

**INFLUENCE OF SCHOOL WATER, SANITATION & HYGIENE PROGRAMS ON
PUPILS' PERFORMANCE AMONG RURAL PUBLIC PRIMARY SCHOOLS IN
MASENO DIVISION, KISUMU COUNTY, KENYA.**

BY

WAGA DAVID OCHIEN'G

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DECLARATION

This research project report is my original work and has not been presented for award in any university.

Signature Date

Waga David Ochien’g

L50/72354/2011

This research project report has been presented for examination with my approval as university supervisor.

Signature Date

Grace Gatundu

Department of Extra-Mural Studies

School of Continuing and Distance Education

University of Nairobi

DEDICATION

I dedicate this report to my family, Pretty, Tamia and Aldy for their love and encouragement to see me through the project. In particular, I feel so indebted to my wife Pretty for the sleepless nights she endured alone with baby Aldy when I left for studies fourteen days after she was born.

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TABLE OF CONTENT

	Page
DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENT.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	x
LIST OF ABBREVIATIONS AND ACRONYMS.....	xi
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	5
1.3 Purpose of the study.....	6
1.4 Objectives of the Study.....	6
1.5 Research Questions.....	7
1.6 Significance of the Study.....	7
1.7 Basic Assumptions of the Study.....	9
1.8 Limitations of the Study.....	9
1.9 Delimitations of the study.....	9
1.10 Definition of Significant Terms used in the Study.....	10
1.12 Organization of the Study.....	11
CHAPTER TWO: LITERATURE REVIEW.....	12
2.0 Introduction.....	12
2.1 The Concept of School Water Sanitation and Hygiene (SWASH).....	12
2.2 Safe Drinking water and Pupils' Performance.....	13
2.3 Sanitation and Pupils' Performance.....	14
2.3 Hand Washing and Pupils' Performance.....	16
2.5 Hygiene Education and Pupils' Performance.....	18
2.6 Theoretical Framework.....	20

2.7 Conceptual Framework	21
2.8 Chapter Summary.....	22
CHAPTER THREE: RESEARCH METHODOLOGY	23
3.1 Introduction	23
3.2 Research Design.....	23
3.3 Target Population	24
3.4 Sample Size and Sampling Procedures	25
3.4.1 Sample Size Determination	25
3.4.2 Sample Selection Procedure	26
3.5 Research Instruments	27
3.5.1 Pilot Testing of Research Instruments.....	27
3.5.2 Validity of Instruments.....	28
3.5.3 Reliability of Instruments	28
3.6 Data Collection Procedures.....	29
3.7 Data Analysis Techniques.....	29
3.8 Ethical Considerations.....	30
3.9 Operational Definition of Variables.....	30
CHAPTER FOUR: PRESENTATION OF FINDINGS, ANALYSIS, AND INTERPRETATION	33
4.1 Introduction	33
4.2 Questionnaire Return Rate	33
4.3 Demographic Characteristics of Respondents.....	33
4.3.1 Sexual Orientation of Respondents	33
4.3.2 Distribution of Respondents by Age	34
4.4 Availability and Access to Drinking Water and Pupils’ Performance.....	35
4.4.1 Availability of Water in school	36
4.4.2 Treatment of Drinking Water at School	36
4.4.3 Drinking water points	38
4.4.4 Perception of Respondents on the Link between Safe drinking Water and Performance.....	39
4.5 Availability and Access to Sanitation Facilities and Pupils’ Performance	40
4.5.2 Number of Latrine Doors Available	40
4.5.2 Cleanliness of Latrines	42
4.5.3 Perception of Respondents on the Link between Sanitation and Performance	43

4.6	Provision and Access to Hand Washing Facilities and Pupils' Performance	44
4.6.1	Availability of Hand Washing Facilities	44
4.6.2	Hand Washing Behavior among Pupils while at School	45
4.6.3	Availability of Soap for Hand Washing at School	47
4.6.4	Number of Hand Washing Stations Available at School.	47
4.6.5	Perception of Respondents on the Link between Hand washing and Performance	48
4.7	Provision of Hygiene Education and Pupils Performance	49
4.7.1	Hygiene Education in School	49
4.7.2	Number of Hygiene Education Lessons attended During the Year.....	50
4.7.3	Perception of Respondents on the Link between Hygiene Education and Performance.	52
CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS		54
5.1	Introduction	54
5.2	Summary of the Findings	54
5.3	Discussion of Findings	56
5.3.1	Availability and Access to Safe Drinking Water and Pupils' Performance	56
5.3.2	Availability and Access to Sanitation and Pupils' Performance	57
5.3.3	Provision and Access to Hand Washing Facilities and Pupils' Performance.....	58
5.3.4	Provision of Hygiene Education and Pupils Performance.....	59
5.4	Conclusions	60
5.5	Recommendations	61
5.6	Study Contribution to the Body of Knowledge.....	62
5.7	Suggestions for Further Research	63
REFERENCES.....		64
APPENDICES		68
	Appendix I: Letter of Transmittal	68
	Appendix II: Pupils Questionnaire	69
	Appendix III: Std 6 & 7 Enrolment for Maseno Division as at March 2013.....	73
	Appendix IV: Research Authorization.....	77

LIST OF TABLES

	Page
Table 3.1: Population Targeted for Study.....	24
Table 3.1: Sample Matrix.. ..	27
Table 4.1 Distribution of Respondents by Sexual Orientation.....	34
Table 4.2 Distribution of Respondents by Age.....	35
Table 4.3 Availability of Water in the school.....	36
Table 4.4 Treatment of drinking water at school.....	37
Table 4.5 Influence of Safe Drinking Water on Absenteeism.....	37
Table 4.6 No of water points available at school.....	38
Table 4.7 Drinking Water availability improves academic performance.....	39
Table 4.8 No of Latrine doors available for use at school.....	40
Table 4.9 Mean Number of Latrine Doors Available at School.....	41
Table 4.10 Cleanliness of latrines at school.....	42
Table 4.11 Influence of Clean Latrines on Absenteeism	42
Table 4.12 Availability of enough clean latrine improves performance.....	43
Table 4.13 Availability of hand washing facilities at school.....	44
Table 4.14 Hand Washing after visiting latrine and before eating at school.....	45
Table 4.15 Influence of Hand Washing on Absenteeism.....	46
Table 4.16 Availability of Soap for washing hands while at school.....	47
Table 4.17 No of hand washing stations at school.....	48
Table 4.18 Hand washing with soap at critical times improves performance.....	49
Table 4.19 Hygiene Education provided at school.....	50

Table 4.20 No of Hygiene Education Lessons attended this Year.....	51
Table 4.21 Mean No of Hygiene Education Lessons Attended this Year.....	51
Table 4.22 Influence of Hygiene Education on Academic Performance.....	52
Table 4.23 Hygiene Education improves performance at school.....	53

LIST OF FIGURES

	Page
Fig 1: Conceptual Framework.....	21

LIST OF ABBREVIATIONS AND ACRONYMS

ACRWC:	African Charter on the Rights and Welfare of the child.
CEPIS:	Council of European Professional Informatics Societies
CSHP:	Comprehensive School Health Program
FPE:	Free Primary Education
HPS:	Health Promoting Schools
ICPD:	International Conference on Population and Development
IRC :	International Water and Sanitation Centre
JICA :	Japan International Cooperation Agency
KCPE:	Kenya Certificate of Primary Education
KESSP:	Kenya Education Sector Support Program
MENA:	Ministere de L'Education Nationale
MoED:	Ministry of Education
MoEVT:	Ministry of Education and Vocational Training
MoPHS:	Ministry of Public Health and Sanitation
MoSPND&V2030:	Ministry of State for Planning, National Development & Vision 2030
NHSSP:	National Health Sector Strategic Plan
ODF:	Open Defecation Free

SIR:	Social Intelligence Reporting
SPSS:	Statistical Package for Social Scientists
SSHE:	School Sanitation and Hygiene Education
SWASH:	School Water, Sanitation and Hygiene
UNCRC:	United Nations Charter on the Right of the Child
UNICEF:	United Nations Children’s Education Fund
URTI:	Upper Respiratory Tract Infections
USAID:	United States Agency for International Development
WASH:	Water, Sanitation and Hygiene
WHO:	World Health organization
WSFSD:	World Summit For Sustainable Development

ABSTRACT

The study was carried out to evaluate the influence of school water, sanitation and hygiene programs on pupils' performance among rural public primary schools in Maseno Division. Based on the Human Capital Theory, the study sought to generate information that would be useful in increasing investment in SWASH programs by linking the programs to pupils' performance. The objectives of this study included; To find out how availability and access to safe drinking water influences pupils' performance among rural primary school in Maseno Division; To assess how availability and access to sanitation facilities influences pupils' performance among rural primary school pupils in Maseno Division; To explore how provision and access to hand washing facilities influences pupils' performance among rural primary school pupils in Maseno Division; To examine how provision of hygiene education influences pupils' performance among rural primary school pupils in Maseno Division. To achieve its objectives, the study adopted a descriptive survey design emanating from Quantitative research paradigm. A sample of 7 schools was selected from the total of 73 primary schools in the division using simple random sampling; a sample size of 360 pupils determined using Fisher's formula was selected to participate in the study. A standardized questionnaire was used to collect data from the 360 pupils. Data collected was entered in SPSS version 20.0 and analyzed to establish any relationships between the SWASH programs and Pupils' performance; this was achieved through the use of cross tabulation and correlation analysis. The study found out that treating drinking water at school could reduce absenteeism by 30%, using clean latrines at school could reduce absenteeism by 42%, hand washing after visiting the toilet and before eating could reduce absenteeism by 41% and that hygiene education has a strong positive relationship with academic performance with $r^2=0.76$. The discussions on the findings of the study led to the conclusion that availability and access to safe drinking water, availability and access to sanitation facilities, provision of hand washing facilities and hygiene education positively influenced the performance of pupils in rural public primary schools. The study recommended prioritization of SWASH programs during budgeting, mobilization of funds from alternative sources to implement SWASH programs and promotion of SWASH clubs in school to help pupils gain and sustain hygiene knowledge.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

School Water Sanitation and Hygiene (SWASH) programs have been in existence since the beginning of compulsory schooling in the latter half of the 19th century. Then, pioneers such as Chadwick, Howard and Simon argued that developing policies to change the social and physical conditions in which people lived provided significant improvement in health (Deschenes et al, 2003) as quoted in (Okech, 2012). There was need to align health and education in order to obtain healthy and successful school communities. It was observed that schools that worked purposely towards enhancing mental, social, emotional and physical health of their students frequently reported higher academic achievements, greater efficiency and development of both positive school climate and a school community culture that promoted and enhanced students' growth (Loevinsohn, 1990). The genesis of health curricular in many schools was the work of Clement Duke on school hygiene emphasizing hand washing, toileting and use of uncontaminated water (Duke, 1885) as quoted in(Okech, 2012).

In USA and Canada the concept of Comprehensive School Health Program (CSHP) better known as Health Promoting Schools (HPS) in which education; health and wellbeing of school children were made priority began early in the 19th century. In China, School hand washing with soap program reduced absentee days by 54%(UNICEF, 2010). In Columbia it is estimated that 10 million of Colombia's inhabitants lack access to clean water supplies and 16 million are without sanitary facilities (UNICEF O. , 2000). In response to these statistics, an international programme on School Sanitation and Hygiene Education (SSHE) is being carried out in six countries, including Colombia, promoted by UNICEF and the International Water and Sanitation Centre (IRC). The programme in Colombia was developed by

CINARA, a research institute of the Universidad del Valle, which has been working in school sanitation and hygiene education for more than 10 years. The process involved several phases, the first being a participatory diagnosis which found out that all schools had water supply systems but sometimes lacked continuous supply, toilets and hand washing facilities existed in all schools surveyed with an average of 30 to 50 children per cubicle but in some cases as high as 90. Hand washing facilities were over crowded highest being 167 per tap (CEPIS/WHO, 2000).

In BurkinaFaso a national Program for advancement of the supply of drinking water and sanitation piloted by the Ministry of Agriculture and Hydraulics was implemented in 2006 which included WASH in schools. This contributed to the 45% of schools having access to drinking water and 63.7% have access to functional latrines by as at 2009 (MENA, 2010/2011).

In Tanzania since 2009, WASH in Schools has gradually gained attention. A school WASH mapping research showed that only 11% of schools surveyed meet MoEVT minimum standards of 20 girls and 25 boys per drop hole, 20% of schools have more than 100 pupils per drop hole and 6% of schools have no latrine at all. The research further indicated that 96% of schools do not have facilities suitable for children with disabilities and that 52% of girls' latrines did not have doors. Despite the potential of handwashing facilities in improving health, 92% of schools did not have functional hand washing facilities (MoEVT, 2009/2010). However the country is arguably on the right path with the development of Draft National School WASH Guidelines and Toolkits and Draft National School WASH Strategic Plan.

In Kenya, the introduction of Free Primary Education (FPE) in 2003 resulted in a rapid increase in the number of children in primary schools, placing severe strain on school infrastructure and facilities which were already inadequate. The school population rose from

5.9 million pupils in 2002 to 7.2 million in 2003, to 8.2 million pupils in 2007 (MoED, Education Situation Analysis, 2010). Kenya has over 18,000 public primary schools and a large number of non-formal schools offering primary school curriculum (MoED, 2011).

The Ministry of Education (MoED), in collaboration with the Ministry of Public Health and Sanitation (MoPHS) and other partners, developed a National School Health Policy and National School Health Guidelines in 2009. The National School Health Guidelines are aimed at operationalizing the National School Health Policy by providing specific guidelines which ensures that school age children, teachers, support staff and community members access quality and equitable services for improved health.

Donor support to WASH in Schools has been remarkable with UNICEF as a key partner within the WASH in Schools sector in Kenya. The Government of Kenya/ UNICEF WASH Program (2008-2013) funded by the Government of the Netherlands includes WASH projects in over 780 schools in 22 (of some 60 original) districts.

According to the MoE Basic Report on Spatial Analysis of School Mapping Data, the national pupil to toilet ratio (2007) is indicated as 38:1 and 32:1 for boys and girls in public schools, respectively (MoE, Feb 2011). These ratios are generally thought to be inaccurate. Additionally, there is no reliable information on the condition and usability of the available facilities.

School WASH in Kenya has been prioritized in several policies, plans and laws have evolved. Sessional Paper No.1 of 2005 ultimately aims at expanding access, equity and improving educational quality in the country. United Nations Convention on the Right of the Child (UNCRC, 1989) and African Charter on the Rights and Welfare of the Child (ACRWC) as enshrined in the Children Act (2001) outline four pillars of Child Rights as Survival, Development, Protection and Participation Rights. UNCRC Specifically gives

young people the right to preventive healthcare and calls for specific protection for those in difficult situation or living with disabilities. Kenya's Children Act (2001) states that "Every child shall have a right to health and medical care, the provision of which is the responsibility of the parent and the government" (para.9). International Conference on Population and Development (ICPD, 1974) recognizes health as a fundamental human right to which all people including school children are entitled. National Health Sector Strategic Plan (NHSSPII), Kenya's blue print in healthcare provision as well as the Kenya Educational Sector Support Programmes (KESSP) emphasize the need to re-think health and education of school children.

Maseno Division has only 11% of households accessing piped water another 67% have access to portable water due to proximity to Lake Victoria and only 52% have latrines (MoSPND&V2030, 2009). These statistics points to potential dangers to school going children while both at school and at home and could indicate even worse situation in the schools because the community as key stakeholders in the development of facilities in schools may be seen not to prioritize WASH. According to SIR Kisumu West covering 12 schools only 25% and 8% of schools met the recommended minimum ratios pupil: latrine for boys and girls respectively. This in essence means that girls are at a disadvantage when it comes to study time wasted while queuing to use the latrines especially given the natural conditions that are unique to them. Nyabera primary school met the recommendation by putting up very temporary structures for use as latrines especially not conducive for girls. Diemo primary had the worst ratio for girls with 93 girls having to share one latrine door instead of the recommended 25 (District Planning Office, 2011).

1.2 Statement of the Problem

In Kenya, school age children (5-19 years) constitute 48 percent of the population and suffer varying but significant degree of ill-health that affect learning (MoED, 2009). Access to safe drinking water and adequate sanitation facilities coupled with adaptation of hygienic practices ensures improved health of the people and protect them, particularly the children, from a number of water and sanitation related diseases including the most commonly occurring disease - diarrhea. Schools are places where children actively stay for most of the day time and therefore for healthy and conducive learning environment, children need safe water for drinking and hand washing, and safe and friendly-to-use sanitation facilities. Improved health and quality learning is not possible without adequate water and sanitation facilities in schools. School children who have no access to safe water and sanitation have more chances to suffer from water and sanitation related diseases. Lack of safe water and sanitation facilities turn schools into unsafe places where diseases are transmitted with mutually reinforcing negative impacts on the children, their families, communities and overall development including academic performance. Limited or poor quality toilets as well as inaccessibility to clean and adequate water in many schools in Kenya increase girls' vulnerability to sexual harassment on their way to and from the toilet, force them out of school to search for water or jeopardize their special needs during menstrual periods.

It is important for policy makers to critically assess the progress being made by the School WASH interventions given the role it plays in intellectual growth and development of the learners, improving retention rates and health. It is recommended that schools provide access to latrines at the ratio of 25:1 and 30:1 for girls and boys respectively(UNICEF/WHO, 2011), many schools especially in the rural areas seem to fall far much below these ratios. According to Social Intelligence review (SIR), it would take more than two hours for all the boys at Rafiki Primary school in Galole District to use the latrine if they wanted to go at the same

time. In Jerirot primary School in Garissa District boy share latrines at the ratio of 82:1, and girls 50:1. The ratios are relatively the same for boys in Central Primary School Kitui District 83:1 and 84:1 for Shitswitswi in Butere District. More notably is that it would take seven hours for all 1,186 pupils of Shitswitswi primary to wash their hands at the single water point available in the school, almost the entire school day (GOK-UNICEF, 2011)

In Maseno Division, the main causes of morbidity are Malaria, URTI, Diarrhea for both the school going ages and the rest of the population (MOPHS-JICA, 2011). The Government and its partners through the Ministry of Public Health and Sanitation are implementing projects aimed at improving sanitation and hygiene in the community through Community Strategy and Open Defecation Free (ODF) Villages project, however focus also need to be given to a school approach to provision of water, Sanitation and Hygiene facilities because school children spend more time in school than at home given that the URTI and diarrhea incidences can directly be attributed water sanitation and hygiene.

1.3 Purpose of the study

The purpose of this study was to evaluate the influence of School Water Sanitation and Hygiene Programs on pupils' performance among primary schools in Maseno Division, Kenya.

1.4 Objectives of the Study

The Study was guided by the following objectives;

- 1 To find out how availability and access to safe drinking water influences pupils' performance among rural primary school in Maseno Division.
1. To assess how availability and access to sanitation facilities influences pupils' performance among rural primary school pupils in Maseno Division.

2. To explore how provision and access to hand washing facilities influences pupils' performance among rural primary school pupils in Maseno Division.
3. To examine how provision of hygiene education influences pupils' performance among rural primary school pupils in Maseno Division.

1.5 Research Questions

1. How does availability and access to safe drinking water influence pupils' performance among rural primary school in Maseno Division?
2. How does availability and access to sanitation facilities influence pupils' performance among rural primary school pupils in Maseno Division?
3. How does provision and access to hand washing facilities influence pupils' performance among rural primary school pupils in Maseno Division?
4. How does provision of hygiene education influence pupils' performance among rural primary school in Maseno Division?

1.6 Significance of the Study

School children who have no access to safe water and sanitation have more chances to suffer from water and sanitation related diseases most commonly diarrhea. Studies have shown that hand washing with soap can reduce the risk of diarrhea by 42-44% (Curtis, 2003), treatment and safe storage of drinking water at point of use reduces the risk of diarrhea by 30-40% (USAID 2004) and that latrine use/safe disposal of faeces can reduce the risk of diarrhea by 32% (Fewtrell, 2005). According to another study in Western Kenya schools, worms contributed to 25% of absenteeism and WASH in Schools was found to promote gender equality since Clean, safe toilets encouraged girls to stay in schools when menstruation starts, WASH reduced girls' absenteeism by 39%(UNICEF, 2010).

Based on these findings, this study sought to find out if the gains from school WASH contribute to good academic performance in primary schools. These gains include reduced absenteeism, reduced diarrhea, reduced worms among others as discussed above. The findings of this study are expected to inform policy formulation and implementation by both the Ministry of Education (MoED) and Ministry of Public Health and Sanitation (MoPHS) in Kenya. The findings also highlight deficiencies in compliance with the prescription of National School Health Policy with regard to School Water Sanitation and Hygiene. It is expected that MoED, MoPHS and their partners such as Unicef, Plan Kenya and Care Kenya among others will find information useful for budgeting and resource allocation and mobilization.

The findings of the study are expected to help school managers and stakeholders to prioritize projects accordingly, not ignoring those related to school WASH since the study seeks to establish the relationship between school WASH and academic performance. It is expected then that School WASH projects will then be given their fair share of budget commensurate with their importance in the physical and intellectual development of the pupils. Adequate allocation of funds to School WASH projects will then increase access and improve the welfare of the both learners and teachers.

According to UNICEF, a school with adequate WASH has a functional and reliable water system that provides sufficient water for all school needs especially hand washing and drinking. The school needs to have a sufficient number of latrines/toilets facilities for pupils and teachers that are private, safe, and clean and gender segregated. The school should have several hand washing facilities including some that are close to the latrines to facilitate hand washing after defecation. Facilities should cater for small children, girls of menstruation age and children with disabilities (UNICEF, 2011). The study will be useful in establishing the extent of provision of facilities as prescribed by local policy papers and UNICEF.

1.7 Basic Assumptions of the Study

The key assumptions of the study were as follows; that the availability of sanitation, hand washing facilities and drinking water in schools meant that the pupils had equal access and use them and vice versa; that all other factors that influence academic performance are held constant; that school administrators and other respondents would participate and give accurate information; and that the findings of this study would be useful to school stakeholders in preparation of future budgets and programs.

1.8 Limitations of the Study

The study was limited by the fact that there are many other factors that influence academic performance of pupils in primary schools and therefore using only one factor of School WASH to conclude for example that pupils in schools with adequate Water, Sanitation and Hygiene facilities performed better than those that did not have can be easily criticized. Speed of data collection may be limited by scattered distribution of most schools from each other. Researcher will make arrangement on means of transport to overcome this problem. Other factors that are likely to influence the Pupils' performance have been considered held constant by the researcher and are listed as extraneous, moderating and intervening variables in the conceptual framework.

1.9 Delimitations of the study

The study was delimited to primary schools in Maseno Division because primary school children constitute a bigger proportion of school-going children and often face more health challenges than their counterparts at higher levels either because of lack of capacity to take charge of their own health or because of mere neglect of their health issues by those concerned. Maseno Division was selected because it was purely rural and the findings would provide a picture of provision of School WASH facilities in rural schools. The respondents were head teachers and pupils of the schools. This was because of the head teachers' special

role in the management of the schools and as custodians of data useful for this study such as enrolment, KCPE results and data relating to School WASH facilities. Pupils are the primary consumers of WASH facilities and their views were key in this study.

1.10 Definition of Significant Terms used in the Study

- Hygiene** : Refers to the practice and acquisition of knowledge of keeping Oneself and surrounding Environment clean i.e. hand washing with soap.
- Sanitation** : Refers to the science of preventing and reducing diseases through provision of adequate latrine facilities to pupils.
- Water** : Refers to safe drinking water for the pupils i.e. treated or untreated but Uncontaminated sources such as protected springs, boreholes, piped.
- Performance** : Mean score in KCPE examinations, retention rates, transition rates and enrolments.
- WASH in Schools** : Is concerned with Water, Sanitation and Hand washing Facilities in Schools along with hygiene education.

1.12 Organization of the Study

This research report is organized into five chapters. Chapter one covers the introduction to the study which highlights the background of the study by looking at the history and the situation of School WASH globally regionally and locally. It also contains the problem statement, research objectives and questions as well as the limitations of the study. The second Chapter contains the literature review which highlights how the provision of school Water, Sanitation and Hygiene facilities influence performance of pupils i.e. by reducing sickness arising from sanitation related diseases hence reduced absenteeism. This chapter has also provided a brief description of the theoretical framework upon which the study was based. It also provides a conceptual framework indicating the relationship and other variables that influence performance which are not under study. A brief summary of literature reviewed is also provided in this chapter. Chapter three describes the research methodology that was used to carry out the study including the research design, target population, sampling methodology, sample size, data collection methods, reliability and validity of research instruments, data collection procedures as well as data processing, analysis and presentation. Chapter four presents the research findings which have been discussed under thematic sub sections in line with the study objectives and finally chapter five presents the summary of research findings, discussions, conclusions and recommendations which also include suggested areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides a review of relevant literature from previous research, journals, texts and reports conceptualized under the objectives of the study and focuses mainly on the following thematic areas: Safe drinking water and Pupils' performance; Sanitation and Pupils' performance; Hand washing with soap and Pupils' performance; Hygiene education/awareness and Pupils' performance. The chapter also provides a description of both the theoretical and conceptual frameworks upon which this study was based. A summary of the review is provided identifying knowledge gaps that need to be filled where applicable.

2.1 The Concept of School Water Sanitation and Hygiene (SWASH)

The UN General Assembly declared the period from 2005-2015 the International Decade for Action, "Water for Life" (WHO, 2005). Unsafe drinking water, along with poor sanitation and hygiene, are the main contributors to an estimated 4 billion cases of diarrheal diseases annually, causing 1.8 million deaths mostly among children less than 5 years of age (WHO, 2005). Although clean water is a human right, 1.1 billion people still do not have access to safe drinking water (WHO, 2006). About 1.8 million people die from diarrheal illnesses every year (WHO, 2007). These illnesses are mainly due to lack of safe drinking water, sanitation and hygiene.

In tandem with the above, children in school have a right to basic facilities such as school toilets, safe drinking water, hand washing facilities, clean surrounding and basic information on hygiene. If these conditions are created, children learn better and can bring concepts and practices on sanitation and hygiene back to their families thus bringing about behavioral changes in the entire community (IRC, 2007).

To achieve the general School WASH objectives, a school with adequate WASH should have a functional and reliable water system that provides sufficient water for all school needs especially hand washing and drinking. The school must also have a sufficient number of latrines/toilets facilities for pupils and teachers that are private, safe, clean and gender segregated. The school should have several hand washing facilities including some that are close to the latrines to facilitate hand washing after defecation. Facilities should cater for small children, girls of menstruation age and children with disabilities. Hygiene education should be an integral part of the school WASH program (UNICEF, 2011).

2.2 Safe Drinking water and Pupils' Performance

Access to safe drinking water is essential to health, a basic human right and a component of effective policy for health protection for both the school and community. The importance for water for health and development has been reflected in the outcomes of a series of international policy forums such as the Alma-Ata primary Health care Declaration (WHO, 1978), the World Water Conference in Mardelplata, Argentina (WHO, 1977), the Millennium Development Goals (WHO, 2000) and the Johannesburg World Summit for sustainable Development (WSFSD, 2002).

In general, literature indicate that it is very important to provide safe drinking water to pupils as a way of reducing sanitation related diseases and hence improved health, retention, performance and transition of all learners. However, the provision of safe drinking water to schools is still a gap in rural schools as confirmed by Obure (2009) in his assessment of Kenya Education Sector Support Program (KESSP) involving five schools in Bondo District found out that only one school provided drinking water and none of the schools treated drinking water (Obure, 2009). It is important to note that the sample of five schools out of a total of 130 schools was small; however the findings are key pointer to the situation which cannot be ignored.

According to Mwaniki and Kirimi (2005), Government Ministries and various organizations have carried out surveys to determine the school WASH situation in Kenya. The surveys are conducted at various times and revealed that the burden to provide water at school frequently fell on the pupils as they often had to travel to fetch water resulting into stress affecting attendance and performance (Mwaniki, 2005). The surveys are done countrywide and only few schools are sampled per province and findings are given based on the provinces which does not give the situation in rural schools specifically as can be compared with urban schools. Similarly a study by Care Kenya (2009) conducted in 185 schools in Nyanza province found out that 87% of schools provided drinking water, only 27% had treated it (CARE (K), 2009). The findings of this study looked encouraging, however they are likely to mislead because the schools surveyed are those that had been part of a WASH program for three years and this study was to find out the sustainability of the program.

In Bangladesh, findings of project evaluations and research found a 15% increase in schools attendance when safe water was available within 15 minutes walk compared to one hour or more. A similar study in Tanzania showed a 12% increase in school attendance when water was available within 15 minutes (Redhouse 2004) as quoted in (IRC, 2007). It is therefore important to carry out further research to find out if the gains made such as increase in attendance from providing safe water contribute to an improved academic performance for schools that have the WASH facilities in place as this can be specifically useful in pushing for resource allocation and funding for WASH programs in schools.

2.3 Sanitation and Pupils' Performance

All children need a sanitary and hygienic learning environment but the lack of sanitation and hygiene facilities in schools has a stronger negative impact on girls than boys. Girls need safe, clean, separate and private sanitation facilities in their schools. According to a study by

the Government of Bangladesh and UNICEF, it was revealed that there was 11% increase in girls' enrolment mainly due to the provision of sanitary latrines (Redhouse 2004) as quoted in (IRC, 2007). A similar study in Kenya found out that provision of safe toilets reduced girls' absenteeism by 39% (UNICEF, 2010). The studies looked at how provision of sanitation increased enrolment and reduced absenteeism respectively, however it is also known that enrolment is important to increase access to education and that reduced absenteeism is important in helping the pupils to complete the syllabus and hence perform better. This study therefore extends from where these left to find out if the reduction in absenteeism was useful in contributing to better mean grades for these schools.

A recent study on violence in and around schools in Swaziland and Zimbabwe revealed that girls considered their toilets as unsafe places, the unsafe toilets were seen to be cut off, isolated where as in contrast, the latrine outside the headmasters office was considered safe (Mitchell and Mothopi-Tapela 2004) as quoted in (IRC, 2007). These findings have brought in an interesting perspective in the provision of sanitation facilities in schools i.e. the facilities should be located in safe, secure and child friendly environment as this is important so that the pupils are feeling safe and psychologically at peace enough to concentrate in their studies; this may contribute to reduced absenteeism and thus better performance.

Esrey (1994) as quoted in (IRC, 2007) in his analysis of 144 water and sanitation studies which show the importance of improved hygiene and safe excreta disposal as interventions to reduce diarrhea found out that safe excreta disposal contributed to the highest i.e. 36% of reduction in diarrhea among other variables. The reduction then is expected to also reduce absenteeism due to illness and eventually improve performance.

A study in Mali (Shordt 2004; De Clercq et al 1998) West Africa demonstrated that academic performance is related to the level of schistosomiasis (a worm caused by poor sanitation) infection as measured by the number of eggs per 10ml urine. The findings of the study seem to answer the research questions of this proposed study, however, it is important to note that the sample was only 580 children in two primary schools in the whole country. Generalization here may be misleading because the sample is too small especially for a diverse country like Kenya i.e. even the 580 children should have been picked from more schools in different parts of the country to make the sample more representative.

In Kenya, the school population has continued to grow since 2003 and there has been no corresponding expansion of physical facilities. According to a survey by the Ministry of Water and Irrigation in 2003 as quoted in (Mwaniki, 2005) on the sanitation situation in schools, majority of schools were categorized as dangerous with Nairobi province being hardest hit with an average of 414 pupils /latrine in the worst schools. However, Nairobi Province has continued to perform better in KCPE examinations compared to others whose sanitation situation were better yet literature support the relationship between sanitation and performance. It is therefore important to have more studies to segregate the schools as rural, urban, private or public so as to inform proper policy review and resource allocation to school water sanitation and hygiene.

2.3 Hand Washing and Pupils' Performance

Diarrhea which rarely leads to deaths in developed world countries is a leading cause of death among children under age five leading to 1.5 million deaths a year in the developing world countries (UNICEF/WHO, 2009). According to Lopez-Quintero et al (2009) germs are transferred sick children some more easily when they have little or no water and soap to wash hands (Lopez-Quintero, 2009). The germs cause diarrhea which leads to children missing

school negatively impacting on their syllabus coverage and academic performance in the long-term.

In China, an evaluation of school hand washing with soap program was found to have reduced absentee days by 54% (UNICEF, 2010). The findings of this evaluation was very positive as far as keeping the children in school is concerned and ensuring good health which is important for their physical and intellectual development. However, this positive impact on absenteeism needs to contribute to better academic performance because the stakeholders of the school are always more concerned with the academic outcomes more than other outcomes in the school system.

Another study in Vietnam investigating hand washing behavior rural Vietnam's school setting showed that children liked the smell of soap and knew they needed to wash their hands with soap. They understood the relationship between germs and disease and the role of washing hands with soap in protecting their health and preventing the spread of diseases such as diarrhea, flu ((Dutton, 2011). These diseases could easily keep the children out of school and negatively impact on their academic performance in the long term, these needs to be linked directly to the practice of hand washing so that the children can sustain the behavior of hand washing.

In Uganda, a study by Kisakye et al (2013) investigated the factors influencing proper hand washing among primary school children in Jinja District. The study found out that proper hand washing among primary school children was influenced by availability of conveniently placed hand washing facilities at the school and class of the children (Kisakye, 2013). The researchers' findings confirm the importance of providing the hand washing facilities and give room for further research to investigate gains made from such provision and also for use in resource mobilization for continued provision of hand washing facilities for those schools that recorded very poor results.

2.5 Hygiene Education and Pupils' Performance

Simply providing safe and clean water and sanitation facilities in schools is not enough. Behavioral change is also needed to ensure proper use and maintenance of the facilities and better hygienic behavior. In the fight against diarrheal disease, hygiene education, including hand washing, is the single-most cost-effective health intervention. Hygiene education is not only important for a healthy school environment and pupils' performance; it also offers opportunities for communicating with and influencing children's families (Buoya and Neeveveen, 2010).

There are examples from the field demonstrating that hygiene education and the demonstration of good practices in the school environment can have a wider impact on communities (UNICEF, 2011). This is because children can easily act as agents of change in their households and communities influencing the hygiene practices of their parents and siblings. It is further expected that in the long-term as children grow and become parents and caregivers themselves, improved hygiene behavior will have a positive impact on child survival rates and development for the future generation including academic performance.

In Indonesia, a baseline study in the district of East Lombok showed that knowledge of benefits of hand washing was low and the practice needed to be promoted (Buoya and Neeveveen, 2010). The findings of this study therefore call for further studies with a view of directly linking the benefits of hand washing to pupils' performance in schools so that more stakeholders can contribute to the investment in School WASH programs thus increasing awareness through hygiene education.

A survey in Djibouti sponsored by UNICEF in 2009 called National School Hygiene and Sanitation Survey found out that there are different levels of hygiene knowledge among school children in public and private systems and that there were significant rural/urban

disparities in the availability of hygiene education classes (UNICEF, 2011). This survey therefore support the importance of segregating schools into rural/urban or public/private during surveys or studies for purposes getting clearer sanitation and hygiene situation for use in policy formulation and resource allocation.

An assessment of six country projects by UNICEF and International Water and Sanitation Centre (IRC) states that it is difficult to isolate the impact of school WASH from other awareness raising programs on households and communities (UNICEF and IRC 2006) as quoted in (Nagpal, 2010). This finding reaffirms the role played by hygiene education in contributing to behavior change in the household and community at large. When the communities become healthy, there is reduced cost of medication and increased productivity which in turn benefits the school in terms of community contribution to school projects and to children's' other needs in schools. This is likely to contribute to the improvement in performance of these schools.

In Kenya, the MoE through KESSP is currently taking measures to better equip the school managers, teachers and learners in water, sanitation and hygiene promotion, knowledge and practices (National School Health Strategy implementation Plan, 2011-2015). However this can only be said to be a step in the right direction as implementation is awaited by the country to bring desired results. This study is expected to continue to generate information that will attract more stakeholders including the communities in which the schools are located to mobilize more funds that can sustain WASH programs in schools because Government interventions only will be inadequate.

2.6 Theoretical Framework

The study was based on the Human Capital Theory proposed by Theodore W. Shultz in 1961. The theory looked at human beings as a form of capital, as a means of production and as the product of investment usually in education and health. The theory therefore links to the study in the promotion of investment in education and health of primary school pupils through investment in school WASH programs. The theory however did not identify specific aspects of education and or health for prioritization that gives quick win results. The study therefore seeks to generate information that will justify School WASH programs as one such area that should be given more focus by school managers, policy makers, donors and stakeholders.

This theory is guided by a number of principles. For example, it asserts that investing in education equips individuals with knowledge, skills and attitudes that are necessary for development. Ideas from this theory has influence in education policies of many governments in different parts of the world and many governments have drawn from this to give greater priority in investing in education with the belief that this brings about economic and health benefits for both individuals and societies (Little 1999) as quoted in (Otieno, 2011).

The researcher, based on this theory collected information from rural primary schools that established the extent of investment in school water, sanitation and hygiene and relate this to pupils' performance. From literature reviewed it has been confirmed that despite its importance in reducing cases of diarrhea, increasing retention, enrolments School WASH has not got a fair share of resources as indicated by the surveys conducted especially by the Ministry of water and Irrigation in 2003 as quoted in (Mwaniki, 2005) showing how many schools fall below the recommended pupil: latrines ratios. Major investments in education are in teaching staff, learning and teaching materials and classrooms. It is therefore important to appreciate that improved health and quality learning are not possible without SWASH.

2.7 Conceptual Framework

The diagram Fig 1 below shows the relationship between variables in the study. Provision of safe drinking water, sanitation facilities and hand washing facilities, hygiene education and their relationship with school performance is presented. Other variables that may influence this interaction are also considered and grouped into two different categories namely: - moderating variables and intervening variables.

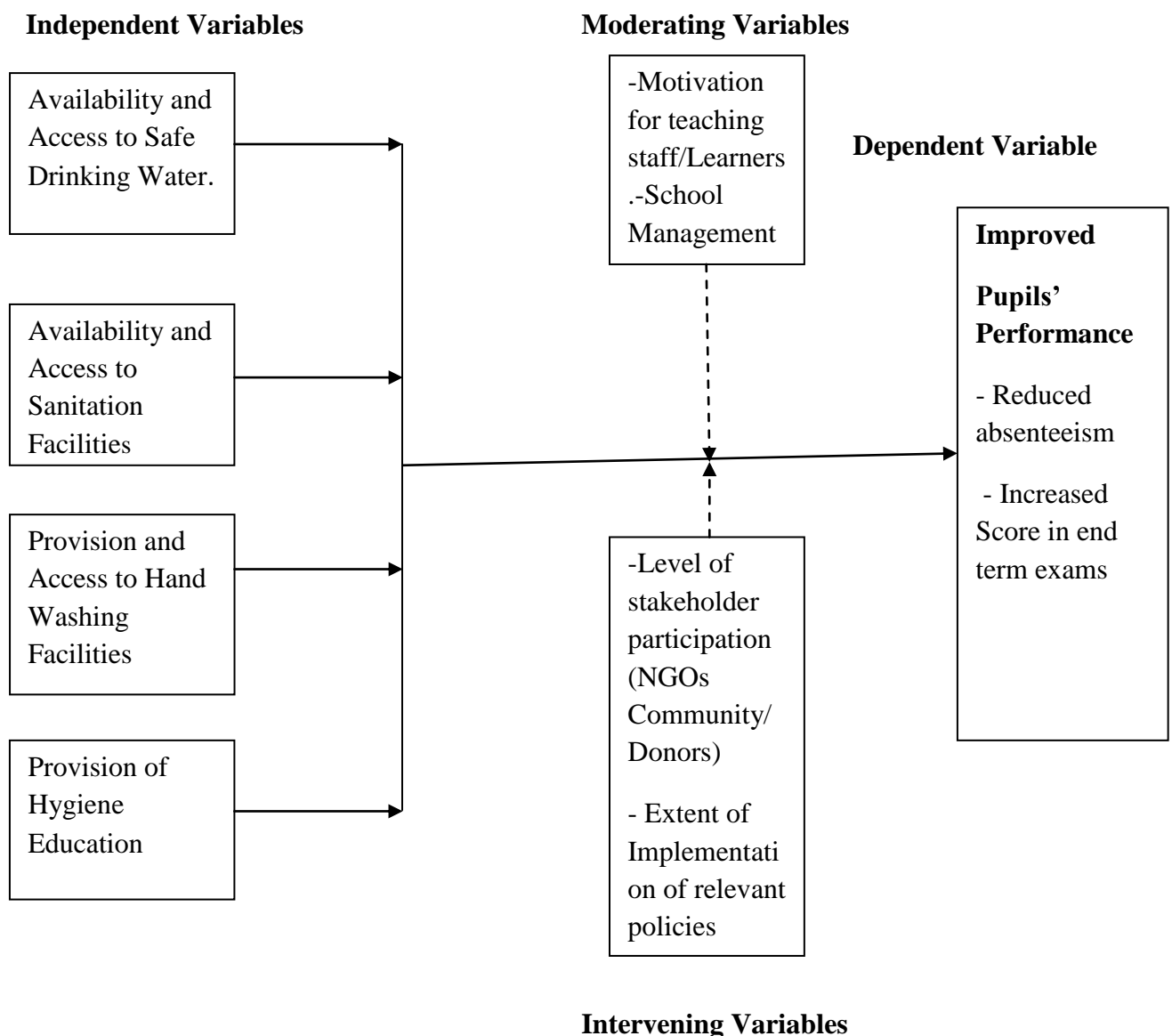


Fig 1: Conceptual Framework

2.8 Chapter Summary

In summary, literature on School Water Sanitation and Hygiene reviewed indicate that the level of access to these facilities especially in the developing countries is inadequate and that safe drinking water, sanitation and hand washing in schools have reduced absenteeism, increased retention, increased enrolment among girls, reduced illness such as diarrhea and worms. However a gap exists in that the gains from school WASH enumerated have not been directly linked to better school mean grades especially in the rural areas where the situation seems to be worse. In addition, using children as agents of change in the community reduces illness hence reduced cost of medication, increased productivity of the community; this in turn is expected to benefit the school in terms of community participation in development of school facilities which should be seen to contribute to support education of children to achieve better grades. This study therefore was the first one to consider the various components of school WASH as independent variables. The components in most studies have been considered together and therefore for the first time we can find information of how a simple activity like providing adequate sanitation facilities to a primary school in rural Kenya can contribute to performance of the pupils in school.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a detailed description of the Research design, Target population, Sample size and Sampling procedures, Research instruments, Pilot testing of Research Instruments, Validity and Reliability of Instruments, Operational definition of variables, Data collection Procedures, Data Analysis Techniques and the Ethical considerations. In this chapter, the researcher also justifies the suitability of research design selected for the study, the type of sampling technique employed, the type data collection and analysis tools used in the study.

3.2 Research Design

The researcher employed Descriptive Survey Design to conduct the study. Survey designs attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Gay, 1981) this therefore allows decision makers to make generalizations on the population and other populations with similar characteristics. According to Mugenda and Mugenda (2003) descriptive survey research design allows the researcher to secure information concerning a phenomenon under study from selected number of respondents (Mugenda, 2003). Descriptive survey design generally entails investigating populations by selecting samples to analyze and discover occurrences.

This design was suitable for this study because a sample was selected from the total number of schools in Maseno Division for data collection and since structured questionnaires were used as also pointed out by Kothari (1990) that descriptive design is best suited for studies where sample sizes are small and where structured questionnaires are used. Kothari however warns that since there are a number of limitations with this design such as chances

of error, there is need to closely supervise data collection (Kothari, 1990). A well conducted survey can provide a description of sample that is representative of general population and show how the phenomenon under study is currently occurring in such population.

3.3 Target Population

There are 73 public primary schools in the division from which a study sample was drawn. The researcher targeted primary schools because primary school children constitute a bigger proportion of school-going children and often face more health challenges than their counterparts at higher levels either because of lack of capacity to take charge of their own health or because of mere neglect of their health issues by those concerned. The respondents comprised of both head teachers of the schools because of their special role in the management of the schools and as custodians of data useful for this study such as enrolment, transition rates KCPE results and data relating to School WASH facilities and pupils of standard six and seven. There are a total of 5772 pupils in standard 6 & 7 in the division targeted for the study; this number comprises 2749 boys and 3023 girls.

Table 3.1 Population Targeted for Study

Division	Zone	No of Schools	Total Pupil Population in std 6 & 7
Maseno	Chulaimbo	16	1790
	Kit Mikayi	21	1216
	Otwenya	18	1279
	Sianda	18	1487
Total	4	73	5772

Source: District Education Office, Kisumu West 2013

3.4 Sample Size and Sampling Procedures

According to Babbie and Maxfield (1995), sampling is method of selecting some part of a group to represent the entire population (Babbie, 1995). Strydom and Venter (2002), on their part refer to sampling as taking a portion of that population or universe and considering it as representative of that population or universe(Strydom, 2002) while Mugenda and Mugenda (2003) defines sampling as the process of selecting a subject of cases in order to draw conclusions about the entire set(Mugenda, 2003).

3.4.1 Sample Size Determination

The researcher determined sample sizes at three levels in this study; the first level was schools, head teachers then lastly pupils. According to Mugenda & Mugenda (1999), for descriptive studies, 10% of the accessible population is enough. Based on this theory, the researcher used simple random sampling to select a sample of 7 primary schools from the total 73 primary schools in the Division. In selecting the sample size for the pupils from the 7 schools selected above, the study adopted the formula developed by Fisher et al (1995) as follows;

$$n = \frac{z^2 pq}{d^2} \quad \text{Where:}$$

n= the desired sample size

Z = the standard normal deviation, set at 1.96 which corresponds to 95% confidence

d = Acceptance range of error

p = participating rate in the primary schools in Maseno Division was 50%

q=Non-participating rate in the primary schools in Maseno Division was 50%

When Population >10, 000 pupils,

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384 \text{ respondents will be selected using proportionate random sampling}$$

across all schools selected to participate.

Since the targeted population is below 10,000 i.e. 5772, the sample size (nf) was calculated using the following formula:

$$nf = n \div \{1 + (n/N)\} \text{ Where;}$$

nf= desired sample size (when target population is less than 10,000)

n = desired sample size (when target population is greater than 10,000)

N = the target population

$$nf = 384 \div \{1 + (384/5772)\}$$

$$= 360 \text{ respondents.}$$

3.4.2 Sample Selection Procedure

The researcher using a list of all the primary schools in the division (sampling frame) drew a simple random sample of 7 primary schools required to participate in the study. The researcher wrote the codes of all the schools on small pieces of paper and folded them well, put the papers in a box, mixed them thoroughly then drew (without looking) 7 pieces of the papers one after the other without replacement. This was done while making sure that in successive drawing each of the remaining pieces of paper had the same chance of being selected. The researcher repeated this process until a simple random sample of 7 primary schools was selected to participate in the study. Systematic random sampling was then used to select the 360 pupils comprising boys and girls drawn from a randomized list using a sample interval.

Table 3.2: Sample Matrix

	Target Population	Sample size
Schools	73	7
Pupils	5772	360

3.5 Research Instruments

The researcher used questionnaires as the main tool for data collection. The selection of the tool were guided by the nature of data that was to be collected, time available as well as the objectives of the study. The instrument was appropriate because it was expected to provide an efficient way of collecting responses from large sample for quantitative analysis. The questionnaire was used for pupils. The questionnaire was divided into five parts with part I generating responses on demographic information. The other parts II, III, IV and V collected information regarding the variables namely Availability and Access to safe drinking water, availability and access to sanitation facilities, Provision and access to hand washing facilities and provision of hygiene education. Pupils both boys and girls were given questionnaires to fill and express opinion and also provide information. The researcher and his assistant however explained the questions before the pupils could begin to fill to ensure understanding by all the respondents.

3.5.1 Pilot Testing of Research Instruments

The researcher tested the data collection tools before actual data collection to ensure that the questions in the questionnaire were answerable and that they provided answers to the research questions. This was done by selecting a school at random then selecting four pupils to test the questionnaire. The decision to select four pupils to test the questionnaire was guided by Taylor et al (2008) who recommended that a sample of three to four is better than no piloting at all. The researcher tested for the appropriateness of the wording, the adequacy

of questions in relation to the research and time needed to fill each questionnaire. The data collected from the pilot was processed and analyzed to check if it yields appropriate results. Correction of the questionnaire was where necessary. For example, question 5.3 was changed to delete the words “diarrhea related illness” so that it only read “How many days have you missed school due to illness this year? This was after it emerged that pupils were shy to indicate that they suffered diarrhea and were skipping the question.

3.5.2 Validity of Instruments

Validity is the degree to which an instrument measures what it is supposed to measure (Muganda, 2008). The research instrument was first given to the supervisor for content validity testing based on their comments whether the full conceptual domain of the research is covered by the questionnaire and corrections was made accordingly. To ensure construct validity, the supervisor and researcher evaluated the relevance of the instrument to the objective of the study and give directions for proper reconstruction if found necessary. Validity of the instrument was ensured by pre-testing the questionnaires in one school to check if the results are the same and reflect the variables under study. The researcher also ensured that the results were not influenced by researcher’s biases, interest or perspectives.

3.5.3 Reliability of Instruments

Reliability is the measure of degree to which a research instrument yields consistent results on data after repeated trials (Mugenda O. M., 1999). Mulwa (2006) argues that reliability is the extent to which a measuring device or a whole project would produce the same result again on different occasion with same objective of the study (Mulwa, 2006). The researcher’s aim was to ensure consistency of the response across all the variables. This was achieved through pilot testing in one school where four pupils were selected to find out if the questions asked are the right ones and whether the responses obtained provided answers to the research questions.

3.6 Data Collection Procedures

The researcher obtained an introductory letter from the University. The letter was then presented to the District Education Officer in Kisumu West who authorized the study through another letter addressed to all Head teachers in Maseno Division. The researcher sent advance letters to the schools selected explaining the purpose of the study and requesting for an convenient date to be set. A research assistant was then trained before being involved in pilot testing of the instruments. Copies of the instruments were made and distributed to the pupils to fill on agreed dates. The last stage in the data collection process was post field work where data coding and entry was done in readiness for analysis.

3.7 Data Analysis Techniques

Kothari (2004) defines data analysis as the computation of certain indices or measures along with searching of patterns of relationships that exists among data groups(Kothari, 2004), on the other hand Singh (2006) defines data analysis as studying the tabulated material in order to determine inherent facts or meanings involving breaking down existing complex factors into simpler parts and putting the parts together in new arrangements for the purpose of interpretation(Singh, 2006).Bogdan and Biken (1992) also defines data analysis as the process of systematically searching and arranging field findings for presentation. It therefore involves working with data, organizing, breaking into manageable units, synthesizing, searching for patterns, discovering what is important and deciding what to tell others (Bogdan and Biken 1992) as quoted in (Otieno, 2011).

Data collected was analyzed quantitatively using SPSS Version 20.0. Frequencies of occurrences and percentages were noted. Correlation and Cross tabulation analysis where applicable were used to establish the existence and nature of any relationships between availability and access to safe drinking water, availability and access to sanitation facilities, provision of hand washing facilities, hygiene education and pupils' performance.

3.8 Ethical Considerations

The researcher obtained Data collection Authorization from the District Education Officer Kisumu West District addressed to all Head teachers in Maseno Division. The potential respondents were presented with consent forms describing the type of study, purpose of study, rights of respondents with special emphasis on respondent confidentiality and the right to withdraw from the study when it was found to be necessary.

The researcher gave an assurance to all those participating in the study on the confidentiality of the information provided by asking them not to indicate their names on the questionnaires. A preliminary telephone conversation with heads of schools in the sample before data collection to explain the purpose of study and convenient times when the questionnaires can administered was considered by the researcher.

3.9 Operational Definition of Variables

Objective	Variable	Indicators	Measurement Scale	Research Instrument	Method of Data Analysis
To find out how availability and access to safe drinking water influences pupils' performance	Availability and Access to Safe Drinking Water	Water source available.	Nominal	Questionnaire	Frequency tables
		Number of water points.	Nominal		Cross tabulation
	Pupils' Performance	Water treatment practiced	Nominal		
		Reduced Absenteeism	Nominal		
		Improved score in end term exams. No of pupils who perceive water availability to improve performance	Ratio Ordinal		
To assess	Availability	No of latrines	Ratio	Questionnaire	Frequency

how availability and access to adequate sanitation facilities influence pupils' performance .	and Access to adequate sanitation facilities Pupils' Performance	available Latrines kept clean. Reduced Absenteeism Improved score in end term exams No of pupils who perceive sanitation to improve performance	Nominal Nominal Ratio Ordinal		Tables Cross tabulation Analysis
To explore how provision and access to hand washing facilities influences pupils' performance	Provision and access to hand washing facilities Pupils' Performance	Hand washing facilities available. Number of hand washing points. Soap available Reduced Absenteeism Improved score in end term exams No of pupils who perceive hand washing to improve performance	Nominal Nominal Nominal Nominal Ratio ordinal	Questionnaire	Frequency Tables Cross tabulation Analysis
To examine how provision of hygiene education influence pupils' performance	Provision of hygiene education Pupils' Performance	Hygiene education lessons in school No of Hygiene lessons attended Reduced Absenteeism	Nominal Ratio Nominal	Questionnaire	Frequency Tables Pearson's Correlation Coefficient

		Improved score in end term exams	Ratio		
		No of pupils who perceive Hygiene education to improve performance	Ordinal		

CHAPTER FOUR

PRESENTATION OF FINDINGS, ANALYSIS, AND INTERPRETATION

4.1 Introduction

This chapter presents the research findings which have been analyzed and interpreted under thematic sub sections in line with the study objectives. The sub sections include: response rate of the study, demographic characteristics of respondents, Availability and access to drinking water and pupils' performance; Availability and access to sanitation and pupils performance; provision and access to hand washing facilities and pupils' performance; Provision of hygiene education and pupils performance.

4.2 Questionnaire Return Rate

This section presents the rate at which questionnaires were returned for the different categories of respondents that took part in the study. Quantitative primary data was collected through administration of questionnaires to pupils in class 6 and 8 in seven different primary schools. Out of the 360 respondents targeted, 360 (100%) responses were obtained. This response rate was achieved because pupils were sampled in their own classroom during school time and only those present on the day of interview were sampled to respond to questions.

4.3 Demographic Characteristics of Respondents

This section describes the demographic characteristics of respondents involved in the study. In this case only the distribution of their sexual orientation and age are presented.

4.3.1 Sexual Orientation of Respondents

The respondents were asked to state their sexual orientation by the researcher. This was because water, sanitation and hygiene issues affect boys and girls differently and it was

important to record if managers of schools and the stakeholders considered this while budgeting for SWASH programs. The results are as presented in table 4.1 below:

Table 4.1 Distribution of Respondents by Sexual Orientation

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	161	44.7	44.7	44.7
Female	199	55.3	55.3	100.0
Total	360	100.0	100.0	

Out of the 360 respondents who participated in the study, 44.7% (161) were male and 55.3% were female. These frequencies compare to the Social Intelligence Review Report (GOK-UNICEF, 2011) which found out that females pupils are more than male pupils in lower classes, however their numbers reduce especially in class eight they are always fewer than their male counterparts especially among the rural schools. The report attributed these low transitions among girls to early marriages, pregnancies among other reasons.

4.3.2 Distribution of Respondents by Age

The study sought to describe the age distribution of the respondents. This was necessary for the researcher to have an appropriate background understanding of this demographic feature among respondents and how they relate with water, sanitation and hygiene facilities in their schools. The respondents were therefore asked to state their ages and the findings presented in table 4.2 below:

Table 4.2 Distribution of Respondents by Age

Age Bracket	Frequency	Percent (%)	Valid Percent	Cumulative Percent
10-12 yrs	96	26.7	26.7	26.7
13-14 yrs	231	64.2	64.2	90.8
15-16 yrs	31	8.6	8.6	99.4
17 yrs and above	2	.6	.6	100.0
Total	360	100.0	100.0	

It can be seen that majority of the respondents were aged between 13-14 years 231 (64.2%), those aged between 10-12 yrs were 96 (26.7%), 15-16 yrs were 31 (8.6%) and lastly 17 years and above were 2 (0.6%). The results of the study confirm the existence of beneficiaries of free primary education program rolled out by the Government in 2003. This partially explains why there are pupils aged 17 years and above still in primary schools whereas under normal circumstances the system would have expected them to be in form three or higher.

4.4 Availability and Access to Drinking Water and Pupils' Performance

This was the first objective of the study which sought to find out how availability and access to clean drinking water influenced pupils' performance in rural public primary schools. The study dwelt on the availability of water at school, source of water, treatment of

water and number of drinking water points and whether the respondents thought that availability and access to drinking water would improve their performance as parameters for the attainment of the objectives.

4.4.1 Availability of Water in school

The study asked respondents to indicate if there was water within the school compound in order to ascertain availability. The findings are presented in table 4.3 below:

Table 4.3 Availability of Water in the school

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	219	60.8	60.8	60.8
No	141	39.2	39.2	100.0
Total	360	100.0	100.0	

Out of the 360 respondents, 219 (60.8%) had water within their school compound while another 141 (39.2) did not have water within the school compound and therefore had to make some distance to get it.

4.4.2 Treatment of Drinking Water at School

Respondents were asked by the researcher to indicate whether drinking water in their school was treated to make it safe for drinking. The findings are presented in table 4.4 below:

Table 4.4 Treatment of drinking water at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Always	103	28.6	28.6	28.6
Sometimes	66	18.3	18.3	46.9
Never	191	53.1	53.1	100.0
Total	360	100.0	100.0	

From table 4.4 above it can be seen that 191 (53%) of the respondents said that water for drinking was never treated at their school. 66 (18.3%) said that water is sometimes treated and only 103 (28.6%) had their drinking water treated. These findings were subjected to further analysis using cross tabulation to determine the relationship of this variable with the dependent variable. Table 4.5 below shows the relationship:

Table 4.5 Influence of Safe Drinking Water on Absenteeism

Count

		No of days pupil absent from school due to illness			
		0	1-7	8-15	>15
Treatment of drinking water at school	Always	76	20	6	1
	Sometimes	40	24	1	1
	Never	84	75	28	4
Total		200	119	35	6

From the cross tabulation, the researcher found that 76 out of 103 respondents who reported that their drinking water is always treated never missed school due to illness this year, in other words 73.7% of those whose drinking water was treated never missed school while 26.3% missed school at least once. On the other hand 107 out of 191 of those whose drinking water was never treated missed school at least once this year and this constitutes 56%. The findings can be compared to similar findings of project evaluations and research conducted in Bangladesh which found a 15% increase in attendance when safe water was available within 15 minutes (Redhouse 2004) as quoted in (IRC, 2007). The findings imply that the use of safe drinking water has influence on pupils absenteeism which is a key performance parameter among primary school learners.

4.4.3 Drinking water points

Respondents were asked by the researcher to indicate the number of drinking water points in their school to establish accessibility. The findings are presented in table 4.6 below:

Table 4.6 No of water points available at school

	Frequency	Percent	Valid Percent	Cumulative Percent
4-6	35	9.7	9.7	9.7
1-3	304	84.4	84.4	94.2
None	21	5.8	5.8	100.0
Total	360	100.0	100.0	

Majority of the respondents 84.4% reported having access to between 1-3 water points for school that provided them. This implies that the facilities are very inadequate because some schools had up to 600 learners. Only 9.7% provided between 4-6 stations for their learners, worse still, and 5.8% of pupils reported having no water points at all at school.

4.4.4 Perception of Respondents on the Link between Safe drinking Water and Performance

Respondents were asked to give their perception on whether the availability and access to safe drinking water in their school would improve their academic performance. The results are presented in table 4.7 below:

Table 4.7 Drinking Water availability improves academic performance

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	167	46.4	46.4	46.9
Agree	108	30.0	30.0	76.9
Disagree	57	15.8	15.8	92.8
Strongly Disagree	26	7.2	7.2	100.0
Total	360	100.0	100.0	

The results in table 4.7 above indicate that majority of the respondents perceive availability of safe drinking water in the school to contribute to improved academic performance with 76.4% agree to this to a varied degree though. These findings should therefore position provision of safe drinking water in school as a priority, they also indicate that there is awareness on the part of pupils on the importance of using safe water and therefore what needs to be done is to invest in the facilities and sustain the hygiene knowledge through continuous education.

4.5 Availability and Access to Sanitation Facilities and Pupils' Performance

The second objective of the study was to establish the influence of sanitation on pupils' performance. To attain this, the respondents were asked to provide responses to a number of questions relating to the number of latrine doors available for boys and girls, cleanliness of latrines and accessibility of latrines.

4.5.2 Number of Latrine Doors Available

Respondents were asked by the researcher to indicate the number of latrine doors available in their school to establish level of investment in WASH related facilities by the schools and stakeholders. The findings are presented in table 4.8 below:

Table 4.8 No of Latrine doors available for use at school

	Frequency	Percent	Valid Percent	Cumulative Percent
1	1	.3	.3	.3
2	39	10.8	10.8	11.1
3	9	2.5	2.5	13.6
4	83	23.1	23.1	36.7
5	38	10.6	10.6	47.2
6	82	22.8	22.8	70.0
7	27	7.5	7.5	77.5
8	18	5.0	5.0	82.5
9	26	7.2	7.2	89.7
10	3	.8	.8	90.6
11	33	9.2	9.2	99.7
12	1	.3	.3	100.0
Total	360	100.0	100.0	

From the frequency table 4.8, it can be noted that the number of latrines available to respondents was normally distributed. The numbers of latrine doors are seen to be fewer at the minimum and at the maximum. These frequencies were further subjected to analysis to establish the mean number of latrines doors and the results presented in table 4.9 below:

Table 4.9 Mean number of Latrine doors

N	Valid	360
	Missing	0
Mean		5.81
Variance		6.488

It can be noted that the number of latrines available to respondents was normally distributed with mean 5.81 i.e. approximately 6 doors and variance 6.488. This means that a school in the division with about 240 pupils may have an approximate pupil/latrine ratio of 1:40 which is below the average compared to the recommended 1:25 and 1:30 for girls and boys respectively. This further implies that there has not been adequate funding of WASH related facilities in the rural primary schools in the division.

4.5.2 Cleanliness of Latrines

Respondents were asked by the researcher to indicate the level of cleanliness latrine available in their school. The findings are presented in table 4.10 below:

Table 4.10 Cleanliness of latrines at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Clean	238	66.1	66.1	66.1
Somewhat Clean	103	28.6	28.6	94.7
Not clean	19	5.3	5.3	100.0
Total	360	100.0	100.0	

66.1% of the respondents reported clean latrines, 28.6% felt that the latrines were somewhat clean. It is only 5.3% of the respondents who felt that their latrine were not clean at all. This finding were subjected to further analysis by cross tabulation with the number of days the pupils was absent due to illness to establish any relationships since latrines that are not clean are known to be a source of illness for learners, the results are presented in table 4.11 below:

Table 4.11 Influence of Clean Latrines on Absenteeism

		No of days pupil absent from school due to illness			
		0	1-7	8-15	>15
Cleanliness of latrines at school	Clean	151	67	17	3
	Somewhat Clean	45	41	16	1
	Not clean	4	11	2	2
Total		200	119	35	6

From the cross tabulations it can be noted that of the 238 respondents who reported clean latrines, only 87 (36.5%) ever missed school during the year due to illness. On the other hand out of the 103 respondents who indicated that their latrines are somewhat clean, 58 (56.3%) of them missed school at least for a day due to illness during the year. Lastly of the 19 who reported that their latrines were not clean, 15 (78%) of them missed school at least for a day due to illness during the year. The findings here point to a relationship between clean latrines and absenteeism due to illness among the primary school learners. The findings compare well with those of Esrey (1994) as quoted in (IRC,2007), in his analysis of 144 water and sanitation studies worldwide, found that safe excreta disposal as an intervention to reduce diarrhea contributed to the highest i.e. 36% reduction compared other interventions.

4.5.3 Perception of Respondents on the Link between Sanitation and Performance

Respondents were asked to give their perception on whether the availability and access to sanitation facilities in their school would improve their academic performance. The results are presented in table 4.12 below:

Table 4.12 Availability of enough clean latrine improves performance

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	145	40.3	40.3	40.3
Agree	126	35.0	35.0	75.3
Disagree	57	15.8	15.8	91.1
Strongly disagree	32	8.9	8.9	100.0
Total	360	100.0	100.0	

75.3% of the respondents agree to varied degree that availability and adequacy of latrines at school can contribute to improved academic performance. 24.7% disagree to a varied degree and perceive latrine availability as something that cannot contribute to an improvement in their performance. This can be attributed to the lack of hygiene knowledge among the respondents. It is also interesting to see the consistency of the percentage of respondents who thought that availability of safe drinking water can contribute to improved performance and those who disagreed.

4.6 Provision and Access to Hand Washing Facilities and Pupils' Performance

The third objective of the study was to establish the influence of hand washing on pupils' performance. To attain this, the respondents were asked to provide responses to a number of questions relating to the number of hand washing stations available, availability of soap, and whether they washed their hands after visiting the toilet or before eating.

4.6.1 Availability of Hand Washing Facilities

Respondents were asked by the researcher to indicate if hand washing facilities were available in their school. The findings are presented in table 4.13 below:

Table 4.13 Availability of hand washing facilities at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	172	47.8	47.8	47.8
No	188	52.2	52.2	100.0
Total	360	100.0	100.0	

The findings in table 4.13 indicate that out of the 360 respondents, 172 (47.8%) reported having hand washing facilities in their school. 188(52.2) reported having no hand washing facilities in their school. Given the importance of hand washing among the pupils, the

findings show that there has not been an adequate investment in the facilities by the school managers and stakeholders.

4.6.2 Hand Washing Behavior among Pupils while at School

Respondents were asked by the researcher to indicate if they washed their hands before eating or after visiting the toilet while at school. The findings are presented in table 4.14 below:

Table 4.14 Hand Washing after visiting latrine and before eating at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	291	80.8	80.8	80.8
No	69	19.2	19.2	100.0
Total	360	100.0	100.0	

The findings show that a higher percentage of the respondents 80.8% washed their hands before eating or after visiting the latrine. This is a unique situation given that only 47.8% of the respondents reported having access to hand washing facilities at school. It may therefore imply that pupils have ways of washing their hands even when the facilities are not available. However this assumption may be dangerous and should not be relied upon by the school management and stakeholders as funds still need to be allocated to provide hand washing facilities. The findings were subjected to further analysis by cross tabulation to establish whether there existed any relationships between hand washing and absenteeism. The results are summarized in table 4.14 below:

Table 4.15 Influence of Hand Washing on Absenteeism

% within Hand Washing after visiting latrine or before eating at school

		No of days pupil absent from school due to illness				Total
		0	1-7	8-15	>15	
Hand Washing after visiting latrine and before eating at school	Yes	61.9%	29.9%	7.6%	0.7%	100.0 %
	No	29.0%	46.4%	18.8%	5.8%	100.0 %
Total		55.6%	33.1%	9.7%	1.7%	100.0 %

From the cross tabulations above, it can be noted that out of the 291 respondents who washed their hands before eating and or after visiting the toilet, 61.9% of them never missed school even a single day during the year 2013. However, 29.9% missed school between 1-7 days and another 7.6% missed school between 8-15 days and lastly only 0.7% missed more than 15 days. On the other hand, out of the 69 respondents who reported never washing their hands 71% of them missed school at least once during the year and more notably 5.8% of them missed school more than 15 days as compared to 0.7% of those who washed hands. The findings therefore indicate the influence of hand washing on absenteeism of the pupils which affects their syllabus coverage and eventually performance in examinations. The findings concur with that of an empirical study by Unicef (2010) which found out that hand washing with soap reduced absenteeism by 54%.

4.6.3 Availability of Soap for Hand Washing at School

Respondents were asked by the researcher to indicate if soap was available for washing hands before eating or after visiting the toilet while at school. The findings are presented in table 4.16 below:

Table 4.16 Availability of Soap for washing hands while at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Always	81	22.5	22.5	22.5
sometimes	103	28.6	28.6	51.1
Never	176	48.9	48.9	100.0
Total	360	100.0	100.0	

From table 4.13 above, it can be seen that only 22.5% of the respondents reported always having soap to wash their hands at school. 48.9% reported never having soap at all at school.

4.6.4 Number of Hand Washing Stations Available at School.

Respondents were asked by the researcher to indicate the number of hand washing stations provided at their school to establish if schools had invested in hand washing to provide access to pupils. The findings are presented in table 4.17 below:

Table 4.17 No of hand washing stations at school

	Frequency	Percent	Valid Percent	Cumulative Percent
4-6	88	24.4	24.4	24.4
1-3	168	46.7	46.7	71.1
None	104	28.9	28.9	100.0
Total	360	100.0	100.0	

Majority of the respondents 46.7% reported having access to between 1-3 hand washing stations for school that provided them. This implies that the facilities are very inadequate because some schools had up to 600 learners. Only 24.4% provided between 4-6 stations for their learners, worse still, and 28.9% of pupils reported having no stations at all. The findings here could also explain why diarrhea and upper respiratory tract infections are among the top three causes of morbidity in the Division.

4.6.5 Perception of Respondents on the Link between Hand washing and Performance

Respondents were asked to give their perception on whether the availability and access to hand washing facilities in their school would improve their academic performance. The results are presented in table 4.18 below:

Table 4.18 Hand washing with soap at critical times improves performance

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	166	46.1	46.1	46.1
Agree	126	35.0	35.0	81.1
Disagree	42	11.7	11.7	92.8
Strongly disagree	26	7.2	7.2	100.0
Total	360	100.0	100.0	

Respondents in the study think that hand washing at critical times as a hygiene practice is important in improving performance at school with 81.1% agree to varied degree while 19.9% disagree. These findings indicate a high level of awareness on the importance of hand washing as a way of controlling diarrhea and other worm causing germs. The findings are in contrary with another in Indonesia where a baseline study in the district of East Lombok showed that knowledge of benefits of hand washing was low and the practice needed to

promoted (Buoya and Neeveven, 2010). In this case the hygiene knowledge need to be sustained through provision of necessary hand washing facilities and continuous hygiene education.

4.7 Provision of Hygiene Education and Pupils Performance

The fourth objective of the study was to establish the influence of hygiene education on pupils’ performance. To attain this, the respondents were asked to provide responses to a number of questions relating to whether they have attended any hygiene education lessons and the actual number of lessons attended during the year

4.7.1 Hygiene Education in School

Respondents were asked by the researcher to indicate whether they remembered being in any kind of lesson that talked about hygiene and cleanliness during the year to establish the provision of hygiene education in the schools. The findings are presented in table 4.19 below:

Table 4.19 Hygiene Education provided at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	322	89.4	89.4	89.4
No	38	10.6	10.6	100.0
Total	360	100.0	100.0	

It can be seen from the findings in table 4.18 above that information on hygiene is available among the pupils since 89.4% of the respondents remember attending a lesson that talked about hygiene and cleanliness during the year. It is therefore evident that the gaps in provision of facilities are the issue that needs to be addressed by the policy makers, managers of schools and the stakeholders. There is need to invest more on the facilities that support hygiene practices among the pupils.

4.7.2 Number of Hygiene Education Lessons attended During the Year

Respondents were asked by the researcher to indicate the number of hygiene education lessons they had attended during the year. The findings are presented in table 4.20 below:

Table 4.20 Number of Hygiene Lessons Attended this Year

	Frequency	Percent	Valid Percent	Cumulative Percent
0	39	10.8	10.8	10.8
1	82	22.8	22.8	33.6
2	103	28.6	28.6	62.2
3	67	18.6	18.6	80.8
4	37	10.3	10.3	91.1
5	22	6.1	6.1	97.2
6	10	2.8	2.8	100.0
Total	360	100.0	100.0	

The number of lessons attended by the respondents is seen to fewer at the minimum which is none and at maximum 6 lessons. The frequencies were subjected to further analysis to establish the mean and variance and the results presented in table 4.21 below:

Table 4.21 Mean Number of Hygiene Lessons attended this year

N	Valid	360
	Missing	0
Mean		2.24
Variance		2.200

The number of lessons attended by the respondents is normally distributed with mean 2.24 and variance 2.2. It therefore means that most of the respondents attended between 2 to 3 lessons for the period from January to June 2013. These results were further subjected to analysis using Pearson's Correlation Coefficient to establish the existence of relationship between the number of hygiene education lessons attended and the end term score in examinations and the results are presented in table 4.22 below:

Table 4.22 Influence of Hygiene Education on Academic Performance

		No of hygiene education lessons attended this year	pupil Score in last term end term examinations out of 500
No of hygiene education lessons attended this year	Pearson Correlation	1	.760**
	Sig. (2-tailed)		.000
	N	360	360
pupil Score in last term end term examinations out of 500	Pearson Correlation	.760**	1
	Sig. (2-tailed)	.000	
	N	360	360

From the correlation in table 4.20 above it can be seen that the value of Pearson's Correlation Coefficient at 0.01 significance level is $r^2 = 0.76$ implies that there exists a strong positive relationship between the number of hygiene education lessons attended by the respondents during the year and the score in last term end term examinations. This implies that hygiene knowledge helps the learners to adhere to hygiene practices that keep them in school as they avoid diarrhea related illnesses to concentrate in completion of the syllabus. The findings clearly identify hygiene education as an aspect of education that should attract investment as prescribed by the Human Capital Theory. Much of the investments in education especially in the rural public schools are in classrooms (GOK-UNICEF, 2011), the findings should therefore inform policy makers and school managers on the importance of allocating adequate funds to the School WASH programs to contribute to development.

4.7.3 Perception of Respondents on the Link between Hygiene Education and Performance.

Respondents were asked to give their perception on whether the availability and access to hand washing facilities in their school would improve their academic performance. The results are presented in table 4.23 below:

Table 4.23 Hygiene Education improves performance at school

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	186	51.7	51.7	51.7
Agree	118	32.8	32.8	84.4
Disagree	31	8.6	8.6	93.1
Strongly Disagree	25	6.9	6.9	100.0
Total	360	100.0	100.0	

Hygiene education was thought to contribute to improved performance by 84.5% of the respondents. For hygiene education, the contribution can be said to be two fold either as part of the curriculum and to enhance hygiene practices which help the pupils in avoiding diarrhea related illnesses. It can be seen from the table that a very small proportion of the respondents thought that hygiene education had no influence in their academic performance and this was given by 8.6% who disagreed and another 6.9% who strongly disagreed. This proportion of respondents who disagreed to this 15.5% can compare to the proportion that had never attended any hygiene lessons during the year which stood at 10.8%.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the major findings of the study, conclusions made, recommendations and suggestions on emerging issues that may require further investigations from the researcher's perspective.

5.2 Summary of the Findings

The purpose of this study was to investigate how Water, Sanitation and Hygiene programs influenced the performance of pupils in rural public primary schools in Maseno Division, Kisumu County, Kenya. In order to achieve its objectives, data relating to the availability and access to safe drinking water, availability and access to sanitation facilities, availability and access to hand washing facilities, provision of hygiene education, absenteeism and academic performance was collected from respondents. This data was subjected to preliminary analysis and summarized in form of frequency tables to show the extent to which the WASH facilities were available to pupils. The frequencies were further subjected to cross tabulation analysis and correlation analysis where applicable to establish the existence of relationships between the independent variables and the dependent variable.

Study findings relating to the availability and access to safe drinking water and pupils performance indicated that schools did not provide adequate water for drinking and other uses to pupils and some pupils still had to travel wasting learning time to fetch the very important commodity and this had an impact on their school attendance and hence performance with 60.8% reporting having water in school and 39.2% do without. Drinking water treatment was to be a practice largely ignored by many school schools yet highly influenced absenteeism among the pupils. 53% of respondents never had their drinking water

treated at all, and 18% had their drinking water treated sometimes. This finding leaves 71% of respondents exposed to infection by germs that cause diarrhea. On accessibility, 84.4% of respondents indicated that their school provided between 1-3 water points for their use.

Availability and access to adequate sanitation facilities to pupils in primary schools pupils was found to reduce absenteeism. Specifically pupils who reported using clean latrines missed school less than those who reported using dirty latrines by 42%. In terms of availability, many schools had less latrine door than they should have compare to the number of pupils in the school with regard to the recommended pupil/latrine ratios with a mean of 6 doors per school.

The study established that 52.2% of the respondents did not have hand washing facilities at their school. It was further found out that 80.8% of the respondents reported washing their hands after visiting the latrines and before eating while at school even though only 47.8% of them had facilities available. The study also found that 71% of those who reported that they never washed their hands after visiting the toilet and before eating while at school missed school at least once during the year. For the 80.8% of respondents who washed hands, the study found that only 22.5% could access soap to so.

The study established that 89.4% of respondents remembered attending a lesson that talked about hygiene and cleanliness during the year. The study further found a strong positive correlation between the number of hygiene education lessons attended by the pupils and the score in end of term examinations as given by the value of Pearson's correlation Coefficient of $r^2 = 0.76$. This implies that those pupils who attended more hygiene education lessons tended to score higher in end of term examinations.

5.3 Discussion of Findings

The findings of the study were discussed guided by the theoretical framework, conceptual framework and the literature reviewed upon which the study was based. This was done as per the thematic areas given by the objectives of the study.

5.3.1 Availability and Access to Safe Drinking Water and Pupils' Performance

The first objective of the study was to find out how availability and access to safe drinking water influences pupils performance. In terms of availability of water within the school compound, the study found out that 60.8% of the respondents had water within the school while 39.2 did not and had to spend some time to fetch water for drinking and other uses. This time spend compromises on study time and also the trips exposes the pupils to risks of attacks especially the girls on their way to the water sources.

The study established that rural public primary schools do not treat drinking water, 53% of respondents never had their drinking water treated at all, and 18% had their drinking water treated sometimes. This finding leaves 71% of respondents exposed to infection by germs that cause diarrhea. In relating the use of safe drinking water and absenteeism, the study established that among who reported using treated drinking water at school, 73% of them never missed school at all during the year. On the other hand for those whose drinking water was never treated 56% of them missed school due to illness at least once during the year giving a relationship between the use of treated water and absenteeism. The findings can be compared to similar findings of project evaluations and research conducted in Bangladesh which found a 15% increase in attendance when safe water was available within 15 minutes (Redhouse 2004) as quoted in (IRC, 2007). The findings imply that the use of safe drinking water has influence on pupils absenteeism which is a key performance parameter among primary school learners.

On accessibility, 84.4% of respondents indicated that their school provided between 1-3 water points for their use. It may look good but since some of the schools had up to 600 pupils, providing one water point may limit accessibility and also time wasting as the pupils queue at the water point and this may have a negative impact on their performance. It is also important to note in summary that the learners themselves feel that availability of safe drinking water in school is essential for their improved academic performance, 76.4% of them agreeing to this. It is therefore important for all the stakeholders in education to prioritize investment in education by considering the water facilities alongside other facilities that the learners need such as class rooms.

5.3.2 Availability and Access to Sanitation and Pupils' Performance

The second objective of the study was to assess how availability and access to sanitation facilities influenced pupils' performance. In terms of availability of latrines, the study found out that averagely there were about 6 latrine doors in each school. This meant that many of the schools in the division may not meet the recommended ratios of 1:25 and 1:30 for boys and girls respectively given the average enrolments despite the fact that 60% of all the CDF funds spent in the district was allocated to education related projects (GOK-UNICEF, 2011). This therefore calls for a shift in resource allocation to provide adequate sanitation facilities to pupils. It was good to note from findings that cleanliness was taken seriously by the schools with 66.1% of the respondents reporting using clean latrines. However, there was still reason to worry as 33.9% of respondents reported using either somewhat clean or not clean latrines because this put them at risk of diarrhea and worm causing germs. The study in assessing the relationship between cleanliness of latrines and absenteeism, it was found that 78% of respondents who reported using dirty latrines while at school missed school at least once during the year compared to 36.5% of their counter counterparts who reported using clean latrines at school. The findings here point to a relationship between clean latrines and

absenteeism due to illness among the primary school learners. The findings compare well with those of Esrey (1994) as quoted in (IRC, 2007), in his analysis of 144 water and sanitation studies worldwide, found that safe excreta disposal as an intervention to reduce diarrhea contributed to the highest i.e. 36% reduction compared other interventions. In general from the findings, it can be said that among the rural public primary pupils, availability and use of clean latrines can reduce absenteeism by about 42%. The study also found out that primary school pupils who participated in the study are aware that access to clean latrines can immensely contribute to their performance at school with 75.3% of the respondents agreeing to this. Therefore while channeling funds to the schools, it should be ensured that schools are given budgets to provide adequate latrines and other materials that are needed for cleaning such as soap.

5.3.3 Provision and Access to Hand Washing Facilities and Pupils' Performance

The study also sought to explore how availability and access to hand washing facilities influenced the performance of pupils in rural public primary schools in Maseno Division. The study established that 52.2% of the respondents did not have hand washing facilities at their school while 47.8% of the respondents reporting having the facilities. It was further found out that 80.8% of the respondents reported washing their hands after visiting the latrines and before eating while at school even though only 47.8% of them had facilities available. This may mean that pupils found alternative ways of washing their hands even when the school did not provide for the facilities, these alternative means may be time consuming and risky in other aspects. However the acute lack of the hand washing facilities in schools could also explain why diarrhea and upper respiratory track infections are among the top three causes of morbidity in the Division (MOPHS-JICA,2011).

On the relationship between hand washing and absenteeism, the study established that 71% of those who reported that they never washed their hands after visiting the toilet and

before eating while at school missed school at least once during the year while on the other hand only 38.1% of those who reported washing their hands at those critical times missed school at least once during the year. The findings concur with that of an empirical study by Unicef (2010) which found out that hand washing with soap reduced absenteeism by 54%. This therefore implies that hand washing as a hygiene practice can reduce absenteeism by about 33% among the rural public primary school pupils. The study also found out that only 22.5% of the respondents had soap always available for washing hands and that 28.9% of the respondents could not access hand washing facilities because even a single hand washing station was not provided for the school population. Finally, the study did establish that 81.1% of the respondents were well aware that hand washing with soap at critical times could make immense contribution towards improving their academic performance at school.

5.3.4 Provision of Hygiene Education and Pupils Performance

Finally, the study sought to examine how the provision of hygiene education influences performance of rural public primary school pupils in Maseno Division. The study established that 89.4% of respondents remembered attending a lesson that talked about hygiene and cleanliness during the year. In terms of frequency of lessons attended, the study found that within a period of about 6 months the mean number of lessons attended was 2.24 lessons. The findings supplement those of a survey in Djibouti sponsored by UNICEF in 2009 that found out that there were significant rural/urban disparities in the availability of hygiene education lessons; this is seen from the mean of 2.24 lessons in a period of six months. The study further established a strong positive correlation between the number of hygiene education lessons attended by the pupils and the score in end of term examinations as given by the value of Pearson's correlation Coefficient of $r^2 = 0.76$. This implies that those pupils who attended more hygiene education lessons tended to score higher in end of term examinations. To support the relationship, the study established that 84.5% of the respondents thought that

hygiene education contributed to their academic performance at school. These findings therefore should be reason enough to sustain hygiene education in public primary schools through adequate budgetary allocations and curriculum review.

5.4 Conclusions

The discussions on the findings of the study led to the conclusion that availability and access to safe drinking water, availability and access to sanitation facilities, provision of hand washing facilities and hygiene education positively influence the performance of pupils in rural public primary schools.

In view of the study findings relating to the availability and access to safe drinking water and pupils performance, the study concluded that schools did not provide adequate water for drinking and other uses to pupils and some pupils still had to travel wasting learning time to fetch the very important commodity and this had an impact on their school attendance and hence performance. Water treatment was to be a practice largely ignored by many school schools yet highly influenced absenteeism among the pupils.

Provision of adequate sanitation facilities to pupils in primary schools contributed to reduced absenteeism. Cleaning the latrines as hygiene practice is important in keeping the germs that cause diarrhea and worms at bay. Pupils who reported using clean latrines missed school less than those who reported using dirty latrines. In terms of availability, many schools had less latrine door than they should have compared to the number of pupils in the school with regard to the recommended pupil/latrine ratios.

Hand washing with soap at critical times helps the pupils avoids contracting germs that cause diarrhea related illnesses which cause them to miss school or perform poorly in exams. Many schools did not provide learners with hand washing stations and for those who provided, the number of stations was so small and soap was always not provided.

Provision of hygiene education to give information and sustain hygiene knowledge has a positive relationship to the performance of the learners. Many schools provided hygiene education lessons though the frequency of the lessons was very small.

5.5 Recommendations

Considering the theoretical framework, conceptual framework and the literature review upon which this study was based, the researcher has given the following recommendations:

1. The Ministry of Education should increase budgetary allocation to School Water and Sanitation programs based on specific needs of the schools.
2. Schools should mobilize additional resources for school water, sanitation and hygiene programs to supplement allocation from the government.
3. Education policies relating to establishment of new institutions should be reviewed to ensure that only new institutions that meet minimum standards of school WASH are registered.
4. Proper enforcement of rules and regulations regarding adherence to School WASH standards should be ensured such that schools that fail to meet the standards can be closed down.
5. Proper auditing, monitoring and supervision of implementation of School WASH projects to avoid misuse of funds by implementers thus ensuring value for money.
6. Promotion of the establishment of WASH clubs in all public primary schools to sustain hygiene knowledge, share experiences, gain new knowledge and to attract more participation by pupils.

5.6 Study Contribution to the Body of Knowledge

Objective

Contribution to Body of Knowledge

To find out how availability and access to safe drinking water influences pupils' performance among rural public primary school pupils in Maseno Division.

Provision of safe drinking water to pupils reduce absenteeism and learning time lost while fetching water for drinking and other uses. Pupils using safe water fall ill less often and cover the syllabus and hence improved performance.

To assess how availability and access to sanitation facilities influences pupils' performance among rural primary school pupils in Maseno Division.

Proper sanitation in schools help keep learners in school by avoiding germs causing diarrhoea and worms associated with poor performance such as schistosomiasis. This reduces absenteeism and improves academic performance.

To explore how provision and access to hand washing facilities influences pupils' performance among rural primary school pupils in Maseno Division.

Hand washing with soap at critical times by pupils reduces absenteeism. Provision of hand washing facilities including soap is very low in public primary schools due to budgetary constraints.

Hygiene education contributes to improved academic performance among rural public primary school pupils by sustaining hygiene practices hence keeping them in school.

Hygiene education contributes to improved academic performance among rural public primary school pupils by sustaining hygiene practices hence keeping them in school.

5.7 Suggestions for Further Research

1. This study can be replicated for urban public primary schools to establish any disparities in the influence of SWASH programs on performance of pupils.
2. The study focused only on the primary school pupils, it is suggested that the study be replicated in public secondary schools within the same county so as to determine how SWASH programs influence the performance of students.
3. A study of similar objectives could be specifically carried out to compare how SWASH programs influence the performance of boys and girls. This would be a comparative study.
4. It is further suggested that a study be carried out to investigate the factors that influence the sustainability of SWASH programs in public primary schools in Kisumu County.
5. Replication of this study with the involvement of head teachers as the main respondents.

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APPENDICES

Appendix I: Letter of Transmittal

P.O. Box 30197-00200

Nairobi

Email: wagaochieng@yahoo.com

Phone: +254727889203

June, 2013

Dear Sir/Madam,

RE: INFLUENCE OF SCHOOL WATER, SANITATION & HYGIENE PROGRAMS ON PUPILS' PERFORMANCE AMONG RURAL PUBLIC PRIMARY SCHOOLS IN MASENO DIVISION, KISUMU COUNTY.

I am a Masters of Arts (Project Planning and Management) student at the University of Nairobi carrying out research on the above topic. It is my humble request that you assist me by filling the questionnaire while responding to the questions as correctly and honestly as possible. Be assured that your identity and responses will be treated with utmost confidentiality.

I take this opportunity to thank you in advance for your willingness to participate in this important exercise.

Yours Faithfully



Waga David Ochieng'

Appendix II: Pupils Questionnaire

Section I: Demographic Information			
1.0	Name of school		
1.1	Age of pupil	10-12	1
		13-14	2
		15-16	3
		17 and above	4
1.2	Sex	Male	1
		Female	2
Section II: Availability and Access to Safe Drinking Water			
2.0	Is there water in the school compound?	Yes	1
		No	2
2.1	If no, where do you get water for drinking and other uses?	River/Lake	1
		Borehole	2
		Well	3
		Rain water	4
		Other (specify).....	
2.2	How long does it take to fetch water from the source in 2.1 above?	Less than 30 minutes	1
		30-60 Minutes	2
		1-2 hours	3
		2-4 hours	4
		More than 4 hours	5
2.3	Is drinking water from the source used in your school treated to make it safe?	Always	1
		Sometimes	2
		Never	3

2.4	How many drinking water points are there in your school?	Between 4 to 6	1
		Between 1 to 3	2
		None	3
2.5	Availability and access to safe drinking water in your school improves your academic performance?	Strongly Agree	1
		Agree	2
		Disagree	3
		Strongly disagree	4
Section III: Availability and Access to Sanitation Facilities			
3.1	How many latrines doors in does the school have for your use? <i>(If you are a boy write the no of boys latrines if girl write no of girls latrines)</i>		
3.2	How clean are the latrines in your school?	Clean	1
		Somewhat clean	2
		Not clean	3
3.3	Are the latrines accessible to all pupils?	Yes	1
		No	2
3.4	Availability of enough, clean latrines improves your academic performance	Strongly Agree	1
		Agree	2
		Disagree	3
		Strongly disagree	4
Section IV: Provision and Access to Hand Washing Facilities			
4.0	Has your school provided hand washing facilities?	Yes	1
		No	2

4.1	Do you wash your hands after visiting the toilet and before eating while at your school?	Yes	1
		No	2
		If No, why.....	
4.2	Is soap available for washing hands at your school?	Always	1
		Sometimes	2
		Never	3
4.3	How many hand washing stations are available at your school?	Between 4 to 6	1
		Between 1 to 3	2
		None	3
4.4	Hand washing with soap at critical times can improve your academic performance	Strongly Agree	1
		Agree	2
		Disagree	3
		Strongly disagree	4
Section V: Provision of Hygiene Education			
5.0	Do you remember being in any kind of school lesson that talked about hygiene or cleanliness	Yes	1
		No	2
5.1	Indicate the number of hygiene education lessons you have attended this year		
5.2	How many days have you missed school due to illness this year	None	1
		Between 1 to 7 days	2
		Between 8 to 15 days	3
		More than 16 days	4
5.3	Hygiene education can improve your	Strongly Agree	1

	academic performance.	Agree	2
		Disagree	3
		Strongly disagree	4
5.4	What was your score during end term examinations last term out of 500 marks		

Appendix III: Std 6 & 7 Enrolment for Maseno Division as at March 2013

Zone	School	Code	Std 6		Std 7	
			Boys	Girls	Boys	Girls
Chulaimbo	AGULU	4169	15	17	13	23
	BAR ANDINGO	4071	32	33	50	56
	CHULAIMBO	4015	23	28	25	19
	ELUHOBE	4019	43	43	37	37
	ESIVALU	4325	19	10	19	10
	KUOYO	4023	31	30	30	42
	MARERA	4186	35	30	47	46
	MASENO DEAF	4032	13	9	22	8
	MASENO GIRLS	4031	0	101	0	99
	MASENO MIXED	4032	48	38	39	51
	MBAKA OROMO	4160	32	34	37	46
	NAMETSA	4042	10	13	17	10
	NYAKONGO	4177	19	30	21	31
	ODOWA	4164	22	15	23	15
	SANGANYINYA	4149	17	16	12	10
SUNGA	4127	17	22	27	23	
			376	469	419	526
Kit Mikayi	AWANYA	4180	9	21	14	12

	KAJULU	4024	26	20	19	19
	KALOKA	4142	6	17	7	11
	KAMBUDI	4102	10	9	11	14
	KIT MIKAYI	4025	35	35	30	28
	KUOYO KAILA	4023	38	35	36	34
	LANGI	4151	17	8	9	23
	MALELA	4121	15	15	15	17
	NANGA KOKER	4179	6	15	8	9
	NGOP NGESO	4137	12	15	10	13
	NYABERA	4114	8	4	6	7
	NYAGUDA	4136	9	4	7	6
	NYAMBOYO	4109	10	10	12	25
	NYAMISRI	4162	10	7	13	17
	OLARE	4173	2	2	5	4
	OLUTI	4104	9	6	9	11
	ORANDO	4050	27	23	17	14
	RODI	4084	20	26	16	18
	RUNDA	4061	12	18	6	18
	SIALA KAILA	4138	11	11	11	16
	SIMBAGERO	4175	16	6	8	16
			308	307	269	332
Otwenya	ASOL	4011	13	14	17	19

	ATOL	4103	16	1	5	3
	ATOYA	4155	18	16	20	12
	GOT ODONGO	4111	24	22	21	23
	KAMAGORE	4110	28	43	55	42
	LUNGA	4081	15	20	24	25
	MAGWAR	4028	0	0	0	0
	MARIWA	4030	27	18	27	25
	MBEKA	4119	14	16	19	9
	MIRANGA	4034	26	16	18	20
	NDUTA	4073	16	14	16	17
	NYAMOR	4326	9	16	19	13
	NYAROMBO	4157	20	20	23	25
	OMBO	4163	16	8	14	11
	ONYINJO	4120	7	7	14	7
	OTWERO	4176	3	7	10	6
	RATTA	4062	29	32	26	33
	URUDI RATTA	4172	31	26	28	25
			312	296	356	315
Sianda	ABOGE	4108	8	10	3	12
	ARUDE	4184	10	19	14	14
	BAR MATHONYE	4072	0	0	0	0
	DWELE	4156	10	14	27	15

HUMA	4022	18	14	19	17
KAWINO	4116	29	30	42	34
KOKULO	4078	13	18	12	12
LWALA KADAWA	4079	19	14	13	19
MALIERA	4106	23	20	13	22
MAWEMBE KODERO	4167	30	26	40	30
NYADUONG	4181	10	8	10	12
NYAKUNE	4150	10	15	16	6
OCHOK KADONGO	4148	18	52	47	47
OLUOWA	4053	19	25	31	26
SIANDA	4065	18	23	24	29
SINYOLO	4066	34	40	36	45
ULALO	4134	31	46	39	42
WANDEGA	4158	13	10	10	12
		313	384	396	394
TOTAL		942	1456	1440	1567

Source: District Education Office- Kisumu West 2013

Appendix IV: Research Authorization

MINISTRY OF EDUCATION

Telegrams:
Telephone: Kisumu (057) 2022626
When replying please quote



REPUBLIC OF KENYA

DISTRICT EDUCATION OFFICE
KISUMU WEST DISTRICT
P.O. BOX 19
PAW-AKUCHE

Date: 11/6/2013

REF: KWD/GA/23/8VOL.I/79

TO ALL HEADTEACHERS MASENO DIVISION.

RE: WAGA DAVID OCHIENG – REG NO.L50/72354/11.

This is to confirm that the above named is a student at the University of Nairobi College of Education and External studies, School of Continuing and Distance Education, Department of Extra-Mural Studies pursuing Masters of Arts in Project Planning and Management.

He has been authorized to conduct a research on **Influence of school water, sanitation and hygiene programs on pupils' performance** among rural public primary schools in Maseno Division, Kisumu County, Kenya.

Please accord him support.

GEORGE OUMA
FOR: DISTRICT EDUCATION OFFICER
KISUMU WEST.

Cc: Area Education Officer
Maseno Division.

DISTRICT EDUCATION OFFICER
KISUMU WEST.