarrheal diseases per year while a majority of 84% does not wear shoes. Further, 38.71% of the schools had sanitary towels provided to the pupils, more specifically to the girls. However, 45.36% of the schools had a constant availability of water for drinking and other uses.

Table 4. 2: General status of water, hygiene and sanitary facilities (n=31)

<table>
<thead>
<tr>
<th>Characteristics of the variable</th>
<th>Number of elements</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of hand washing facility (N=31 schools)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>32.26</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>68.74</td>
</tr>
<tr>
<td>Availability of water (Observed) (N=31 schools)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14</td>
<td>45.16</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>54.64</td>
</tr>
<tr>
<td>Absence from school due to Diarrhea illness (N=310 pupils)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>86</td>
<td>27.74</td>
</tr>
<tr>
<td>No</td>
<td>224</td>
<td>72.26</td>
</tr>
<tr>
<td>Provision of Sanitary towels, n=31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>38.71</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>61.29</td>
</tr>
<tr>
<td>Wearing of Shoes (N=310 pupils)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50</td>
<td>16</td>
</tr>
<tr>
<td>No</td>
<td>260</td>
<td>84</td>
</tr>
</tbody>
</table>
4.4 Status of water in schools

Table 4.3 below illustrates the various sources of water for use by the schools. Using observational checklist, the study identified six main sources of water for schools. These were rivers, spring, wells, piped water, bore holes and rain water. Based on frequency of respondents and observational checklist, the results indicated that many of the schools had multiple sources of water with spring (48.4%) ranked as the commonest source of water.

**Table 4.3: Shows number and sources of drinking water by schools (n=31)**

<table>
<thead>
<tr>
<th>Source</th>
<th>No. of respondents</th>
<th>Percentage (%)</th>
<th>Rank(1-most) known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>15</td>
<td>48.4</td>
<td>1</td>
</tr>
<tr>
<td>Rain water</td>
<td>10</td>
<td>32.3</td>
<td>2</td>
</tr>
<tr>
<td>Rivers</td>
<td>8</td>
<td>25.8</td>
<td>3</td>
</tr>
<tr>
<td>Boreholes</td>
<td>7</td>
<td>22.6</td>
<td>4</td>
</tr>
<tr>
<td>Piped water</td>
<td>2</td>
<td>6.5</td>
<td>5</td>
</tr>
<tr>
<td>Others (e.g vendors)</td>
<td>1</td>
<td>3.2</td>
<td>6</td>
</tr>
</tbody>
</table>

4.4.1 Storage facilities for drinking water in schools

Table 4.4 below indicates the various storage water facilities available in the 31 sampled schools. The study sought to establish the sanitary state of the containers by observing for water container coverage and availability of taps that help to avoid cross-contamination.
Six storage facilities were identified namely plastic tanks, masonry tanks, water jars, ordinary drums and fero-cement tanks among others. The majority of schools (48.8%) used clay pots for water storage and least by ordinary drums (6.4%). The study observed that all water containers in the 31 sampled schools were covered but did not have a running tap.

Table 4.4: Shows water storage facilities

<table>
<thead>
<tr>
<th>Storage container</th>
<th>Respondents (schools=31)</th>
<th>Percentage (%)</th>
<th>Presence of container cover</th>
<th>Presence of container tap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Plastic</td>
<td>4</td>
<td>12.9</td>
<td>4\textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Masonry</td>
<td>2</td>
<td>6.4</td>
<td>2 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Jars</td>
<td>6</td>
<td>19.5</td>
<td>6 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Pots</td>
<td>15</td>
<td>48.8</td>
<td>15 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Drums</td>
<td>2</td>
<td>6.4</td>
<td>2 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Fero-cement</td>
<td>4</td>
<td>12.9</td>
<td>4 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>6.4</td>
<td>2 \textperiodcentered</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>N=31</td>
<td>100%</td>
<td>31</td>
<td>0</td>
</tr>
</tbody>
</table>
4.4.2 Safety measures for drinking water in schools

Figure 4.1 below shows the various methods used for sterilization of safe drinking water in schools as identified by the study. The majority of schools (58.07%) used boiling method while the least utilized is filtration among other methods.

**Figure 4.1: Shows Methods Used At Schools To Ensure Safe Drinking Water**

<table>
<thead>
<tr>
<th>Sterilization Methods</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling</td>
<td>58.07%</td>
</tr>
<tr>
<td>Addition of chemicals</td>
<td>29.03%</td>
</tr>
<tr>
<td>Other Methods</td>
<td>12.90%</td>
</tr>
</tbody>
</table>

4.4.3 Water facility inspection in schools

Table 4.5 below depicts the number of schools whose water facility had been inspected once in a year. Each School health teacher from the sampled school was asked to provide a ‘yes’ or ‘No’ response. Results indicate that 100% of public schools had never had their water facility inspected by authorized government agencies.
Table 4.5: Shows inspection of water facility by government agencies

<table>
<thead>
<tr>
<th>Sampling and inspection of water by government agencies</th>
<th>Number of schools</th>
<th>Percentage (%)</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2 (private school)</td>
<td>6.45</td>
<td>6.45</td>
</tr>
<tr>
<td>No</td>
<td>29 (public)</td>
<td>93.55</td>
<td>100</td>
</tr>
</tbody>
</table>

4.4.4 Laboratory analysis of water samples from study schools

Table 4.6 below indicates results of the water samples drawn from water sources of five primary schools. One sample was drawn from one of the two private schools while each of the four educational zones was subjected to random selection to provide four samples. The aim was to determine the safety of water for drinking and other domestic use including establishing the presence of coliform bacteria which are a sign of heavily contaminated water. Results for water variables that included physical, biochemical and bacteriological characteristics from the five samples were found to fall within the acceptable WHO (1993) standards for drinking water. The results for the means of various variables were: Turbidity (9.2), hardness (207.2), PH (7.36, and chlorides (334). Lead and fluorides levels were within established normal ranges as shown on the table.
Table 4.6: Laboratory Analysis of water samples.

<table>
<thead>
<tr>
<th>Water variables</th>
<th>Sampled Primary schools (water findings for P1 …P5)</th>
<th>Descriptive statistics for 5 samples</th>
<th>WHO/MOW Standards (1975)-Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P1</td>
<td>P2</td>
<td>P3</td>
</tr>
<tr>
<td>Turbidity</td>
<td>10</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Colour (on pt-scale)</td>
<td>25</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Taste and odour</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>pH</td>
<td>7.5</td>
<td>7.2</td>
<td>6.8</td>
</tr>
<tr>
<td>Hardness</td>
<td>300</td>
<td>200</td>
<td>90</td>
</tr>
<tr>
<td>Lead level</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Ca++ level</td>
<td>79</td>
<td>96</td>
<td>100</td>
</tr>
<tr>
<td>Fluorides</td>
<td>1.4</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Nitrates</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Chlorides</td>
<td>220</td>
<td>400</td>
<td>280</td>
</tr>
<tr>
<td>Coliforms</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>


4.5 Hygiene and sanitation in schools

4.5.1 Hand washing facilities in schools

Table 4.7 shows availability of water and soap in the 31 sampled schools. Personal hygiene was determined by establishing whether or not there were hand washing facilities, water and soap by the toilets; and various personal hygiene practices observed by pupils. The results indicate that 32.26% of the schools had adequate hand washing facilities.
Table 4.7: Availability of hand washing facility

<table>
<thead>
<tr>
<th>Presence of hand washing facility</th>
<th>Number of schools (respondents, n=31)</th>
<th>Percentage (%)</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10</td>
<td>32.26</td>
<td>32.26</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>68.74</td>
<td>100</td>
</tr>
</tbody>
</table>

4.5.2 Presence of water and soap at the hand washing facility

Table 4.8 shows presence of water and soap at the hand washing facility. Presence of water and soap was determined by the researcher observing the facility when pupils were in their break time hours from class. The found out that only 19.45% of the schools had water and soap at the facility.

Table 4.8: Presence of water and soap at the facility.

<table>
<thead>
<tr>
<th>Presence of water and soap</th>
<th>Number of schools (respondents=31)</th>
<th>Percentage, %</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
<td>19.45</td>
<td>19.45</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>80.55</td>
<td>100</td>
</tr>
</tbody>
</table>
4.5.3 Routine personal hygiene checkups in schools

The results of table 4.6 below show that 65% of schools undertake personal hygiene checkups for their pupils once weekly. Twenty eight percent perform checkups once daily. The responses were obtained from 31 school health teachers in the 31 sampled schools.

Table 4.9: Personal routine hygiene checkups of the pupils at schools n=31

<table>
<thead>
<tr>
<th>Frequency of Routine personal checkups</th>
<th>Number of schools (respondents) n=31</th>
<th>Percentage (%)</th>
<th>Cumulative % Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>7</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Weekly</td>
<td>21</td>
<td>65</td>
<td>93</td>
</tr>
<tr>
<td>Fortnight</td>
<td>2</td>
<td>4</td>
<td>97</td>
</tr>
<tr>
<td>Monthly</td>
<td>1</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

4.5.4 Provision of sanitary towels in schools.

In table 4.9, school health teachers were asked if sanitary towels were provided in schools. Results indicated that 22.6% of the schools provided sanitary towel to pupils. However, these towels were provided by local non-governmental organizations (NGO) for both categories of schools.
Table 4. 10: Shows provision of sanitary towels by school category=31

<table>
<thead>
<tr>
<th>Response</th>
<th>Private</th>
<th>Public</th>
<th>Total</th>
<th>Provider of towels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>5</td>
<td>7 (22.6%)</td>
<td>NGO</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>24</td>
<td>24 (77.4%)</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>29</td>
<td>31</td>
<td>-</td>
</tr>
</tbody>
</table>

4.5.5 Cleaning of school toilets

In table 4.10 below, pupils were asked to state the persons responsible for cleaning of toilets. Response showed that 96.77% of the cleaning is done by pupils with the figure representing all public schools. The remaining 3.33% represented the private schools. The pupils were also asked if they were given protective garments to wear during the cleaning of toilets. The results indicate that protective health gears are not given to pupils.
Table 4. Shows the persons responsible for cleaning toilets at school, n=310

<table>
<thead>
<tr>
<th>Toilet cleaners</th>
<th>Number of responses</th>
<th>Percentage (%)</th>
<th>Use of protective garments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO</td>
</tr>
<tr>
<td>Pupils</td>
<td>300</td>
<td>96.77</td>
<td>No</td>
</tr>
<tr>
<td>Subordinate staffs</td>
<td>10</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td>Outsourced personnel</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Others e.g Prisoners</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

4.5.6 Personal hygiene practices observed by pupils

In table 4.11, teachers were asked to respond and prioritize the personal hygiene practices that are to be observed by pupils in schools. Majority (64.52%) of the teachers prioritized washing hands after toilet, before and after eating and after any form of soiling. Equally emphasized in priority ranking (56.45%) was keeping of nails and hair short. This was followed by teeth brushing (38.7%) of at least once daily. However, using toilet tissue during toilet visit and bathing and washing clothes regularly as personal hygiene practices to be observed by pupils received 29.03% and 24.20% respectively. Carrying a handkerchief (19.35%) was the least ranked of the practices to be observed.
Table 4.12: Teachers response on personal hygiene observed by pupils, n=62 teachers

<table>
<thead>
<tr>
<th>Hygiene practices</th>
<th>No. of responses</th>
<th>Percentage</th>
<th>Rank (1-most known)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing hands after toilet, soiling and before and after eating.</td>
<td>40</td>
<td>64.52</td>
<td>1</td>
</tr>
<tr>
<td>Keeping of nails short, hair clean</td>
<td>35</td>
<td>56.45</td>
<td>2</td>
</tr>
<tr>
<td>Teeth brushing at least once daily</td>
<td>24</td>
<td>38.71</td>
<td>3</td>
</tr>
<tr>
<td>Use of toilet tissue during toilet visit</td>
<td>18</td>
<td>29.03</td>
<td>4</td>
</tr>
<tr>
<td>Bathing and washing clothes regularly.</td>
<td>15</td>
<td>24.20</td>
<td>5</td>
</tr>
<tr>
<td>Carrying handkerchief to school and always.</td>
<td>12</td>
<td>19.35</td>
<td>6</td>
</tr>
<tr>
<td>Wearing shoes</td>
<td>10</td>
<td>16.12</td>
<td>7</td>
</tr>
</tbody>
</table>
4.5.7 Adequacy of toilets in schools

Table 4.12 below illustrates the adequacy of toilets in schools. Adequacy of the sanitary facilities was calculated using the Kenya Building Code. The male – toilet ratio stood at 50:1 while for females it was 41:1. The overall pupil – toilet ratio was 46:1. The acceptable male – toilet ratio is 8:1 for the first 30 boys and then 1:30 for any additional 30 boys in school. For girls, it is 8:1 for the first 30 girls and 1:39 for any additional 39 girls in school.

Table 4.13: shows adequacy of toilets in schools

<table>
<thead>
<tr>
<th>Gender</th>
<th>Enrolment</th>
<th>No. of functional toilets</th>
<th>Pupil – toilet ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>5,968</td>
<td>120</td>
<td>50:1</td>
</tr>
<tr>
<td>Female</td>
<td>6,148</td>
<td>152</td>
<td>41:1</td>
</tr>
</tbody>
</table>

4.5.8: Frequency of toilet cleaning

Results in table 4.13 were obtained by finding from school health teachers how often the toilets were cleaned weekly. Results reveal that 80.65% of the schools had their toilets cleaned once daily within a week against 19.35% who had theirs cleaned once weekly.
Table 4.14: Frequency of cleaning toilets in schools

<table>
<thead>
<tr>
<th>Cleaning Frequency</th>
<th>Number of schools</th>
<th>Percentage (%)</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once daily</td>
<td>25</td>
<td>80.65</td>
<td>80.65</td>
</tr>
<tr>
<td>Twice daily</td>
<td>0</td>
<td>0</td>
<td>80.65</td>
</tr>
<tr>
<td>Once weekly</td>
<td>6</td>
<td>19.35</td>
<td>100</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

4.5.9 Cleanliness of sanitary facility

Table 4.14 below indicates the cleanliness status of the 272 pit latrine toilets at the 31 sampled schools. The observed sanitary facilities were considered to be dirty if not flushed, blocked or soiled with faecal matter as per Unicef (2010) criteria. Overall, 22.1% of the female toilets were considered dirty as opposed to 13.2% of the male counterparts.

Table 4.15: Shows status of sanitary cleanliness by gender category n=272

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of dirty toilets</th>
<th>No. of clean toilets</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>60 (22.1%)</td>
<td>92 (33.8%)</td>
<td>152</td>
</tr>
<tr>
<td>Males</td>
<td>36 (13.2%)</td>
<td>84 (30.9%)</td>
<td>120</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96 (35.3%)</strong></td>
<td><strong>176 (64.7%)</strong></td>
<td><strong>272 (100%)</strong></td>
</tr>
</tbody>
</table>
4.5.10 Teachers response on performers of sanitary duties, n=62

Table 4.15 depicts the category of schools and performers of sanitary duties in primary schools. Results show that 100% of sanitary duties are performed by pupils in public schools as opposed to non by private educational institutions.

Table 4.16: Shows performers of sanitary duties in primary schools.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Category of school and Performers of sanitary duties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Private</td>
</tr>
<tr>
<td>Washing classroom</td>
<td>Workers</td>
</tr>
<tr>
<td>Cleaning of school compound</td>
<td>Workers</td>
</tr>
<tr>
<td>Washing of teachers toilets</td>
<td>Workers</td>
</tr>
<tr>
<td>Cutting of grass or mowing of</td>
<td>Workers</td>
</tr>
<tr>
<td>school compound</td>
<td></td>
</tr>
<tr>
<td>Washing of urinals or toilets</td>
<td>Workers</td>
</tr>
<tr>
<td>Cleaning and washing of staff</td>
<td>Workers</td>
</tr>
<tr>
<td>rooms and offices</td>
<td></td>
</tr>
</tbody>
</table>
4.5.11 Disposal of solid wastes in schools

Figure 4.2 below describes the disposal methods of solid waste in schools. The commonest method of disposal in use was the composite pit (64.5%) with the least known method being open dumping (9.68%).

**Figure 4.2: Methods of solid waste disposal in schools**

<table>
<thead>
<tr>
<th>Mode of Solid Waste Disposal</th>
<th>No. Of Schools</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composit pit</td>
<td>20</td>
<td>64.54%</td>
</tr>
<tr>
<td>Open Burning</td>
<td>7</td>
<td>22.60%</td>
</tr>
<tr>
<td>Open Dumbing</td>
<td>5</td>
<td>39.68%</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>13.22%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>100%</td>
</tr>
</tbody>
</table>

4.5.12 Vector, vermin and pest control and Prevention in schools

The table below, 4.16 gives the methods used in schools for control and prevention of vectors and pests. Drainage of stagnant water received 100% response from all the 31 schools and was therefore ranked as the best method. Wearing of shoes was considered the least method for pests and vector control and prevention. However, covering of water
tanks and utensils with lids was identified and ranked as the second best method of vector, vermin and pest control and prevention in schools.

Table 4.17: Shows prevention and control methods against vectors at schools

<table>
<thead>
<tr>
<th>Mode of control and prevention</th>
<th>Number of schools (responses)</th>
<th>Percentage (%)</th>
<th>Rank (1-most known)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage of stagnant water</td>
<td>31</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>Covering of water tanks and utensils with lids</td>
<td>18</td>
<td>58.06</td>
<td>2</td>
</tr>
<tr>
<td>Store food in meshed cupboard</td>
<td>7</td>
<td>22.58</td>
<td>3</td>
</tr>
<tr>
<td>VIP latrines</td>
<td>6</td>
<td>19.35</td>
<td>4</td>
</tr>
<tr>
<td>Use of insecticides and larvicides</td>
<td>3</td>
<td>9.68</td>
<td>5</td>
</tr>
<tr>
<td>Wearing of shoes</td>
<td>2</td>
<td>6.45</td>
<td>6</td>
</tr>
</tbody>
</table>

4.5.13 Chi-square Tests of Associations

4.5.13.1: Association between diarrhoea and source of water

Table 4.17 gives the relationship between diarrhoeal diseases among pupils in the sampled schools and the water sources. Most diarrhoeal are due to water washed
diseases or water related diseases. Therefore there was need to establish any association between water source and diarrhoeal. There was significant relationships with chi-square value of 13.99, p-value of 0.0019 with 3 degrees of freedom at 0.05 level of confidence.

Table 4.18: Diarrhoeal diseases according to source (n=310)

<table>
<thead>
<tr>
<th></th>
<th>River</th>
<th>Borehole</th>
<th>Spring</th>
<th>Rain</th>
<th>Total</th>
<th>Test of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10 (E=47)</td>
<td>5 (E=7.5)</td>
<td>5 (E=7.5)</td>
<td>6 (E=7.54)</td>
<td>26</td>
<td>Chi-square=13.99, Df=3, p-value=0.0019</td>
</tr>
<tr>
<td>No</td>
<td>76 (E=82.53)</td>
<td>181 (E=178.49)</td>
<td>181 (E=178.49)</td>
<td>180 (E=178.49)</td>
<td>618</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>186</td>
<td>186</td>
<td>186</td>
<td>644</td>
<td></td>
</tr>
</tbody>
</table>

4.5.13.2 Relations between adequacy of toilets in public and Private schools.

Table 4.18 shows that there is no statistical relationships between a dequacy of toilets in public and private schools with a chi-square value of 0.01, p-value of 0.817 at 0.05 level of confidence.

Table 4.19: Adequacy of toilets by school category (n=310)

<table>
<thead>
<tr>
<th></th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
<th>Test of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>145 (E=81.38)</td>
<td>145 (E=81.38)</td>
<td>290</td>
<td>Chi-square=0.00, Df=1, p-value=0.817</td>
</tr>
<tr>
<td>No</td>
<td>10 (E=6.38)</td>
<td>10 (E=6.38)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>155</td>
<td>310</td>
<td></td>
</tr>
</tbody>
</table>

4.5.12.3 Relationship in the status of toilets by gender category

The results of table 4.19 indicates no relationship in the status of the male versus female toilets, the p-value being 0.084 at a confidence level of 0.05.
### Table 4.20: Status of toilets by gender category (n=272)

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Test of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>88(E=94.8)</td>
<td>88(E=94.8)</td>
<td>176</td>
<td>Chi-square=3.03</td>
</tr>
<tr>
<td>Dirty</td>
<td>58(E=51.18)</td>
<td>38(E=43.82)</td>
<td>96</td>
<td>Df=1</td>
</tr>
<tr>
<td>Total</td>
<td><strong>146</strong></td>
<td><strong>125</strong></td>
<td><strong>272</strong></td>
<td>p-value=0.084</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusions and recommendations and further research drawn from the findings on the status of water, hygiene and sanitation in primary schools of Sabatia Sub-County in Vihiga County of Kenya.

5.2 Discussions

The purpose of this study was to assess the current status of water, hygiene and sanitation in primary schools of Sabatia Sub-County, Vihiga County. This assessment was benchmarked on the national schools health policy (2009). The independent variables of study included clean safe water, methods of waste disposal, personal hygiene practices, vermin, vector and pests control and prevention in schools; and social demographics of the schools. The dependent variable was the National school health policy on status of water, hygiene and sanitation. The study involved an analysis of data derived from 31 out of 102 schools which were sampled through both cluster and random sampling techniques. The researcher sought answers to the following questions:

1. What were the risk factors related to water, hygiene and sanitation in schools?
2. What measures were in place for disease prevention and control in schools?

The researcher also wanted to test and prove the null hypothesis which stated that: “The current status of water, hygiene and sanitation did not have any potential effect on the health of the school community in Sabatia Sub-County”.

The main findings of this study are therefore outlined as follows:
5.2.1 Discussion on social demographic status of the schools

The study observed and established that 93.55 percent of the sampled schools were of public status. The gender ratio for pupils in both public and private schools stood approximately at 1:1. This is in conformity with the rights to access education by every child and the universal primary education (UPE) concept coined by MDG (2000) and the education for all (EFA) initiatives (WHO, 2010). This also implies that both girls and boys are given equal opportunity for education and that the community seems to place equal value on the education of girls and boys. The overall age range among all gender was 5 to 18 years in all the 31 sampled schools. The mean age stood at 11.5 years. All the 310 standard seven and eight pupils were randomly selected to participate in the exercise through questionnaires while all the key informant and focus group participants were interviewed. The study observed and deduced that the mean age of pupil participants stood at 15 years and that they demonstrated a high ability to read, understand and write grammatically correct English when answering questionnaire questions.

The general pupil-teacher ratio for the sampled schools was 44:1 far from the recommended ratio of 20 pupils per teacher under the education Act (2001). The import of this ratio is that there is overcrowding in schools which in turn is likely to affect quality of health, learning and teaching environment. Similar findings were echoed in a health survey study for Nairobi Primary children (Mutuku and Kinoti, 2006).
5.2.2 Discussion on Status of water in schools

The study identified six main sources of water for the 31 schools namely rivers, springs, boreholes, wells, rain and piped water. Over half of the sampled schools had many multiple sources of water for use while the rest had a single source.

According to WHO (2004), use of multiple sources of water have many benefits. Many sources ensure readily availability of water. Sufficient amount of water can help to control unpleasant smell and improve body hygiene. In addition, availability of multiple sources of water frees pupils from time wasting in searching for water and releases the time needed for productive education. This practice of using multiple sources of water resonates well with the advice by the ministry of water and irrigation (MWNS, 2008) encouraging schools to use rain water harvesting, springs, borehole water, protected wells and piped water- all boiled or treated in schools.

The study observed that most schools use rain- harvested water from iron roofs. Wood (2008) argued that if water is collected from iron sheets or tile roofs into gutters and then into the clean, closed tanks, then this is considered the purest natural water. However, the study observed that most iron sheets which served as collecting surfaces for the rain water had leaves, insects or birds and animal droppings on them and this served as a contamination sources for water in schools.

Other sources of water for schools like river water have tendency to be contaminated by bathing, urinating, refuse, industrial waste or animal excreta in the water and human defecation. Show (2009) noted that all water is susceptible for contamination and therefore it is important and imperative to subject any form of water to water treatment.
system. This is in tandem with the requirement of the school national health policy (2009). However, the researcher observed that those schools with boreholes and springs sources of water facilities were well protected and had steady supply of water.

The study established that most schools (35.5%) stored drinking water in clay pots, followed by water jars and least by masonry tanks at 6.4 percent. Clay pots are traditionally known to make water cooler because they do not absorb heat like most other vessels. They are cheap, popularized locally and also manufactured using appropriate local technology (Wood et al 2008). Show (2009) argued that to make water safe for drinking it is important to first store it for more than two days before use. This effectively prevent the transmission of diseases like schistosomiasis, whose cercariae which are the intermediate host in the life of the schistosomes, can only survive for 48 hours after leaving the snail. This argument underscores the importance of storing water for a reasonable period before use. Conversely, Wood (2008) cautions that water may go bad and lose its natural taste if stored for far too long in clay pots or cistern because of oxygen deprivation. However, the study observed that all storage facilities for drinking water in all the 31 sampled schools were not fitted with drawing taps which are usually meant to help avoid cross contamination. This was in contravention of the schools’ health policy (2009), the public health act (cap 242) and the water development act (2002). The three state agencies argue that water from any source may become contaminated if it is drunk from dirty or communal drinking vessel that has no fitted tap for running water.

Regarding making water safe for drinking, the study established that boiling (58.07), additional of antiseptic chemicals like chlorine (29.03%) and filtration (12.90%) were observed as the methods used to ensure safe drinking water. However, the study observed
that boiling water was done on limited scale and made mainly available for teachers perhaps due to high expenses involved in boiling. NSHP (2009) asserts that the health benefits of safe and adequate drinking water reduces diarrhea and brings enhanced psychosocial well being of the pupils. In his work, Sandly (2002) agrees that access to safe drinking water is essential to health, is a basic human right and a component of effective policy for health protection at national, regional and local level and other institutions. The import of these methods used at schools indicated that there was high awareness on the need to prevent water borne and water related diseases and this conforms to the requirements of the national school health policy (2009). Simple methods of water purification like filtration in which water is filtered through the pottery candle and eventually stored in containers is recommended for schools and can also serve as teaching experiments for pupils, KSWHPHPS (2008). However, this method is the least adopted by the sampled schools for water sterilization. Caincriss (2002) observed that boiling as a method of water sterilization is the easiest and safe way to sterilize water but few people are prepared to do this regularly. The author’s observation is in line with practices of sterilization methods in most schools which stood at 58.07% for water. The gist of the author’s argument is that since few people or institutions will bother to boil water, they must be encouraged to protect the water source. However, this author’s argument, though true, is contrary to results of this study on the same. According to Nissen (2002), filtration method is arguably as a very cheap and safe way of water sterilization. Allowing water to stand for a long time gives many harmful organisms which may be in it to die because they cannot survive in water for a long time. This
method also allows most of the suspended matter to settle to the bottom thus rendering water to be clean and safe for use.

The study established that 93.55 percent of the 31 sampled schools had never had water inspected, sampled or analyzed by health officials. One of the major requirements of the National School Policy (2009), the KNSWH (2012) and the public health act (2012) is that water quality surveillance and monitoring should be carried out in schools at least twice per term and sometimes after an outbreak of diseases, after drought and after rains to ensure safety. Perhaps this lack of water quality control mechanisms could be attributed to weak government enforcement systems. WHO (2006) asserts that this is the systematic identification of the current level of quality the facility or system is achieving and is one way of quantifying the current performance or compliance with the expected standards. Failure to carry out such an important activity in 93.55% of the schools is an indicator that pupils and other members of the schools have the potential of running into risks of contracting preventable water related diseases. Sanitary water reports provides a direct method of identifying all the hazards that are potential and actual causes of contamination of the water supply (Afubwa and Mwanthi, 2013). This therefore in turn provide essential information about immediate and on-going possible hazards associated with school water supply even in the absence of microbiological or chemical evidence of contamination.

Results from laboratory on the biochemical, physical and bacteriological analysis of water samples from five schools revealed that all variables examined were within normal standards set by both WHO (1975) and Ministry of Water by the Kenya Government (2008). Goal (2006) asserts that the presence of bacteriological coliforms in a water
sample is a sign of heavy contamination. Coliforms especially of the type Escherichia
coli is found in the intestinal tract of man and animals. Therefore the presence of even
one Escherichia Coli is indicative of faecal pollution and hence the water being
unsuitable for drinking. This argument is supported by similar findings by WHO (2006)
on contamination of drinking water.

5.2.3 Discussion on school hygiene

All the 31 sampled schools had their pupils undergo routine personal check ups as
enshrined in the school health policy (2009). The policy provides that teachers should
undertake routine personal hygiene check-ups of the pupils’ clothes, washings, nails and
other body care. The study found out that in 65% of the schools pupils underwent weekly
check-ups while in some others, it was a monthly affair. These variations implied that
there was no policy that guided and bound the district schools on how often the check-
ups could be uniformly conducted in the schools.

NSHP (2009) asserts that hygiene education should be organized at least once every four
months in collaboration with the ministry of public health and sanitation. Nordberg
(2006) observed that many careless and unhygienic habits help spread some diseases
particularly the contact diseases and those that may spread by the hands, food, soil and
water. He argued that changes in personal behavior are often difficult to initiate and
require an educational process. This argument is in tandem with what the school health
policy (2009) advocates and needs to impart to pupils.

Regarding hand-washing facilities among schools, the MOEST (2001) criteria states that
a maximum of 30 pupils are required to use one basin for washing hand. However, in its
observation, this study established that only one basin was available for use by both girls and boys in those schools that had the facility (32.30%). This could result in overcrowding and hence easy spread of diseases. This suggested that there was lack of supervision and enforcement by the local public health officers (PHO). Similarly, there could have been failure of school inspectors and health teachers to ensure that the education act (cap 211) was not being implemented and enforced. A study done by unicef (2010) resonates well with the findings of this work for it argued that good sanitation improved quality of life by 32% in reducing communicable diseases like diarrhea and it must be accompanied by good hygiene practices.

The study observed and established that 84% of the pupils did not wear shoes. This large body mass of pupils were seen as potentially predisposed to risks of contracting preventable infections such as worm infestations and diarrhea diseases. This study is supported by a similar one done by Nyaguthii (2005) in which she found out that 60% of pupils attending Nyeri municipality schools in Kenya did not wear shoes. Walking bare footed to many toilets that are contaminated with urine and soiled with fecal matter is hazardous to children’s health.

The study established that 22.6% of the schools facilitated pupils with sanitary towels which were supplied by the local NGO’S. In 2005, the Kenya parliament passed a motion requiring the government through the ministry of education to provide free sanitary pads and cleaning materials for girls in schools. This was meant to reduce absenteeism, improve personal hygiene, reduce diseases and create a good learning environment in schools. A study conducted by unicef (2010) supported this argument on the need and importance of sanitary towels for school girls. These research findings were also
supported by the work of Mumbi (2007), who concluded that poor hygiene and inadequate sanitation facilities had negative implications on the girl child participation in primary education. She observed that due to lack of toilet papers, pupils used filled exercise books when visiting the toilets which showed that teachers were not inculcating scholarly discipline as the exercise books could be used for revision. It also indicated that the program for provision of sanitary towels by government to schools had not been implemented.

5.2.4 Discussion on sanitation in schools

A key requirement of MOH (2008) is that schools should ensure that the absolution and sanitation facilities were adequate, constantly used by pupils and that they were well maintained and hygiene promotion was always on going. The study established that in all public schools there was inadequacy of toilets as evidenced by pupil to toilet ratio population. Adequacy of the sanitary facilities was calculated and interpreted using the Kenya Building Code (2001). The code specifies that for the first 30 boys there should be 4 facilities and then one facility for every 30 boys. For girls, the code specifies that, for the first 30 girls there should be four facilities and one for every 39 girls. According to 1995 pilot survey of 14 countries in the developing world, the average number to each toilet in the schools was 50 (Wijk et al, 2003). In Sabatia district the average pupil to toilet ratio is 48:1. This suggests that the district was barely managing to keep up with the rise in pupil enrolment population. Overall, the study found the sanitary facilities for both gender to be grossly inadequate and inconsistent with education act (cap 211), the building code act (2001) and the public health act (cap 242). According to UNEP et al (2002), inadequate sanitation and water jeopardizes not only pupil’s health but also
school attendance. Girls are likely to be kept out of school if there are no sanitation facilities. The findings of this study are also consistent with the research done by Devreede(2003) who found out that there are several shortages of toilets in many public schools in Kenya.

Results from the study indicate that unlike private schools, pupils in public primary schools provide 100% labor force for classroom, toilet and general cleaning of the school compound. The study observed that the pupils were not provided with protective health gears such as hand gloves during the cleaning of toilets. This implied that pupils were at risk of contracting diseases related to hygiene and sanitation. These findings of the study are at variance with the study results of Torres et al (2002) in which he found that one of the major problems faced by hundreds of millions of school aged children is infestation with parasites and preventable diarrhea diseases. All these have compromised children’s attendance and performance in schools.

The study identified three methods of solid waste disposal in the schools: composite pit (64.5%), open burning (22.60%) and least by open dumping. And all the 31 schools used one or more than one method of refuse disposal. The researcher observed that dry and wet refuse were heaped in alternate layers on a plot of a depth 1.5 metres then covered with grass or earth for decomposition. This ensured safe protection of the environment thus reducing any health hazards and risks to pupils. This also ensured that the decomposed refuse provided future raw material for making fertilizer.

The research found out that simple open-air burning was the second most practiced method of solid waste disposal. However, this method has been argued as one of the
source of disease spread. Rubbish waiting to be burned harbours vermins and blows out thus becoming a source of disease spread. The crude open dumping method for refuse disposal according to Wood (2008) is commonly used but is arguably considered unsanitary. The study by Pickford (1999) is consistent with the practices of waste disposal by schools in this study. He opined that good sanitary practices stimulate learning environment for children’s behavioral change and serve as a model for pupils to influence the communities from which they hail.

From the foregoing results it is deductive to note that the majority of schools have the necessary skills to promote good sanitation practices in furtherance of provision of preventive health services.

5.2.5 Focus Group and Key informant Interviews

4.2.5.1 Focus Group Interviews

Thirty one focus group interviews were conducted in all the 31 sampled schools of Sabatia District. The focus groups consisted of the three school management committee members, the head teacher, the school health teacher and three representatives from parents’ association members.

Generally, all members of the FGD argued and agreed that teachers are expected to be leading members of the community in which they live in and work; are experts, and have special knowledge and experience of local community and environment. Therefore they had a duty and responsibility to communicate issues of water hygiene, sanitation and school health policies between the school and community so that the community could help them solve the schools’ health problems through corporate action. These cooperate
actions were identified by FGD as forming school health conventions to discuss children health and their learning health environment that is affected by water, hygiene and sanitation. The groups noted that the National School Health Policy and Guidelines documents for operationalization of the comprehensive National school Health program (2009) had not been availed to schools for implementation. One of the participant was quoted as saying, “if school health is properly managed, it can improve access to health services, educate pupils about pressing health issues and promote a safe and health environment in which pupils can learn and grow”. Other actions included organizing local health education where local chiefs, local health centre health officials, religious leaders, and parents are invited to a health talk to ensure that schools had clean and hygienic environment for learning and teaching. In addition, FGD members suggested that schools should form a partnership for health with business community, politicians, NGO’s and other donor agencies to help them support school projects like construction of modern secure boreholes for safe, clean, available and sufficient water. A parent was also quoted as thus, “to date, the full potential of school health has not been reached due lack of community and external support”. Others gave options for construction of health resource centres in schools where health education materials would be displayed such as a model environment for cleanliness. These suggestions by the FGD tally well with the works of Linda M et al (2012) which impute that by working in partnership with families, community organization, businesses, and health care professionals, schools can increase their capacity to offer a comprehensive array of health services that can meet the health needs of the school community. The FGD demanded for the National School Health Policy (2009) documents to be made available to schools.
5.2.5.2 Key Informant Interviewees (KII)

The health education experts were composed of the public health nurse and the public health officer while the District education officer represented the education ministry.

Regarding water, sanitation and hygiene in schools, the officers were of unanimous opinion that their ministry did not have enough experts and laboratory facilities to undertake water surveillance, sampling, testing and monitoring in all primary schools. They noted that collaboration with the officials of ministry of water could enhance and improve the exercise. However, they pointed out that their key role in schools evolve around public health education, inspection of public health facilities, participation in school health services such as immunizations and enforcing public health laws.

The education officer noted that his role was to ensure education standards and education ethics are followed by the schools, teachers and pupils and to liaison with other ministries in solving health problems in school communities and must be in tandem with the school health policies. However, it must be noted that the Education Officer’s role is supposed to be facilitative thus linking the schools with the public health department and ministry of water officials.

5.3 Summary of the Conclusions

Unicef (2010) noted that Health programs are meant to ensure that children enroll and stay in schools, learn more while in school and develop skills, knowledge and health behavior that protect themselves and their future children from preventable disease. This study looked at the National School Health Policy which was meant to enable the Government address the health and education needs of the learners, teachers and their
families on matters of water, hygiene and sanitation. The objectives of the study were to determine the risk factors to disease transmission, the measures put in place for prevention and control of diseases related to water, hygiene and sanitation in schools and the awareness of the Health policy and its implementation. This research based on its findings concluded as follows:

1. The study revealed that there were health hazards that could potentially interfere with pupil’s education. This was evident in the lack of adequate sanitary facilities, presence of many dirty toilets, absence of hand washing facilities, the use of pupils to clean dirty toilets without wearing shoes and failure to fit drawing taps on storage facilities to prevent contamination for drinking water.

2. All schools had not been provided or accessed the National School Health Policy and Guidelines (2009) documents from the Ministry of Education that could help them operationalize the comprehensive National School Health program on water, hygiene and sanitation requirements for schools. This was evident in the focus group discussions.

3. The study established that solid waste collection, storage and appropriate disposal was well carried out by the schools and conformed to the requirement of the public health act (2012) cap 242 of the law of Kenya. The researcher confirmed this through check list observation.

4. That, by in reference, the Null Hypothesis was rejected and alternate hypothesis accepted. This was because the chi-square test of association at p-value of <0.05 proved that the current status of water hygiene and sanitation in the schools still
posed a potential risk to the health of the pupils and did not meet the requirements of the National Schools Health Policy.

5.4 Recommendations

The recommendation of this study may be used or influence policy making and change, training, management of school health and other forms of timely interventions. The recommendations are based on the findings of the study and are as follows:

1. To improve the National School health program, there is a need for schools to come together to develop a National Self-Assessment Tool cascading to District Education Levels to help monitor and evaluate school health policy and programs on water, hygiene and sanitation. This will help identify the strengths and weakness of the school health programs and should contain agreed guidelines for indicators to assess progress in its implementation.

2. National School Health Policy (2009) and the National School Health Guidelines documents be availed to schools by the ministry of education to enable teachers to read, understand and interpret the document requirements so that they can fast track water, hygiene and institution issues in the schools.

3. To help attain vision 2030 through sustainable environment and industrialization, schools should consider constructing toilets with aseptic tanks that can be emptied by Municipal Exhauster trucks to disposal sites; and which in turn can be used to provide raw materials for fertilizer industry in future. Schools have the potential to provide this material because of its large populations.
4. All schools in the District should strive to construct at least a functional borehole through collaboration with NGO’s, donor’s government and local communities. This will create a sustainable availability of clean, safe water and reinforce sound hygiene and sanitation practices.

5.5 Further Research

Further studies need to be carried out in the following areas:

1. A study of primary schools as new potential frontiers for supply of Liquid waste raw materials in future for fertilizer industries in the counties. This will help the country to attain vision 2030 through industrialization and job creation. The large body mass of pupils can supply sufficient and sustainable excreta raw materials for the industry.

2. The impact of poor hygiene and sanitation and unavailability of water for teaching and learning in primary schools.

3. A feasibility study on the outsourcing of workers to provide labor for sanitary facilities in primary schools.

4. A study on the feasibility for toilets with aseptic tanks in all rural primary schools.
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Unicef- Water, sanitation and hygiene [http://www.unicef.org/wash_index-43/07htm]
14th March 2013.


APPENDICES

Appendix 1.0 Letter of Transmittal

Kenyatta University
P.O. Box 43844
Nairobi, Kenya

Date: __________________

The District Education Officer
Sabatia District
P.O. Box
Wodanga

RE: RESEARCH STUDY

I am a post graduate student (No. 157/6024/004) undertaking a Master Degree in Public Health (Family Health and Epidemiology) at Kenyatta University. I wish to carry out a study in your area. The study is titled: "Assessment of School-Based Health Programmes on the status of water, hygiene and sanitation in Sabatia District."

I have identified your district as a very important resource for this questionnaire exercise. I wish to assure you that I will be nothing but ethical in my work. The results of the study will be used for academic purposes and may go along way in assisting policy formulation and perhaps improve and encourage best practices in health delivery services regarding school health programmes.

The findings of the study will be made available to your institution.

The purpose of this letter is to request for your permission to conduct this research.

Thank you.

Yours faithfully,

KIJUNGU M. MESHACK
Appendix 1.1 Informed Consent Form

Kenyatta University
P.O. Box 43844
Nairobi, Kenya

SUBJECT: INFORMED CONSENT

Dear Respondent,

My names are Kishasha Meshack Kijungu. I am a Masters student from Kenyatta University. I am conducting a study titled: ‘Assessment of School Health on the Status of Water, Hygiene and Sanitation in Primary Schools, Sabatia District, Vihiga County, Kenya’. The information obtained will be used by ministry of Education, the Ministry of Health and Water as well as other stakeholders to formulate policies, develop interventions that will help improve school health.

Procedure to be followed

Participation in this study will require that I ask you some questions and also access educational records at your offices and schools. I will record the information from you in a structured and checklist questionnaire.

You have the right to refuse participation in this study. You will not be penalized nor victimized for not joining the study and your decision will not be used against you at your place of employment or study.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any question(s) and you may stop an interview at any time. You may also stop being in the study at any time without any consequences to the service you are rendering or as a pupil.

Discomforts and Risks.

Some of the questions you will be asked on the subject may be embarrassing or make you uncomfortable. If this happens; you may refuse to answer if you choose. You may also stop the interview at any time. The interview may take about 15 minutes.

Benefits

If you participate in this study you will help us to learn about the status of health in schools regarding water, hygiene and sanitation. This is important because it will assist us to improve the health of our school going children and their learning environment. You will benefit from this because the study will help us to determine any future health interventions for our children.
Rewards

If you agree to participate in this study, tea and buttered bread will be provided to you at the time of interview.

Confidentiality

The interviews will be conducted in a private setting within the school or the offices. Your name will not be recorded on the questionnaire and that the completed questionnaires will be kept in a safe place at the University.

Contact information

If you have any questions you contact the following supervisors: 1. Dr. John Oyore of Telephone ………………….. and Dr. Peterson Warutere of Telephone ……………… or Kenyatta University Research Review Committee of Box…………………Nairobi Kenya.

Participant’s Statement.

The above statement regarding my participation is clear to me. I have been given a chance to ask questions and my questions have answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work or study whether I decide to leave the study or not and my decision will not affect the way I am treated at my place of work or study.

Name of Participant………………………………………..Date………………………..

Signature of participant…………………………………………………

Investigators Statement

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

Name of interviewer…………………………………………Date………………………

Interviewer’s Signature………………………………………………
Appendix 1.2 Informed Consent Form

Kenya University
P.o Box 43844
Nairobi, Kenya

SUBJECT: ACTIVE INFORMED CONSENT

Dear Parent/ Guardian,

My names are Kishasha Meshack Kijungu. I am a Masters student from Kenyatta University. I am conducting a study titled: ‘Assessment of School health on the status of water, hygiene and sanitation in primary schools, Sabatia District, Vihiga County, Kenya.

Your child has been identified as an important asset in this study. The purpose of this letter is to seek your consent to allow your child to participate in the study.

Attached please find the letter of informed consent for the child outlining the procedure to be followed during the study, explanation on the benefits, rewards, privacy of the study and the discomforts and risks involved.

Parent/Guardian statement.

The above statement and the informed consent for my child hereby appended are clear to me regarding the procedure to be followed in the study and the risks and the benefits involved. I hereby give consent for participation.

Name of parent/guardian..................................................Date......................

Signature of Parent/guardian.................................................................
Appendix 1.3

**QUESTIONNAIRES**

**School Interview Form 1 – Teachers/Head**

**SECTION I**

A. **Socio-Demographic Characteristics**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Division</td>
<td>1. Sabatia</td>
</tr>
<tr>
<td>4. No. of male staff</td>
<td></td>
</tr>
<tr>
<td>5. No. of female staff</td>
<td></td>
</tr>
<tr>
<td>6. Total no. of staff</td>
<td></td>
</tr>
<tr>
<td>7. No. of boys</td>
<td></td>
</tr>
<tr>
<td>8. No. of girls</td>
<td></td>
</tr>
<tr>
<td>9. Total no. of pupils</td>
<td></td>
</tr>
</tbody>
</table>

B. **WATER**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10. What are the sources of drinking water for children while in school?</td>
<td></td>
</tr>
<tr>
<td>1. Rivers</td>
<td></td>
</tr>
<tr>
<td>2. Brought from home</td>
<td></td>
</tr>
<tr>
<td>3. Tap water at the school</td>
<td></td>
</tr>
<tr>
<td>4. From a dug well at the school</td>
<td></td>
</tr>
</tbody>
</table>
5. Rain-roof harvested water
6. Others (specify) __________

11. How do you ensure safe drinking water for the school community?
   1. Boil always
   2. Boil sometimes
   3. Add chemicals (chlorine)
   4. Use of treatment plant
   5. Others (specify) __________

12. How is drinking water stored at school?
   1. Plastic tanks
   2. Masonry tanks
   3. Ordinary drums
   4. Water jars
   5. Clay pots
   6. Ferro-cement tanks
   4. Others (specify) __________

13. Is water for drinking and other uses inspected by Ministry of Health and water officials?
   1. Yes
   2. No

14. If yes for 13, how often?
   1. At opening of school
   2. At closing of school
   3. Before closure and opening of school
   4. Others (specify) __________
C. HYGIENE

15. What type of sanitary facilities does the school have?
   1. Water-borne
   2. VIP latrine
   3. Ordinary latrine
   4. Others (specify)_________

16. If a pit latrine, what kind of floor does it have?
   1. Cement
   2. Earth (soil)
   3. Wooden
   4. Others

17. How many toilets are there for boys?
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)____________

18. How many water-borne facilities are there for girls?
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)____________

19. How often are the toilets cleaned?
   1. Once daily
   2. Twice daily
3. Once weekly
4. Others (specify)  

20. Are there facilities for hand washing?
1. Yes
2. No

21. How do you take care of the pupils who fall sick at school?
1. Send them home
2. Treat at school dispensary
3. Refer to nearest health facility
4. Others (specify)_____________

D. SANITATION

22. How is the solid waste (from school) disposed of?
1. Composite pit
2. Open burning
3. Burning
4. Open dumping
5. Others (specify)_____________

23. How do you prevent and control vector borne diseases like malaria?
1. Using insecticides (ITNS)
2. Use information education Information
3. Cleaning of bushes
4. Drainage of stagnant water
5. Use of prophylases
6. Use of larvicides
7. Others (specify)___________
24. How about prevention and control of pests, vermin, worms and other parasites

   1. Use of clean treated drinking water
   2. Encouraging children to wear shoes
   3. Regular stool examination
   4. Washing, deworming children
   5. Storage of food in meshed cupboard
   6. Coverage of water tanks
   7. Ventilated improved pit latrines
   8. Others (specify)_____________________

25. What are the challenges schools face in provision of water, hygiene and sanitation?
Appendix 1.4

Pupils Personal Data (Interview)

A. SOCIO-DEMOGRAPHIC

1. Division
   1. Sabatia
   2. Chavakhalı

2. School name
   1. Public
   2. Private
   3. Informal school

3. Gender
   1. Male
   2. Female

5. Age (years)
   1. >14
   2. 9 – 13
   3. 4 – 8

6. Residence (village etc)

7. Number of days absent from school over the last six months (school register)

8. Is child wearing shoes (observe)
   1. Yes
   2. No

9. Do you wear shoes at home
   1. Yes
   2. No

B. SAFE CLEAN WATER

10. What are the sources of drinking water at school?
    1. River
    2. Spring
    3. Piped water
    4. Boreholes
    5. Venders
6. Rain water (roofs)  
4. Others _________________________

11. Do you make water safe for drinking?  
1. Yes  
2. No

12. If yes for No11 what do you do to make water safe for drinking?  
1. Boil always  
2. Boil sometimes  
3. Add sometimes  
4. Add chemicals (disinfect)  
5. Others (specify) ___________________

13. How is water for drinking stored at school?  
1. Plastic tanks  
2. Masonary tanks  
3. Water jars  
4. clay pots  
5. Others (specify) ____________________

14. Is there a time when health and water officials come to take water samples for analysis from your water source?  
1. Yes  
2. No

15. Are you aware of the meaning hygiene?  
1. Yes  
2. No

16. Does the school in conjunction with Ministry of Public Health and Sanitation/other stake holders organize regular education on hygiene at the school?  
1. Yes  
2. No
17. Does the school provide sanitary or equivalent for the girls/anal cleaning?
   1. Yes
   2. No

18. Does the school undertake routine personal hygiene checkups of the pupils (e.g. oral hygiene, nail cuts, clothes etc)?
   1. Yes
   2. No

19. If yes for No. 18, how often is hygiene checks ups done?
   1. Daily
   2. Weekly
   3. Fortnightly
   4. Monthly
   5. others specify ______________

20. Does your school have a latrine/toilet? (Verified by inspection)
   1. Yes
   2. No

21. If yes for No.20 what type (verified by inspection)
   1. Pit latrine
   2. Communal pit latrine
   3. Water closer
   4. Others (specify) ______________

22. If no for No. 20, where do you go for long and short call?
   1. Bush
   2. River
   3. others (specify)______________

23. When do you wash your hands?
   1. After visiting latrine
   2. before eating
   3. After handling dirty items
   4. Before and after eating
5. After toilet, before and after eating

6. Others (specify)

______________________

24. Why do you wash your hands before eating?
   1. prevent diseases
   2. Others
      (specify)______________________

25. Should fruits be washed?
   1. Yes
   2. No

26. Do you wash fruits before eating food
   1. Yes
   2. No

27. If No to No.26, why not?
   1. Lack of water
   2. No need to wash
   3. Others (specify)_______________

28. Have you been sick for the last 2 weeks?
   1. Yes
   2. No

29. If yes for no.28 what are you suffering from?
   1. Diarrhea
   2. Cough
   3. Stomach ache
   4. Headache
   5. Others (specify)________________
30. When sick, do you go for treatment?
   1. Yes
   2. No

31. If No for no 30, why not?
   1. I was not too sick
   2. I was bought medicine
   3. Lack of money
   4. Others (specify) ______________

32. Does your school have facilities or water points for washing hands after toilet or meals?
   1. Yes
   2. No

D. SANITATION

33. Does your school have sanitary facilities like toilets, ablutions?
   1. Yes
   2. No

34. Do you think the toilets are adequate for the students/pupils population?
   1. Yes
   2. No
35. How clean do you consider the toilets

1. Very clean
2. Good
3. Dirty
4. Others (specify) ________________

36. Does your school have appropriate/enough sanitary bins (containers for waste disposal)

1. Yes
2. No

37. Are there provisions in school for control, and prevention of pests, vectors and vermin’s?

1. Yes
2. No

38. If yes for no.37 which control measures are available?

1. Drainage of stagnant water
2. Use of insecticide/larvicides
3. Use of insecticide treated nets
4. Storage of food in meshed cupboard
5. Coverage of water tanks
6. Ventilated improved pit latrines
7. Others (specify)____________________
Appendix 1.5

Observational checklist – form for the searcher

1. What is the general cleanliness of the male and female waterborne facilities?
   1. Excellent
   2. Good
   3. Satisfactory
   4. Fair
   5. Poor

2. How many of the male waterborne facilities are clean or dirty
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)_______________________

3. How many of the female waterborne facilities are clean or dirty
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)_______________________

4. What is the general cleanliness of the pit latrines for the boys
   1. Excellent
   2. Good
   3. Satisfactory
   4. Fair
   5. Poor

5. What is the general cleanliness of the pit latrines facility for females
1. Excellent
2. Good
3. Satisfactory
4. Fair
5. Poor

6. How many of the male pit latrines are clean or dirty?
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)_______________________

7. How many of the female pit latrines are clean or dirty?
   1. One
   2. Two
   3. Three
   4. Four
   5. Five
   6. Others (specify)_______________________

8. Is there any hand washing facility (i.e. near the toilet and with soap)
   1. Yes
   2. No

9. If yes for No 8, what type
   1. Tap water
   2. Hand wash basin
   3. Leaking time
   4. Others (specify)________________________
10. Observe for availability of water, wearing of shoes by pupils, state of classrooms, refuse disposal methods and key performers of sanitary duties in the schools.

Appendix 1.6

Focus group discussion Form IV-parents (PTA)

1. How do you ensure the school has access to safe clean water?
2. And what about ensuring that the school has hygiene environment for learning and teaching?
3. Are the schools well sensitized on the Kenya National School Health Policy on water, hygiene and sanitation?
4. In regards of pests, vermin’s and vectors in school, how do you prevent and control them?
APPENDIX 1.7

Key Informant Interview

1. What are the health problems concerning water, hygiene and sanitation that you experience or are reported to you from the primary schools?
2. As health and educational authorities, how do you relate with schools in solving these problems?
3. How do you enforce compliance to National school health Policy on water, hygiene and sanitation?
Appendix 1.8

Safe Drinking Water


<table>
<thead>
<tr>
<th>Water characteristics findings</th>
<th>WHO standards</th>
<th>Laboratory findings for water in schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(a) Physical</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Turbidity</td>
<td>5 - 25</td>
<td></td>
</tr>
<tr>
<td>2. Colour(pt-scale)</td>
<td>5 - 50</td>
<td></td>
</tr>
<tr>
<td>3. Taste and odour</td>
<td>Nothing</td>
<td></td>
</tr>
<tr>
<td>4. Others (specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(b) Chemical</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PH</td>
<td>8.8 – 6.5</td>
<td></td>
</tr>
<tr>
<td>6. Hardness</td>
<td>100 - 500</td>
<td></td>
</tr>
<tr>
<td>7. Lead</td>
<td>0.10 – 0.10</td>
<td></td>
</tr>
<tr>
<td>8. Calcium</td>
<td>75 - 200</td>
<td></td>
</tr>
<tr>
<td>9. Fluorides</td>
<td>1 – 1.5</td>
<td></td>
</tr>
<tr>
<td>10. Nitrates</td>
<td>45 - 45</td>
<td></td>
</tr>
<tr>
<td>11. Chlorides</td>
<td>200 - 600</td>
<td></td>
</tr>
<tr>
<td>Others (specify)</td>
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<td></td>
</tr>
<tr>
<td><em>( C )Bacteriological</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Coliform(E. Coli)</td>
<td>0 - 0</td>
<td></td>
</tr>
<tr>
<td>13. Others</td>
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Appendix 1.9

Budget For The Research

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<th>Item</th>
<th>Purpose / Activity</th>
<th>Cost in Kshs.</th>
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<td>Proposal</td>
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<td>Thesis</td>
<td></td>
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<tr>
<td></td>
<td>Flash disks (2)</td>
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<tr>
<td>Photocopying charges</td>
<td>Proposal copies (6)</td>
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<td></td>
<td>Research instrument for 130 subjects</td>
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<td></td>
<td>Thesis binding binding (6 copies)</td>
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<tr>
<td>Other stationery</td>
<td>Typing paper (3 reams)</td>
<td>900/=</td>
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<tr>
<td></td>
<td>Pens (pencils (7)</td>
<td>1,050/=</td>
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<tr>
<td></td>
<td>Note books (5 books)</td>
<td>1,000/=</td>
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<tr>
<td></td>
<td>Files (3 robin type)</td>
<td>640/=</td>
</tr>
<tr>
<td>Full accommodation</td>
<td>For research at Golf Hotel, Kakamega @Kshs.3,000/= per day for 60 days.</td>
<td>180,000/=</td>
</tr>
<tr>
<td>Training Data Collection</td>
<td>2 Research assistants @Kshs.600/= per day for 5 days.</td>
<td>6,000/=</td>
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<tr>
<td>Lab Tests for water samples</td>
<td>31 samples @ Ksh2500 per sample</td>
<td>77,500</td>
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<tr>
<td>Two Research Assistants</td>
<td>Payments during data collection for 60 days at Kshs.1,000/= per day.</td>
<td>60,000/=</td>
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<tr>
<td>External Supervision</td>
<td>Honorarium</td>
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<tr>
<td>Transport</td>
<td>From Kakamega to Sabatia and back per day @Kshs.400/= per day for 60 days.</td>
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<td>Contingencies</td>
<td>Emergencies / other needs 10% of Grand Total</td>
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<td></td>
<td>Grand Total</td>
<td>505,499/=</td>
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Appendix 1.10

The 31 Participating schools, enrolment and pupil-toilet ratio

<p>| Primary Schools (n=31) | Boys | | | Girls |
|------------------------|------|-------------------|-------------------|
|                        | Enrolment | No of functional Toilets | Pupil - Toilet ratio | Enrolment | No. of functional toilets | Pupil-toilet ratio |
| Vokoli                 | 320 | 6 | 54:1 | 315 | 8 | 40:1 |
| Kapsambo               | 137 | 3 | 45:1 | 144 | 3 | 48:1 |
| Mudungu                | 134 | 3 | 45:1 | 149 | 4 | 37:1 |
| Chamakanga             | 212 | 4 | 53:1 | 233 | 6 | 39:1 |
| Lotego                 | 140 | 3 | 47:1 | 156 | 4 | 39:1 |
| Ikuvu                  | 221 | 4 | 56:1 | 175 | 4 | 44:1 |
| Kivagala               | 230 | 4 | 56:1 | 195 | 6 | 33:1 |
| Gahumbwa               | 190 | 2 | 80:1 | 216 | 4 | 52:1 |
| Kigama                 | 289 | 7 | 42:1 | 306 | 8 | 39:1 |
| Kisangula              | 156 | 4 | 39:1 | 176 | 4 | 44: | |
| Vohovole               | 166 | 3 | 56: | 183 | 4 | 46: |
| Bugina                 | 167 | 3 | 58: | 182 | 4 | 46: |
| Gaigedi                | 180 | 5 | 36: | 203 | 6 | 34: |
| Losengeli              | 217 | 5 | 44: | 234 | 5 | 46: |</p>
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<tr>
<th>Place</th>
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<th>Patients</th>
<th>4:1</th>
<th>Patients</th>
<th>5:1</th>
<th>Patients</th>
<th>6:1</th>
<th>Patients</th>
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<td>108</td>
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<tr>
<td>Lyaduywa</td>
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<td>64:1</td>
<td>200</td>
<td>4</td>
<td>50:1</td>
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Appendix 1.11: Kenyatta University Research Authorization

KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530


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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION KISHASHA MESHACK KIJUNGU – REG. NO.
157/6024/2004

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

Mr. Kijungu intends to conduct research for a M.P.H proposal entitled,
“Assessment of School Based Health on the Status of Water, Hygiene and
Sanitation in Primary Schools, Sabatia District, Viliga County, Kenya.”

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL
Appendix 1.12: Research Authorization By Ncsti

NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310371, 2219420
Fax:+254-20-318245, 318249
Email: secretary@ncosti.go.ke
Website: www.ncosti.go.ke
When replying please quote
Ref. No.

NACOSTI/P/14/7409/715

Meshack Kishasha Kijungu
Kenyatta University
P.O Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "Assessment of school based health on the status of water, hygiene and sanitation in primary schools, Sabatia District, Vihiga County, Kenya," I am pleased to inform you that you have been authorized to undertake research in Vihiga County for a period ending 31st December, 2016.

You are advised to report to the County Commissioner and the County Director of Education, Vihiga 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. M. K. RUGUTTT, PhD, HSc.
DEPUTY COMMISSION SECRETARY
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:
The County Commissioner
The County Director of Education
Vihiga County.
Appendix 1.13: Research Permit By Nesti
Appendix 1.14: Ethics And Review Committee Approval- Kenyatta University

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Email: knerc.chairman@kua.ac.ke
knerc.secretary@kua.ac.ke
Website: www.ku.ac.ke

P. O. Box 43844 - 00100 Nairobi
Tel: 5710901/12
Fax: 8711242/8711575

Our Ref: KU/R/COMM/51/240

Date: 23rd October, 2013

Kishasha Meshack Kijungu
Kenyatta University,
Department of Community Health,
P.O. Box 43844 00100-Nairobi

Dear Mr. Kishasha,

APPLICATION NUMBER PKU/157/1 138 – “ASSESSMENT OF SCHOOL-BASED HEALTH ON THE STATUS OF WATER, HYGIENE AND SANITATION IN PRIMARY SCHOOLS, SABATIA DISTRICT, VIHGIA COUNTY, KENYA”

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic, “Assessment of school-based health on the status of water, hygiene and sanitation in primary schools, Sabatia District, Vihiga County, Kenya” received on 11th September, 2013.

2. APPLICANT
Kishasha Meshack Kijungu
Kenyatta University,
Department of Community Health,
P.O. Box 43844 00100-Nairobi

3. SITE
Sabatia District, Vihiga 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 is of the view that against the following elements of review,

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

AND APPROVED and that the research may proceed ON CONDITION that you incorporate its advise below.
ADVICE/CONDITIONS

With respect to matters of scientific design and conduct of study and recruitment of research participants, the following specific conditions must be fulfilled in writing before an approval can be granted. The manner of fulfilling these should be outlined and submitted to KU-ERC as soon as possible.

i. Title of the study is not clear. Rephrase it for clarity.
ii. Sampling criteria is not clear.
iii. Clarify who the respondents are in your study.
iv. Consent form is inadequate.
v. Mention how you will get permission from School Authorities to carry out the study.

When replying, kindly quote the application number above.

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.

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

I accept the advice given and will fulfill the conditions therein.

Signature.......................... Dated this day 21st of October, 2013.

cc. Vice-Chancellor
    Director: Institute for Research Science and Technology
Appendix 1.15: Map Of Sabatia Sub-County In Vihiga County