

**FACTORS INFLUENCING IMPLEMENTATION OF HYGIENE
PRACTICES IN PUBLIC SECONDARY SCHOOLS IN CENTRAL
DIVISION OF MACHAKOS DISTRICT IN MACHAKOS COUNTY**

BY

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**A Research Project Report Submitted in Partial Fulfillment of the Requirements for the
Award of the Degree of Masters of Arts in Project Planning and Management of the
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DECLARATION

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

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This research project report has been submitted for examination with my approval as the university lecturer.

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DEDICATION

I dedicate this work to my dear husband Benjamin Matheka, my children Diana Nduku, Dora Mwikali, Doris Mueni and Delvis Musela for their encouragement, moral support and prayers during my career development period .Their sacrifice during nights and weekend classes when they had to do without me for the best part of the years 2011-2012 will always linger in my mind. To all public secondary school students and principals in Central Division, Machakos District for their quest for knowledge on hygiene practices, you will surely defeat this social evil (poor hygiene practices) which cripples development in the society.

May God bless them abundantly.

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TABLE OF CONTENTS

DECLARATION	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	x
LIST OF FIGURES	xiv
LIST OF ACRONYMS AND ABBREVIATIONS	xv
ABSTRACT	xvi
CHAPTER ONE : INTRODUCTION	1
1.1 Background of the Study	1
1.3 The Purpose of the Study.....	7
1.4 Objectives of the Study	8
1.5 Research Questions	8
1.6 Hypotheses of the Study	9
1.8 Assumptions of the Study.....	9
1.9 The Scope of the Study.....	10
1.10 Significance of the Study.....	10
1.11 Definitions of Significant Terms.....	11
CHAPTER TWO : LITERATURE REVIEW.....	13
2.1 Introduction.....	13
2.2 The Concept of Hygiene Practices	13

2.3 The Availability of Soap and its influence on the Implementation of Hygiene Practices	15
2.4 The Availability of Water and its influence on the Implementation of Hygiene Practices.....	17
2.5 The Availability of Toilets and its influence on the Implementation of Hygiene Practices ...	18
2.6 The Influence of Sanitary Towel Disposal Bins on the Implementation of Hygiene Practices	20
2.7 Theoretical Framework	21
2.8 Conceptual Framework	23
2.9 Summary of the Reviewed Literature	24
CHAPTER THREE : RESEARCH METHODOLOGY.....	26
3.1 Introduction.....	26
3.2 Study Location	26
3.3 Research Design.....	26
3.4 Target Population	27
3.5 Sample Size and Sampling Technique	28
3.6 Data Collection Instrument.....	29
3.6.1 Pilot Testing	30
3.6.2 Validity of the Instrument.....	30
3.6.3 Reliability of the Instrument	31
3.7 Data Collection Procedures	31
3.8 Data Analysis Techniques	31
3.9 Ethical Issue	32
3.10 Operationalization of Variables	33
CHAPTER FOUR : DATA ANALYSIS, PRESENTATION AND INTERPRETATION.....	35
4.1 Introduction.....	35
4.2 Questionnaire Return Rate.....	35

4.3 Demographic Characteristics of the Respondents.....	36
4.3.3 Class of Students	38
4.4 Availability of Water and its Influence on Implementation of Hygiene Practices	39
4.4.1 Provision of Water for Hand Washing after visiting the Toilet.....	39
4.4.2 Type of Water provided for Hand Washing	40
4.4.3 Regular Availability of Water for Hand Washing after visiting the Toilet	41
4.4.4 The extent to which Water Points for Hand Washing are adequate.....	42
4.4.5 Location of Water in relation to Nearness to the Toilet	44
4.4.6 The extent to which Students Wash Hands after visiting the Toilet	45
4.4.7 Hypothesis H_{01} There is no Significant Relationship between Availability of Water and Implementation of Hygiene Practices in Public secondary schools in Central Division of Machakos District.	46
4.5 Availability of Soap and its Influence on Implementation of Hygiene Practices	52
4.5.1 Provision of Soap for Hand Washing after visiting the Toilet.....	52
4.5.2 Type of Soap provided for Hand Washing	53
4.5.3 Location of Soap for Hand Washing after visiting the Toilet.....	53
4.5.4 The extent to which Students Washed Hands with Soap after visiting the Toilet	54
4.5.5 The extent to which Soap for Hand Washing is Always Available	55
4.5.6 Effective use of Soap for Hand Washing after Visiting the Toilet	56
4.5.7 Hypothesis H_{02} : There is no Significant Relationship between Availability of Soap and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District	57
Table 4.21 Regression Model for Availability of Soap and Implementation of Hygiene Practices, Subject to Proper use of Toilets.....	60
4.6 Availability of Toilets and their Influence on Implementation of Hygiene Practices	61
4.6.1 Type of Toilets used by Students	62

4.6.2 Number of Toilets for Students.....	63
4.6.3 The extent to which Toilets are Adequate for Students.....	66
4.6.4 The extent to which Students Toilets provide Privacy	67
4.6.5 The extent to which Toilets are Cleaned and Disinfected	69
4.6.6 Hypothesis H ₀₃ : There is no Significant Relationship between Availability of Toilets and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District.	70
4.7. Sanitary Towel Disposal Bins and their Influence on Implementation of Hygiene Practices in Public Secondary Schools	75
4.7.1 Provision of Sanitary Towel Disposal Bins	75
4.7.2 Location of Sanitary Towel Disposal Bins	76
4.7.3 Degree of Disposing of Used Sanitary Towels in the Disposal Bins	78
4.7.4 The extent to which Sanitary Towel Disposal Bins are Emptied	79
4.7.5 The extent to which Sanitary Towel Disposal Bins are Cleaned.....	79
4.7.6 Testing of the Hypothesis	80
4.7.7 H ₀₄ : There is no Significant Relationship between Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District.....	80
4.8 Opinion on how to Improve Hygiene Practices in Public Secondary Schools.....	85
CHAPTER FIVE : SUMMARY OF THE FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS	87
5.1 Introduction.....	87
5.2 Summary of the Findings.....	88
5.2.4 Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices.	89
5.3 Discussion of the Study Findings.....	89
5.3.2 Influence of Soap on Implementation of Hygiene Practices in Public Secondary Schools .	90

5.3.3 Influence of Toilets on Implementation of Hygiene Practices in Public Secondary Schools	90
5.3.4 Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices in Public Secondary Schools	91
5.4 Conclusion of the Study	91
5.5 Recommendations of the Study	92
5.5.2 Recommendations for Further Research	93
REFERENCES	94
APPENDICES	102
APPENDIX I	102
LETTER OF INTRODUCTION	102
APPENDIX II	103
Questionnaire for Students	103
APPENDIX III	107
Interview Schedule for Principals	107
APPENDIX IV	108
Table of schools in the study	108
Appendix V	114
Authorization Letter from Machakos District Education Office	114
Appendix VI	115
Authorization letter from National Council for Science and Technology	115

LIST OF TABLES

Table 3.1 Operationalization of Variables.....	31
Table 4.1 Distribution of Respondents by Gender.....	35
Table 4.2 (a) Distribution of Principals by Type of School.....	36
Table 4.2 (b) Distribution of Students by Type of School.....	37
Table 4.3 Distribution of Students by Classes.....	37
Table 4.4 Provision of Water for Hand Washing after visiting the Toilet	38
Table 4.5 (a) Type of Water Provided for Hand Washing as reported by Students.....	39
Table 4.5 (b) Type of Water Provided for Hand Washing as reported by Principals.....	39
Table 4.6 Regular Availability of Water for Hand Washing	41
Table 4.7 (a) Adequacy of Water Points as reported by Students.....	42
Table 4.7 (b) Adequacy of Water Points as reported by Principals	42
Table 4.8 (a) Location of Water Points as revealed by Students	43
Table 4.8 (b) Location of Water Points as reported by Principals	44
Table 4.9 The extent to which Students wash Hands after visiting the Toilet	45
Table 4.10 Influence of Water on Implementation of Hygiene Practices	46
Table 4.11 Regression Model for Availability of Water and Implementation of Hygiene Practices, subject to Hand Washing	47
Table 4.12 Regression Model for Availability of Water and Implementation of Hygiene Practices, Subject to Proper use of Toilets	49

Table 4.13 Provision of Soap for Hand Washing as reported by Students	51
Table 4.14 Type of Soap Provided for Hand Washing as revealed by Students	52
Table 4.15 Location of Soap for Hand Washing	52
Table 4.16 Extent of Hand Washing with Soap after Visiting the Toilet.....	53
Table 4.17 Extent to which Soap for Hand Washing is Always Available	54
Table 4.18 Effective use of Soap for Hand Washing	55
Table 4.19 Influence of Soap on Implementation of Hygiene Practices	56
Table 4.20 Regression Model for Availability of Soap and Implementation of Hygiene Practices, Subject to Proper Hand Washing.....	57
Table 4.21 Regression Model off Availability of Soap and Implementation of Hygiene Practices Subject to Proper use of Toilets	59
Table 4.22 Type of Toilets used by Learners as indicated by Students	61
Table 4.23 Type of Toilets used by Learners as revealed by Principals	61
Table 4.24 Number of Toilets as indicated by Students	63
Table 4.25 Number of Toilets as revealed by Principals	64
Table 4.26 Adequacy of Toilets used by Students	65
Table 4.27 Extent to which Toilets used by Students Provide Privacy	66
Table 4.28 Frequency of Repairing of Toilets	66
Table 4.29 Extent to which Toilets are Cleaned and Disinfected as Reported by Students.....	67
Table 4.30 Extent to which Toilets are Cleaned and Disinfected as Indicated by	

Principals.....	67
Table 4.31 Influence of Toilets on Implementation of Hygiene Practices	69
Table 4.32 Regression Model for Availability of Toilets and Implementation of Hygiene Practices, Subject to Proper Hand Washing	70
Table 4.33 Regression Model for Availability of Toilets and Implementation of Hygiene Practices, Subject to Proper use of Toilets	71
Table 4.35: Location of the Sanitary Towel Disposal Bins as revealed by Students	77
Table 4.36 Location of Sanitary Towel Disposal Bins as reported by Principals.....	77
Table 4.37 Extent of Disposal of used Sanitary Towels in Disposal Bins.....	78
Table 4.38: The extent to which Sanitary Towel Disposal Bins are Emptied	79
Table 4.39: The extent of Regular Cleaning of Sanitary Towel Disposal Bins.....	80
Table 4.40: Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices	81
Table 4.41:Regression Model for Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices, Subject to Proper Wand washing after Disposing Used Sanitary Towels.....	82
Table 4.42: Regression Model for Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices, Subject to Proper use of Toilets.....	84

Table 4.43: (a) How to Improve Hygiene Practices in Public Secondary Schools	
as reported by Students.....	85
Table 4.43: (b) How to Improve Hygiene Practices in Public Secondary Schools	
as revealed by Principals.....	86

LIST OF FIGURES

Figure 1 Conceptual Framework.....	22
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LIST OF ACRONYMS AND ABBREVIATIONS

BASNEF	Beliefs, Attitudes, Subjective Norms and Enabling Factors
CDF	Constitutional Development Fund
EFA	Education for All
HWWS	Hand Washing With Soap
MDG	Millennium Development Goals
NCFW	National Curricular Frame Work
MOE	Ministry Of Education
UNCED	United Nations Council for Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WSSCC	Water Supply and Sanitation Collaborative Council

ABSTRACT

This study was set to investigate the factors influencing implementation of hygiene practices in public secondary schools in Central Division of Machakos District in Machakos County. The study was guided by objectives namely; to establish whether availability of soap influences implementation of hygiene practices in public secondary schools in Central Division of Machakos District, to establish whether availability of safe water influences implementation of hygiene practices in public secondary schools in Central Division of Machakos District, to establish the relationship between availability of toilets and the implementation of hygiene practices in public secondary schools in Central Division of Machakos District and to investigate the relationship between availability of sanitary towel disposal bins and implementation of hygiene practices in public secondary schools in Central Division of Machakos District. The study adopted a theoretical framework from Hubley (1993) model known as BASNEF on why people change their hygiene behaviors. The researcher formulated a conceptual frame work which showed the relationship between availability of soap, water, toilets and sanitary towel disposal bins as the independent variables and hygiene practices as the dependent variable. The conceptual framework incorporated moderating variables namely student's attitudes, religion, customs and culture and intervening variables namely school finance, policies, management and student background. The study looked at literature review from other researchers on hygiene practices and reviewed their findings on independent variables under study. Descriptive survey research design was adopted. A target population of 30 schools and 4481 students and 30 principals from Central Division was selected and a sample size of 28 schools, 354 students and 28 principals was selected by use of Krejcie table and formulae. Questionnaire and interview schedules were used as research instruments to collect data and they were tested for validity using content validity and tested for reliability using Pearson correlation coefficient of split half method. Data was analyzed by using descriptive statistics for quantitative data, by use of frequency tables, percentages and measures of central tendency. Hypotheses was tested using one way analysis of variance (ANOVA) since hygiene practice as the dependent variable was measured at interval scale while the independent variables were measured at the nominal scale. Regression prediction models were developed for estimating implementation of hygiene practices. The findings of this study would provide several groups of people with a better understanding of factors influencing implementation of hygiene practices and perhaps encourage them to practice and improve hygiene in their own organizations. The study found out that availability of water has the greatest influence on implementation of hygiene practices and was followed by availability of soap while availability of sanitary towel disposal bins does not have a strong influence.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Hygiene is the practice of keeping oneself and one's surroundings clean so as to prevent illness or the spread of preventable diseases (Ministry of Public Health and Sanitation and Ministry of Education, 2009). It is often referred to as the behaviors and measures which are adopted so as to break the chain of transmission of infections both at home and in school. While lack of safe water, sanitation and prevalence of poor hygiene behaviors is the major cause of death among students in developing countries, a contaminated environment and poor hygiene practices account for over 60% of the total burden of disease among students in these countries. (UNICEF and WHO, 2009).

Eradication of open defecation, improved hand washing practices and ensuring that all liquid and solid waste are properly managed will help in ensuring proper hygiene practices and also save an estimated 1.9 billion school days that are lost due to diarrhea illness and other water and sanitation-related diseases (Hutton, Guy and Laurence, 2004). It is important to note that apart from the family, schools are important and stimulating learning environments for children and have the potential to significantly alter the behavior patterns of students leading to improved hygiene practices (UNICEF, 2009). According to Water Supply and Sanitation Collaborative Council (2010), these hygiene behaviors include proper hand washing, regular bathing and laundering, safe disposal of waste, and proper use of toilets which will help in enhancing effective learning, attracting large student enrolment in schools and ensuring a reduced burden on diseases.

While water and sanitation infrastructure provide the physical facilities needed for hygiene, they cannot independently prevent the transmission of diseases in a school set up. They need to be used in a hygienic manner by all the people so as to prevent environmental pollution and disease

(WHO, 2010). Too often, schools are some of the places where children become ill and although health education can bring about the intention to change poor hygiene practices, availability of appropriate hygiene facilities is essential in transforming students' intention to change into actual change both today and even in future. This will further be facilitated by mutual sharing of information and ensuring that these facilities are well designed, well located and that they are used and maintained appropriately thus enabling students to practice good hygiene and stay healthy (UNICEF, 1998b).

Poor hygiene practices have not only serious health consequences but also represent large economic losses and a bad image for countries and governments. The cholera epidemic in schools in Latin American cities for example, which was caused by deteriorated water supply and poor hygiene conditions, spurred politicians and administrators into action although they had thought that the disease had long been overcome. Schools in Peru were hit by a similar cholera epidemic which caused the country an estimated 200 billion US dollars in lost lives, decreased production, exports and tourism (Hutton, Guy and Laurence, 2004). There is therefore little doubt that access to clean water and sanitation should become a priority in schools and this will trigger implementation of proper hygiene practices. According to Cairncross and Kocher (1994), proper hygiene practices is a critical input in the overall development of a child and is significantly influenced by factors namely availability of water, soap, toilets and sanitary towel disposal bins. However, many schools experience unsanitary conditions that force them to practice poor hygiene.

According to studies done by UNICEF and WHO (2008), 1.1 billion people worldwide have already gained access to improved sanitation facilities since 1999 but the global community is still unlikely to achieve the Millennium Development Goal target-to halve by 2015, the proportion of people living without sustainable access to safe drinking water and basic sanitation facilities (Howard and Bartram, 2003). This is because the number of people (including students) who continue to suffer from lack of access to improved water and sanitation is still high (UNICEF, 1998).

During the world summit on sustainable development in 2002, the UNICEF executive director emphasized that every school should be equipped with separate sanitation facilities for boys and girls and should have a source of safe water. However, UNICEF estimates that half of the

schools in the world today still lack safe water and sanitation and experience unhygienic conditions that vary from inappropriate and inadequate sanitary facilities such as unavailability of water to the outright lack of toilets. Based on this, one can conclude that more than three hundred million children go to schools which lack safe water or clean toilets. This situation makes the students practice poor hygiene and yet very few studies have been done concerning factors influencing implementation of these poor hygiene practices. This problem has partly been aggravated by the implementation of the Free Primary Education (FPE) which has witnessed a drastic increase in the number of secondary school students.

In Tanzania for example, there was an increase in school enrolment from 5.4 million in 2001 to 7.6 million in 2005 (MOE strategic plan, 2002-2005). This has led to constraining of the available sanitation and school infrastructure. In Kenya the enrolment of pupils in both primary and secondary schools increased from 5.9 million in 2002 to 8.6 million in 2010, overstressing the already existing inadequate water and sanitation facilities (MOE strategic plan, 2006-2010). As a way of trying to address this issue, most governments have come up with guidelines for providing sanitation infrastructure in schools which range from a simple latrine to student ratio to detailed designs that must be used in the construction of toilets and hand washing stations. According to The Ministry of Public Health and Sanitation and Ministry of Education (2009), the recommended ratio is 1:25 and 1:30 for girls and boys respectively. However, studies show that these standards have not been met. In reality, standards are almost never met and most school sanitation infrastructure is woefully inadequate.

In most schools, latrine to student ratio is a main concern with hundreds of students sharing one toilet thus affording no privacy especially for the girls and forcing most of the students to practice poor hygiene. This is in contrast to recommendation by The Ministry of Public Health and Sanitation and Ministry of Education (2009) which emphasize that these sanitation facilities should provide privacy to all students. A study conducted in Zimbabwe by The Small Projects Foundation (SPF) for example showed that 400 girls out of 700 students were subjected to use four toilets for all their ablution needs. The study further observed that the toilets had broken doors and passersby could see into the toilet (Sommer, 2009). Girls reported that absence of privacy, which was contributed by doors that could not lock, caused them embarrassment and fear while accessing such toilets (Freeman *et al.*, 2009).

According to Maria (2010) a study which was conducted in 6500 schools in South Africa reported that majority of the schools in the Eastern Cape had pit latrines which were poorly maintained with most of them full and therefore no longer in use. This forced the students to look for alternative places where they could relieve themselves when answering to calls of nature.

In Tanzania, national data shows that on average there is only one pit latrine for every 56 children in schools (UNICEF, 2009). A research which was carried out in public schools in Tanzania by UNICEF and Water Aid (2009) reported that in one of the schools one latrine was being used by 187 pupils. This makes students in most of the schools in Tanzania not to be in a position to practice proper hygiene.

In Kenya, the situation is not any better. A research carried out by The Schools Sanitation and Hygiene Education Group in public schools in Machakos, Kiambu and Nairobi found out that an average of 64 students were sharing a single toilet (WHO, 2009). Learners' toilets in a school reflect the school's image and may have an influence on the learners' morale, behavior and health and as the children's commissioner for Wales stated in one of his reports, lack of priority given to these basic amenities is seen by many children as an indication of lack of priority and respect given to them by the society (Gould, 2012).

Disposal of solid waste is a very big challenge which was recognized by all nations in the 1992 conference on Environment and Development and regarded as a major barrier in the path towards sustainability (UNICEF, 1992). Parker,(2004) underscored this in his report which showed that globally, school girls use over 12 billion sanitary towels which are disposed off annually, filling up pit latrines or ending up in city dumps and landfills. He further observed that currently, sanitary towels form an estimated 6.3% of the sewerage related debris along rivers and beaches. Crofts and Fisher (2011) reported that these sanitary towels may lead to clogging of sewerage systems and consequent difficulties of unblocking such systems. A study conducted in Libode district in Zimbabwe by Maria (2010) found out that most primary school girls were dumping used sanitary towels in pit latrines claiming that the sanitary towel disposal bins were always full and never emptied. Crofts (2011) pointed out that such latrines would fill up very quickly since most of the sanitary towels used were not very bio-degradable.

Pilliteri (2011) reported that in Malawi, one school had an open pit full of used sanitary towels which were being removed by birds and dogs. He was supported by Crofts (2011) when he recorded similar observations in Uganda. This behavior can easily lead to land pollution and force the governments of the affected countries to spend huge amounts of money in rehabilitating such a land.

The Schools Sanitation and Hygiene Education Group that carried out a study in Kenya observed that in one of the schools, girls threw used sanitary towels behind the dormitories (WHO, 2009). These observations, most of which were carried out in primary schools, reveal very poor hygiene practices. Very few studies have been carried out particularly in public secondary schools to investigate whether similar practices are carried in these schools.

As part of hygiene, The Global Hand Washing Day has been calling for improved hygiene practices since its inception in 2008 with its guiding vision being a local and global culture of washing hands with soap. This practice has not been adopted by many schools as Parker (1993) reported that globally the rates at which hands are washed with soap range from 0–34%. Cairncross (1998) observed that the use of soap is an uncommon practice both in schools and at home.

Kay *et al.* (2005) and Curtis (2002), conducting a study among school adolescents from nine African countries found out that hand washing after visiting the toilet was poorly practiced. Cairncross (1998) expressed concern over the situation in rural schools in Kenya which he said lack the simplest hand washing facilities let alone a source of safe water. This situation makes it difficult for students in such schools to practice proper hygiene. A survey conducted in seven districts in Kenya including Machakos reported that washing hands with soap is almost non-existent in many Kenyan schools as only 1% use soap while washing hands. The study also reported that there were higher levels of hand washing at home than in school. In addition, it asserted that 17% of the participants involved in the study practiced proper hygiene (WHO, 1999).

The above researches revealed that there were very poor hygiene practices in public schools and yet there was very limited literature in regard to factors influencing implementation of hygiene

practices in public secondary schools in Central Division of Machakos District as was reported by the DEO's office in Machakos District.

In relation to this, this study sought to establish factors influencing implementation of hygiene practices particularly in public secondary schools in Central Division of Machakos District and possibly establish the extent to which these factors had been addressed in the schools under study.

1.2 Statement of the Problem

Hygiene is very important to healthy living and survival of humanity. Despite the realization of the importance of observing good hygiene practices and the risk of poor hygiene practices, many public secondary schools in Kenya had not implemented good hygiene practices. Even though the rapid growth of student intake in public schools since 2003 as a result of free primary and secondary education was deemed to be the immediate cause, the situation could have been attributed to culmination of many years of neglect and mismanagement of sanitation systems in many public secondary schools. The state of sanitation and hygiene practices in public secondary schools of Machakos District was wanting despite the fact that the government of Kenya, through the Constitutional Development Fund (CDF), had endeavored to provide water and sanitation facilities to schools so as to enable students in such institutions to practice proper hygiene. This fact was backed by a number of studies conducted in this region to gauge the level of hygiene practices in the schools. A survey conducted in Machakos among other districts by World Health Organization reported that hand washing with soap was almost non-existent as only 1% of the students used soap in washing hands after visiting the toilets (WHO, 2009).

The student toilet ratio in many public secondary schools was another core concern with hundreds of students sharing a single toilet. This was in contrast with the recommendation by The Ministry of Public Health and Sanitation and Ministry of Education (2009) which recommended a ratio of 1 toilet for every 25 girls and 1 toilet for every 30 boys in order for the sanitation facilities to provide adequate privacy to all students and to be used hygienically. The condition of the existing toilets was pathetic with broken doors, foul smell and alarming grubbiness.

Unhygienic disposal of used sanitary towels by girls in most public secondary schools was another alarming hygienic practice with most of the girls hiding used sanitary towels behind their dormitories or in dark corners of the school compound. This practice led not only to clogging of sewerage systems and consequent difficulties in unblocking of the sewerage systems but also posed a great threat to the environment as was observed by some researchers. It had been revealed that there was a dire lack of empirical researches on the factors influencing implementation of hygiene practices particularly in public secondary schools in Central Division of Machakos District as was reported by the District Education Office (DEO, 2013) in Machakos. There was therefore a dire need for learning and research institutions to instigate research in order to find out the factors which led to the dominance of these poor hygiene practices in most public secondary schools in this region. This would enable the concerned stakeholders and policy makers to initiate strategies so as to enhance the sanitation situation and hygiene practices in public secondary schools in this area.

It is against this background that this research sought to fill this gap by providing comprehensive information on factors influencing implementation of hygiene practices in public secondary schools in central division of Machakos district.

1.3 The Purpose of the Study

The purpose of this study was to establish the factors influencing implementation of hygiene practices in public secondary schools in Central Division of Machakos District with a view of coming up with a practical solution that would enhance sanitation situation and ensure reduction of poor hygiene practices in public secondary schools in the district. The study was based in Central Division of Machakos District.

1.4 Objectives of the Study

The study was guided by the following objectives

1. To establish whether availability of safe water influences implementation of hygiene practices in public secondary schools in Central Division of Machakos District.
2. To establish whether availability of soap influences implementation of hygiene practices in public secondary schools in Central Division of Machakos District.
3. To establish the relationship between availability of toilets and the implementation of hygiene practices in public secondary schools in Central Division of Machakos District.
4. To investigate the relationship between availability of sanitary towel disposal bins and implementation of hygiene practices in public secondary schools in Central Division of Machakos District.

1.5 Research Questions

The study addressed the following research questions

1. To what extent does the availability of water influence implementation of hygiene practices in public secondary schools in Central Division of Machakos District?
2. To what extent does the availability soap influence implementation of hygiene practices in public secondary schools in Central Division of Machakos District?
3. To what extent does the availability of toilets influence implementation of hygiene practices in public secondary schools in Central Division of Machakos District?
4. To what extent does the availability of sanitary towel disposal bins influence implementation of hygiene practices in public secondary schools in Central Division of Machakos District?

1.6 Hypotheses of the Study

1. There is no significant relationship between availability of water and implementation of hygiene practices in secondary schools in Central Division of Machakos District.
2. There is no significant relationship between availability of soap and implementation of hygiene practices in secondary schools in Central Division of Machakos District.
3. There is no significant relationship between availability of toilets and implementation of hygiene practices in secondary schools in Central Division of Machakos District.
4. There is no significant relationship between availability of sanitary disposal bins and implementation of hygiene practices in secondary schools in Central Division of Machakos District.

1.7 Limitations of the Study

The researcher was faced by the following limitation when carrying out the study. It was not possible to study all public secondary schools in Machakos District due to financial constraints and therefore the researcher sampled only 28 schools in central division of Machakos District to represent all public secondary schools under study. Time was also limited. However the researcher recruited data collection experts to assist in data collection. This enabled the researcher to cover all the 28 public secondary schools adequately and in time.

1.8 Assumptions of the Study

For the purpose of this study the following assumptions were made;

Students in public secondary schools understand the importance of hygiene practices.

The principals of secondary schools are conversant with hygiene practices and the proper use of hygiene facilities.

The respondents would be co-operative and provide reliable information for this study.

1.9 The Scope of the Study

The research study confined itself to the factors influencing implementation of hygiene practices in public secondary schools in Central Division of Machakos District namely availability of soap, safe water, toilets and sanitary towel disposal bins. The study may not have been generalized to cover tertiary institutions and universities since factors influencing implementation of hygiene practices in these institutions may be significantly different.

Data was collected from form two and three students only but not from form one and four students. This is because the form two and three students had stayed in the school long enough and had familiarized themselves with the school environment and therefore knew where most of sanitation facilities were unlike the form one students who were still be in the process of being oriented in the school. The form four students were revising for their mock examination and therefore seemed too busy to fill the questionnaires.

There are moderating variables that may influence implementation of hygiene practices. These include students' attitudes, background, beliefs, knowledge and perception towards hygiene but due to limited time and other resources, this study did not collect data on them.

1.10 Significance of the Study

The findings of this study may be of help to several groups of people: Firstly, it may provide the curriculum planners and developers and all the stakeholders in the education sector with a better understanding of factors influencing implementation of hygiene practices in schools. The curriculum planners may then use the study findings to develop appropriate national standards of toilets and other hygiene facilities that are relevant to secondary schools in Kenya.

Secondly, the ministry of education may use the study findings to develop a school program with guidelines for hygiene practices. These guidelines may be approved by the ministry and send to teacher training colleges where they may be used to prepare teachers and help them develop

curricular materials related to hygiene. The trained teachers may then use the materials and the guidelines to incorporate the theme into their subjects and encourage students to practice the knowledge gained both in school and at home.

Thirdly, the community health workers may use the research findings to educate the general public on good hygiene practices and factors that influence their implementation. They may as well use the findings to persuade individuals, families and social groups to adopt new, healthier and better hygiene practices.

Fourthly, the research findings may also provide a foundation for policy makers and project managers to make rational decisions on improving adolescent reproductive health both in school and in the communities.

Finally, heads of learning institutions and the teaching and non-teaching staff may use the research findings to re-assess hygiene facilities in their institutions and perhaps apply recommendations made by the researcher to better these facilities and also emphasize on improving hygiene practices in their own schools.

1.11 Definitions of Significant Terms

Hygiene: This word has been used in this study to mean the practice of maintaining clean hands, toilets and making proper use of the sanitary towel disposal bins in schools.

Hygiene practices: This word has been used in this document to include hand washing using soap, proper disposal of used sanitary towels, regular bathing and avoiding open defecation.

Implementation: It refers to the process of putting in place resources and strategies towards achieving the desired level of hygiene.

Sanitary towel disposal bins: Sanitary towel disposal bins has been used to refer to containers in which adolescent girls dispose of their used sanitary towels.

Sanitary towels: This word has been used in this study to refer to the materials which adolescent girls use to absorb blood during their menstruation.

Sanitation: This word has been used in this study to refer to any system that promotes proper disposal of sanitary towels, human waste, proper use of toilets and avoiding open space defecation

School principal: Refers to the administrator of a school appointed by the Teachers Service Commission in accordance with Education Act Cap 211

Secondary school: Post primary institutions where pupils progressively receive formal education from form one to form four.

Soap: The word soap in this document is used to refer to cleaning agent used with water for hand washing.

Toilet: This word has been used to refer to a room used by students in case they want to go for a long or short call.

Water: The word water has been used in this document to refer to water that has been treated and made safe for drinking and washing hands.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines a worldwide view of past researches on the concept of hygiene practices and factors that influence implementation of these hygiene practices in public secondary schools. It is divided into five sub-sections. The first sub-section discusses the concept of hygiene practices worldwide. The second sub-section gives a global perspective of factors influencing these practices, narrowing down to public secondary schools in Central Division of Machakos District, Kenya. In the third and fourth sub-sections, theoretical framework and conceptual framework of the study are formulated respectively showing the relationship between hygiene practices and the factors influencing their implementation. Finally a summary of the reviewed literature is discussed.

2.2 The Concept of Hygiene Practices

According to Ministry of Public Health and Sanitation and the Ministry of Education (2009), hygiene is the practice of keeping oneself and ones surroundings clean so as to prevent illness or the spread of preventable diseases. The practice may include hand washing with soap, proper use of sanitation facilities, proper disposal human waste and menstrual hygiene management.

Since its inception in 2008, The Global Hand Washing Day has been reinforcing the call for improved hygiene practices worldwide (UNICEF and WHO, 2008). Its key vision is the implementation of a local and global culture of hand washing with soap as a major strategy in reducing diarrhea infections by 30-50% (Cairncross and Valdmanis, 2006). However, studies have shown that globally, the rate at which hands are washed with soap ranges from 0-34% (Parker, 1993). This is a very insignificant number compared to the total world population.

According to Crofts and Fisher (2011), menstrual hygiene management has been an issue for almost half of the world's adolescent girls. It has been a cause of shame, stigma, and school absenteeism and contributes greatly to reproductive tract infections. Addressing these hygiene practices particularly in public schools can bring the much needed international attention to focus on these neglected issues. Schools, particularly those in rural areas often have inadequate water, toilets, hand washing soap and hand washing facilities making it difficult for some students to practice proper hygiene. Boys and girls are likely to be affected in different ways by this inadequacy and this may contribute to unequal learning opportunities. Sometimes girls fail to practice proper hygiene as was observed by Parker (1993) in a study carried out in Libode district in Zimbabwe where some girls reported dropping used sanitary towels in the pit latrines or throwing them in the nearby bushes since their sanitary towel disposal bins were always full and dirty. A study carried by Parker (1993) in West Bengal showed that girls missed school during menstruation since they could not use the sanitary towel disposal bins which were dirty and smelly. These practices interfere with the achievement of one of the Millennium Development Goals on ensuring environmental sustainability since this disposal of used sanitary towels is not ecologically friendly. Another Millennium Development Goal on the promotion of gender equality will also not be achieved since girls, unlike boys, miss school during menstruation period.

In most public schools, latrine to student ratio is a core concern with hundreds of students sharing a single toilet thus affording inadequate privacy especially for the girls. This is in contrast to recommendation by The Ministry of Public Health and Sanitation and Ministry of Education (2009) which recommend a ratio of 1 toilet for every 25 girls and 1 toilet for every 30 boys in order for the sanitation facilities to provide adequate privacy to all students. A study conducted in Machakos showed that an average of 64 students was sharing one toilet (WHO, 2009). Another study carried out by Curtis and Cairncross (2003) showed that in most public schools, toilets were divided into cubicles with no doors and had an open roof. Most of the toilets were dirty with feces on the walls and urine on the floor. Such conditions do not favor proper hygiene practices. There is therefore need to build separate gender-appropriate toilets that provide privacy, adequate hand washing water, soap and disposal facilities for the entire school community. In addition, proper hygiene practices should be instigated in public schools since sanitary conditions and basic personal hygiene practices such as hand washing using soap, proper

disposal of used sanitary towels and proper use of toilets are still not widely practiced among students. Schools should provide an enabling environment where the students can learn these practices and implement them both in school and even at home.

2.3 The Availability of Soap and its influence on the Implementation of Hygiene Practices

The Global Hand Washing Day has been calling for improved hygiene practices both locally and globally with its guiding vision being a culture of washing hands with soap. Parker (1993) noted that this practice is not adopted by many communities especially in public schools. UNICEF and WHO (2008) noted that although people around the world wash their hands after visiting the toilet and before handling food, very few do so using soap despite the fact that this practice has been emphasized by United States Agency International Development (USAID,2011). It is generally believed that proper hand washing involves the use of both water and soap but thorough hand washing with liquid soap and running water has been found to be the single most effective way of preventing germs from getting into our bodies and causing infection (Horton, 1996). According to Gould (2012), this practice eliminates most germs from our hands and can reduce diarrhea morbidity by 44% and respiratory infections by 23% (Curtis and Cairncross, 2003). However, globally, the rates at which hands are washed with soap range from 0-34% (Parker, 1993). Kumie *et al.*, (2005) carrying out a study in a rural school in Atbara region of Ethiopia reported that out of all the available toilets, only 21% had hand washing facilities and none contained soap. Horton (1996) carrying out a study in another region still in Ethiopia reported that although 76.6% of the students knew that washing hands with soap after defecation was important, only 28% practiced this behavior. A similar study conducted among 200 Columbian school children reported that only 7% of the children reported having clean water and soap regularly available at school and only 2% of these children washed their hands with soap before eating but non washed hands after visiting the toilet. In the same country, 4 out of 10 schools that were studied did not have soap while only 2 out of 10 schools that were studied had pupils washing their hands with soap (UNICEF, 2005).This was a very insignificant number as compared to the total number of schools studied.

When UNICEF carried out a similar study in Nepal, findings showed that although 62% of the schools had hand washing facilities, only 1 out of 40 schools had hand washing soap which was rarely used by the students.

Fewtrell, L., Kaufmann, R.B. and Kay, W.D. (2005) and Curtis (2002), studying hand washing among adolescents from some countries in Africa found that hand washing with soap after visiting the toilet was less frequent. These studies confirm the low rate of hand washing using soap especially after visiting the toilet.

A study conducted in Burkina Faso, Nepal, Nicaragua, Vietnam and Zambia indicated that addressing the issue of hand washing with soap had complexities such as managing hand washing particularly organizing the children and ensuring sufficient water points, monitoring the soap in relation to its quality, theft and loss and monitoring the school community to ensure that all practiced hand washing with soap.

(Zomerplaag, and Mooijman, 2003)

According to Curtis (2002), The Global Public Private Partnership for Hand Washing which conducted a study in several sub Saharan countries (Kenya, Senegal, Tanzania and Uganda) reported that only 17% of the participants washed their hands with soap after visiting toilets while 45% used water only. A survey conducted in seven districts in Kenya including Machakos reported that hand washing with soap is almost non-existent in many Kenyan schools as only 1% of the schools use soap while washing hands. The study also indicated that students practiced hand washing using soap after visiting the toilet more often at home than in school (WHO, 2009). The same study showed that almost $\frac{1}{3}$ of the school children did not wash hands with soap after urination and only a few washed hands using soap after defecation.

The above studies have shown that the rate at which soap is used by children in hand washing after visiting the toilets is very low. However, the studies have failed to show why most of the students did not wash hands using soap. Consequently, this study intends to establish factors that influence implementation of hand washing using soap as a hygiene practice in public secondary schools in Central Division of Machakos District, Kenya.

2.4 The Availability of Water and its influence on the Implementation of Hygiene Practices

Insufficient number of water points in public schools and sometimes complete lack of water pose a big challenge, forcing some children to adopt a common practice of using a basin for washing hands instead of running water. This has been the case in several schools in Zambia as was reported by a participatory study carried by UNICEF (2006). This is a poor hygiene practice which can contaminate the water in the basins when all the children use the same water. Running or flowing water from a tap, jug or a tippy tap is encouraged since it can easily eliminate germs (USAID, 2011). A participatory study conducted in Columbia in the year 2003 found that in 6 out of 10 schools that were studied most children did not wash their hands after visiting the toilet despite the fact that there was water that had been provided in form of tippy taps (Zomerplaag, and Mooijman, 2005). In 3 of the schools, an average of 60 students was using only 1 tippy tap for washing hands after visiting the toilet. In another study, a few girls in Malawi reported lack of water as a reason for not washing hands after visiting the toilet or bathing regularly during menstruation while a larger number did not give reasons for this poor hygiene practice but only said that they would have preferred a disposable sanitary product (Pilliteri, 2011).

The situation in Kenya is equally pathetic even though the Ministry of Education (MOE) has recommended an average standard of one water point for every 50 students. An assessment conducted by the Schools Sanitation and Hygiene Working Group in public schools in Machakos, Nairobi and Kiambu found that 90% of schools in rural Kenya do not have a source of water and lack even the simplest hand washing facilities. Out of the 10% of the schools where water was available, only a few students washed hands after visiting the toilet. In one of the schools where safe running water was available, the study found out that only about 20 out of 400 students washed hands after visiting the toilet (Onsomu et al., 2004). Siwolo (2004) who conducted a study in public schools in Machakos found out that most students did not wash their hands after visiting the toilet. He observed that the few tippy taps that were available for hand washing were located near the teachers' toilets and none were found near the pupils toilets.

The above studies were conducted mostly in public primary schools but not in secondary schools and show how the issue of water unavailability is a major concern. However, the studies have failed to show why most of the children did not wash hands after visiting the toilet particularly in

those schools where water was available. Consequently, this study intends to establish whether such a practice is found in secondary schools and whether availability of water influences its implementation particularly in public schools in Central Division of Machakos District, Kenya.

2.5 The Availability of Toilets and its influence on the Implementation of Hygiene Practices

Learners' toilets project an image of the school and can have an influence on students' morale, hygiene practices and health. As the children's commissioner for Wales stated in one of his reports in 2004, failure to give priority to these basic amenities is viewed by many children as an indication of disregard given to them by the society. According to Hutton, Guy and Haller (2007), one of the Millennium Development Goals (MDGs) targets is to halve the proportion of people without access to sanitation by the year 2015. However, research shows that over a century after the sanitation revolution in 19th century in Europe, 40% of the world's population still lack access to basic sanitation (UNICEF/WHO, 2008). During the World Summit on Sustainable Development which was carried out in the year 2002, the executive director of UNICEF recommended that every public school in the world should be equipped with separate sanitary facilities for boys and girls. Such facilities would ensure privacy to all students.

A study conducted in Burkina Faso, Vietnam, Nicaragua, Nepal, Columbia and Zambia reported that public schools in these countries implemented this recommendation by constructing child friendly designed toilets which included separate toilets / urinals for girls and boys and ensured that these facilities were located within the school compound. In 4 out of 6 countries, the toilets and urinals that were constructed followed the international norms about the ratio of children per toilet which is 1:25 for girls and 1:30 for boys (WHO, 2009). However, the norms vary considerably ranging from 1 toilet/urinal for 25 girls or boys in one country up to 1 toilet for more than 100 children in another country (Zomerplaag and Mooijman, 2005). During a water and sanitation workshop that was conducted at Burkina Faso in 2000 it was reported that 1 toilet was being used by 381 students and 1 urinal by 892 students (WHO, 2006).

A study conducted in two schools in Zimbabwe by The Small Projects Foundation (SPF) showed that 400 girls out of 700 students in one of the schools were subjected to use four toilets for all their ablution needs while in another school, 262 girls out of 400 students had to use five toilets

for similar needs. The toilets had no doors to provide privacy for the older girls particularly during their menstruation period (Sommer, 2009).

In some cases, the condition of the toilets makes them unusable by students as was noted by Maria (2010) in her study in a school in South Africa where she reported that students could not use toilets since they were in a bad state. Some of the toilets had no doors to provide privacy while the remaining ones had badly rusted corrugated iron sheets and broken doors thus passersby could see into the toilets. Most of the toilets had no water for hand washing. This was in contrast to USAID (2011) which stated that water should be kept beside the toilets to make it convenient and much more likely for students to wash their hands after visiting the toilet.

Studies show that many schools lack adequate hygiene facilities and even where separate toilets for boys and girls are provided, their filthy conditions make them unusable. In a study conducted in 6500 public schools in the Eastern Cape Province in South Africa, it was reported that most of the schools had poorly maintained pit latrines and most of them were full and therefore no longer in use (Maria, 2010). The study revealed that the awful state of the toilets led to poor school attendance by girls during menstruation period. Sommer, (2011) noted that even where the toilets are well used and maintained, girls feel uncomfortable when there is no privacy from other girls particularly during urination and menstrual management. This poses a big challenge to such schools in relation to hygiene practices.

In Kenya, the situation is pathetic despite the fact that the government through the ministry of education has set standards of 1 toilet for every 25 girls and 1 for every 30 boys. This is meant to ensure cleanliness of the toilets and separation between boys and girls which in the long run will enable the students to practice proper hygiene (MOE, 2003). A study that was carried out in Kisumu revealed that in one of the schools, an average of 50 students was sharing 1 toilet (Curtis and Cairncross, 2003). Another study conducted by Chabari (2010) in 9 public secondary schools in Machakos District showed that 66.7% of the schools had not fulfilled the guidelines by the Ministry of Education on sanitation facilities. According to the Ministry of Education (2003) guidelines, sanitation facilities in schools should be in the following ratio: 1:30 for boys; 1:25 for girls, and six schools out of the nine studied had over 30 students sharing a toilet. Although these researchers have reported of many students sharing a single toilet, they have failed to show whether the toilets were used hygienically or not.

Siwolo (2004), Asyago (2005), and Mugo (2006) conducted studies in public schools in Nairobi, Machakos, and Embu District respectively. They all found out that inadequacy of sanitation facilities (toilets and urinals) were among the challenges experienced in the schools. In addition, the condition of available toilets in the studied schools was awful. This is because most of the toilets had broken doors and were very dirty.

The above studies show how the issue of inadequacy of toilets in public schools is a major concern. In addition, the condition of the available toilets is awful. However, these studies have not shown whether the students used the available toilets hygienically or not. Most of the studies were carried out in primary schools with very few concentrating on secondary schools.

In relation to this, this research then intends to establish the relationship between availability of toilets and the implementation of hygiene practices particularly in public secondary schools in Central Division of Machakos District, Kenya.

2.6 The Influence of Sanitary Towel Disposal Bins on the Implementation of Hygiene Practices

Used sanitary towels are disposed of in unhygienic ways by many students and yet very few researches have been carried out in relation to this poor and unhygienic practice. Currently, such towels form an estimated 6.8% of the sewerage related debris along rivers (Parker, 2004) and may lead to clogging of sewage systems and consequent difficulties in unblocking such systems (Crofts and Fisher, 2011). Research shows that many school girls find it difficult to observe female hygienic practices because of lack of sanitary towel bins to dispose off their used sanitary pads and this may cause them embarrassment (Parker, 1993). Globally, over 12 billion sanitary towels which are disposed of by students annually fill up pit latrines or end up in city dumps and landfills. In Malawi, one school had an open pit of used sanitary pads which were removed by dogs and birds as was reported by Pilliteri (2011). This was supported by Crofts and Fisher (2011) when they recorded similar behaviors in Uganda. Crofts and Fisher (2011) said that many girls in Uganda reported that they wrapped the used sanitary towels in plastic paper bags and disposed them in dumping sites while others threw the used sanitary towels inside the toilet pans

or even threw them outside the toilet windows. The girls reported that in many cases the bins in the toilets were full and smelly and in most cases they were not emptied.

Such towels are an environmental hazard that may cause land pollution which may cost the government a lot of money in curbing it. He pointed out that female pit latrines would fill up very quickly since most of the sanitary towels used were not bio-degradable.

Scott (2009) reported that girls were burying their used sanitary towels against their teacher's caution and when Maria (2010) conducted a study in Libode district in Zimbabwe, she observed that most of the school girls dumped used sanitary towels in the pit latrines or threw them in the nearby bushes. In a descriptive cross cultural study conducted among 190 adolescent girls of a certain rural school in West Bengal, most of the girls reported being absent from school during their menstrual period giving the excuse that they could not use the sanitary towel disposal bins in their schools because they produced a foul smell. Scott (2009) reported similar observations among girls in Ghana. The condition of the sanitary towel disposal bins forces most of them to stay away from school during times of menstruation and thus fails to give boys and girls equal opportunities of being in school throughout their study time. It also denies the girl child the opportunity to exploit her full potential as a student.

The above studies show how the issue of sanitary towel disposal in public schools is a major concern. Most of these studies were carried out in primary schools and very few in secondary schools. This study therefore seeks to establish whether similar practices are experienced in secondary schools and more particularly in public secondary schools in Central Division of Machakos District.

2.7 Theoretical Framework

The researcher will base the study on the Hubley's BASNEF Model of health practices. The model was developed by Hubley in 1993 his desire to determine the reasons as to why people change their health behaviors. According to Hubley, an individual will adopt a new practice when he believes that the practice has more benefits for his health. The person will then develop a positive attitude to the change. Subjective Norms, which may be other people's views, will also

influence the person's decision to try the new practice. Skills and resources which in this model are referred to as Enabling Factors, will then determine if the practice is indeed taken up and sustained.

The views advanced by Hubley (1993) seem to apply appropriately to this study because worldwide, hygiene is poorly practiced and this leads to diseases which is a major social evil that cripples any development in the society. The solution to this evil starts at home but a longer lasting solution will be offered at the school level where student's understanding about hygiene will be enhanced by peer influence as the students watch others practice proper hygiene. According to Hubley, the success of the implementation of these hygiene practices will largely depend on combined efforts of encouragement of proper hygiene practices and the construction of water and sanitation facilities. These will serve as enabling factors that will make the students to transform the newly acquired attitudes and beliefs into desirable hygiene practices. If properly addressed, these factors will lead to healthy students who will learn better and become productive members of the society with the ability to share the benefits of basic hygiene practices in their own homes and communities.

2.8 Conceptual Framework

Independent variables

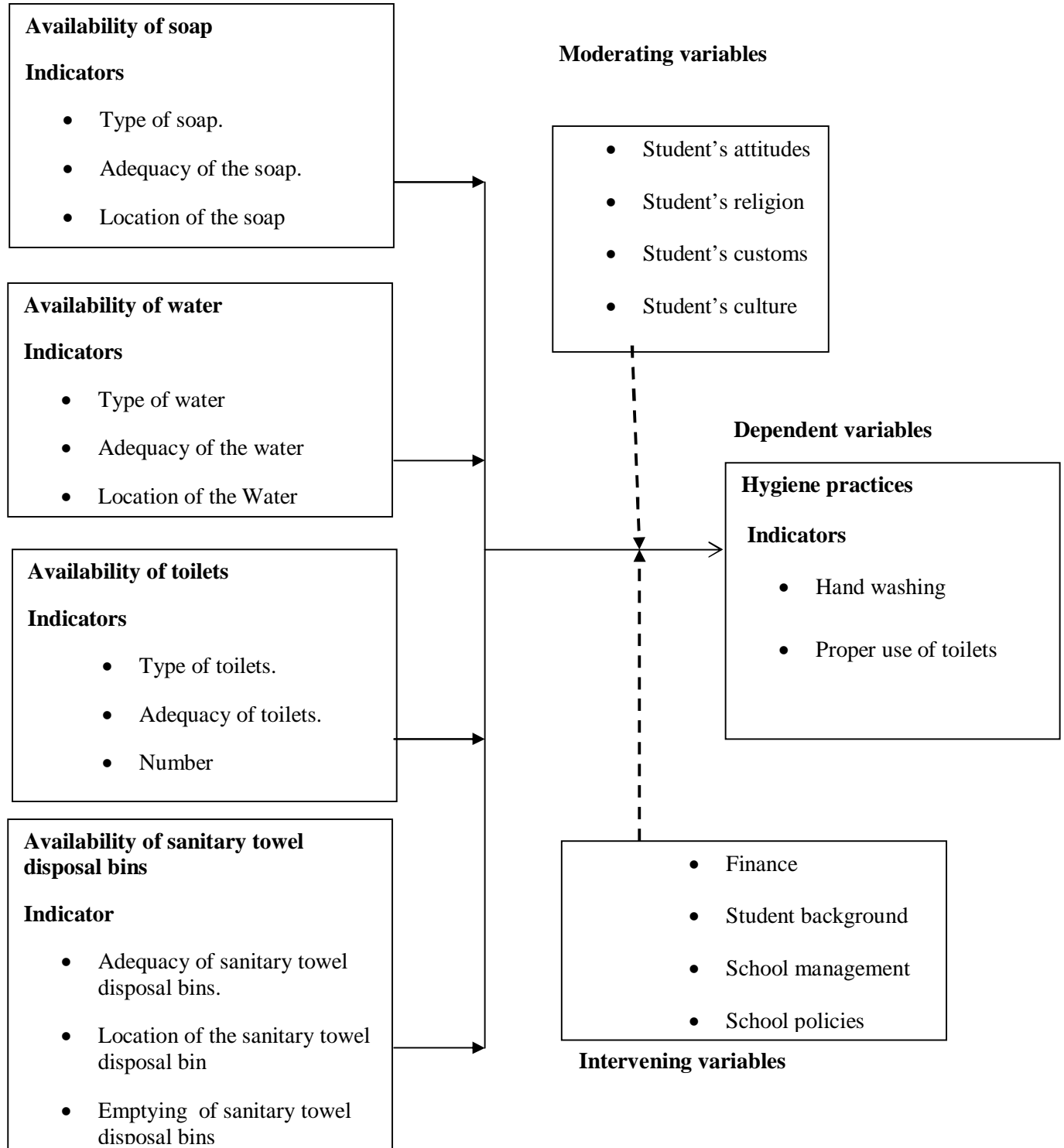


Figure 1 Conceptual Framework

Mugenda and Mugenda (2003) define conceptual framework as a graphical or diagrammatic representation of the relationship between variables in a study. This representation brings out clearly the relationship between variables being studied. The conceptual framework of this study diagrammatically shows the relationship between the independent variables namely availability of water, soap, toilets and sanitary towel disposal bins and their influence on the implementation of hygiene practices as the dependent variable. The independent variables as shown in the conceptual framework interact and eventually influence hygiene practices.

Availability of water has indicators such as its availability, adequacy and location while the indicators for toilets include their types, condition, availability and adequacy. The indicators for sanitary towel disposal bins include their availability, condition and location while indicators for soap include their availability, type and adequacy. The indicators for hygiene practices include proper hand washing, proper use of toilets and disposal of used sanitary towels.

Intervening variables in this study will be availability of finance, school management, school policies and student background which significantly influence implementation of hygiene practices but due to financial constraints and time factor they will not be included in this study. Students' attitudes, beliefs, religion, customs and culture can also influence the implementation of hygiene practices but will not be included in this study due to financial constraints. They will act as the moderating variables. These two groups of variables will be shown by use of a broken arrow.

2.9 Summary of the Reviewed Literature

The reviewed literature revealed that although many studies had come up with recommendations on plausible approaches of improving hygiene practices in schools, the implementation of these recommendations had been hampered by many factors. Some of the factors include insufficient resources, ignorance, beliefs and customs among others. The reviewed studies had not addressed all the factors influencing implementation of hygiene practices in schools particularly in public secondary schools. It is against this background that this research intended to fill this gap by

investigating the factors influencing the implementation of hygiene practices in public secondary schools in Central Division of Machakos District.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter consists of the methods which were used to collect data from the respondent. Among the aspects of research methodology discussed are; the study area, the target population, research design, sample size, sampling procedure, research instruments, validity and reliability of the instruments, data collection procedure and ethical considerations pertaining to the research.

3.2 Study Location

The research was carried out in Machakos district in Machakos County, Kenya. The District is an administrative area in the Eastern Province of Kenya with its capital town being Machakos. It has a population of 906,644 (1999 census). The local climate is semi arid. The terrain is hilly; the district has an altitude rising from 1000 to 1600 meters above sea level. Akamba people are the dominant tribe. The district has nine administrative divisions namely Machakos central, Matuu, Kalama, Kangundo, Kathiani, Masinga, Matungulu, Mavoko, Mwala, Ndithini, Yathui and Yatta. The study was based in Machakos Central Division which is centrally located in the District. It covers an area of about 4000 square kilometers and has an estimated population of 143,274. It has three education zones namely; Muvuti, Mutituni and Mumbuni with a total of 30 public secondary schools, 2018 Teachers and 6161 students as at 2010.

3.3 Research Design

According to Kombo and Tromp (2006), a design is used to structure the research, to show how the various parts of the research project collaborate to address the central research questions.

Orodho (2003) defines it as the scheme, outline or plan that is used to generate answers to research problems.

This study adopted the descriptive survey research design. Mugenda and Mugenda (2003) define a survey research as an 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. This design was chosen because the study involved asking questions (in form of questionnaires) to a large number of respondents in order to get their opinions and ideas concerning factors influencing implementation of hygiene practices in their schools. Descriptive survey design was also used because it provided the researcher with an opportunity to probe the respondents for more information. This research design is also relatively cheap as compared to others.

3.4 Target Population

According to Mugenda and Mugenda (1999), a population refers to an entire group of individuals, events or objects having a common observable characteristic. Kombo and Tromp (2006) define a population as a group of individuals, objects or items from which samples are taken for measurement.

The target population of this study was the 30 public secondary schools in Central Division of Machakos District of which 2 were boys schools, 3 were girls' schools and 25 were mixed (DEOs office, 2013). The schools have a total of 4481 students in form two and three who formed the target population of this study.

The form two and three students were chosen because they had been in the schools long enough and had familiarized themselves with the school environment and therefore knew where most of the sanitation facilities were located unlike the form one students who were still in the process of being oriented since they were still new in the school.

The form four students were busy revising for their mock examinations and therefore seemed too occupied to fill the questionnaire.

3.5 Sample Size and Sampling Technique

Central division has a total population of 30 public secondary schools. For the purpose of this study, a smaller sample was chosen from the 30 public secondary schools. Neumann (2000) defines a sample as a set of individuals selected from the target population and is usually intended to represent the population in a research study. Kombo and Tromp (2006) define sampling as the “procedure a researcher uses to gather people, places or things to study”. Out of the 30 public secondary schools in Central Division of Machakos District, the researcher selected 28 schools as the sample size. This sample size was determined by use of Krejcie and Morgan table. The 28 schools had a total population of 4481 students in form two and three. Out of the 4481 students, 354 students were selected as respondents in the study. The researcher selected 8% of respondents from each school which ensured proper representation of each school in the sample.

The schools were categorized into girls, boys and mixed schools. The study used Krejcie and Morgan formulae to determine the number of boys and girls who participated as respondents from each school. Numbers 1 to 30 were written on separate pieces of paper to represent each school. The papers were then folded, put in a box and shuffled after which pieces of paper were picked randomly and the schools represented by numbers 1 to 28 were then selected as the sample for this study.

Individual respondents from each school were selected through simple random sampling in which the researcher prepared coupons equal to the total number of students in form two and three in each school. Random sampling was used since it allows generalizability to a larger population with a margin of error that is statistically determinable. A number of the coupons equal to the total number of boys and/or girls to be included in the study in each school were labeled “yes” while the rest were labeled “No”. Those who selected coupons labeled “yes” participated in the research as the respondents.

3.6 Data Collection Instrument

The study used questionnaire as the main data collection tool for this research. The questionnaire was designed by the researcher to gather the intended information from the students. An interview schedule was also designed by the researcher and used to collect data from the school principals. Studies by Bowling (1999) reveal that questionnaires are the best data collection instruments especially for survey research because they are carried out in natural settings and the questions increase the natural validity of the study. Ogula (1995) observed that the instruments recommended for data collection in descriptive research studies include the use of questionnaires and interview schedules. By using the interview schedule, the researcher standardized the interview situation such that she asked the same questions in the same manner to different school principals.

The questionnaire for collecting information from the students was designed qualitatively and articulately divided into five sections. Section I contained questions concerning the background information or demographic characteristics of students, Section II contained questions on availability of soap, Section III contained questions on availability of water, Section IV questions on availability of toilets and finally, Section V contained questions on availability of sanitary towel disposal bins. The questionnaire adopted two major formats namely the Likert scale and check-lists. The Likert scale was useful in producing a comparative set of data based on strength of feeling or belief of the students as the respondents. In this case, the respondent was instructed to tick one from a range of boxes indicating “strongly agree”, “agree”, “neutral”, “disagree”, and “strongly disagree”.

Majority of the questions in the questionnaire were patterned in a check-list format. The question were asked and various options given for the respondent to choose. Where multiple choices were expected, the researcher indicated this for easier understanding of the questions by the respondents. Generally, the wording of questions was made clear, precise and unambiguous. The researcher also put into consideration the question formulation and did not presume that the respondents had more knowledge than they did. Hence, the researcher did not lead respondents

to a particular answer. In such a case, the researcher formulated some questions open-ended and others closed ended.

The questionnaires were administered personally to the respondents in the morning and collected in the afternoon of the same day so as to give them ample time to fill them correctly and comprehensively. The researcher briefed the respondents on the purpose of the research before they started filling the questionnaires. The researcher used the interview schedule to personally interview each of the 28 principals of the selected schools under study. The interview questions were developed based on the research questions and the research objectives.

3.6.1 Pilot Testing

A pilot test was carried out on the questionnaire. The test aimed at knowing whether the questions wording pattern could achieve the desired results, whether they had been placed in the best format and order, whether they were well understandable by the respondents and whether instructions given to the respondents as to what to do were adequate and comprehensive.

The researcher sent a number of draft questionnaires to respondents put into the same category with the final respondents that were to answer the final questionnaires. The pilot study was conducted in the neighboring Kalama Division in Machakos District where 100 students in 10 schools were involved. The researcher then used feedback from the pilot test to make necessary adjustments to the draft questionnaire.

3.6.2 Validity of the Instrument

According to Orodho (2009), validity is the degree to which results obtained from the analysis of the data actually represent the phenomenon under investigation. Mugenda (1999) defines validity as the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. It is how accurately the data obtained in the study represents the variables of the study. The research used content validity, which means the extent to which a measured instrument provides adequate validity for its testing by discussing its contents with

other colleagues with the consultation of the supervisor as recommended by Orodho (2004). The questionnaire was subjected to a pilot test for the purpose of determining the reliability before the researcher undertook the collection of the data.

3.6.3 Reliability of the Instrument

Mugenda and Mugenda (2003) define reliability as the degree to which a research instrument yields consistent results or data after repeated trials. The researcher used the split-half method to determine the reliability of the instrument. The results obtained from the pilot study in the ten public secondary schools in Kalama division were analyzed using Spearman's rank correlation coefficient to determine the reliability of the instrument.

3.7 Data Collection Procedures

The researcher obtained a permit from the National Council of Science and Technology after approval by the university. Permission to collect data in public secondary schools in the district was obtained from the District Education Office in Machakos town. The researcher also wrote a letter to the selected secondary school principals for introduction purposes. A brief explanation on how to fill the questionnaire was also carried out by the researcher with the help of the research assistants to ensure uniformity. The questionnaires were administered to the respondents in the morning after which the filled questionnaires were collected in the afternoon of the same day in order to give the respondent sufficient time to fill the questionnaires correctly and comprehensively. Face to face interviews were conducted with the school principals.

3.8 Data Analysis Techniques

Data analysis deals with the organization, interpretation and presentation of collected data (Oso & Onen, 2005). The researcher analyzed data using descriptive statistics for quantitative data, by use of frequency tables, percentages and measures of central tendency. Measures of central

tendency which comprise the mean, the mode and the median show how quantitative data obtained from respondents or from the study tends to cluster towards a certain center. In social sciences, measures of central tendency are used to give expected summary statistics of variables being studied (Mugenda and Mugenda 2003). Measures of central tendency are very useful statistics for describing a lot of data and therefore were appropriate for this study since the study involved description of a lot of data from the respondents.

Frequency distribution tables give a record of the number of times a response occurs. In this study, frequency tables were used in showing the distribution of the variables being studied such as toilets, soap, water and sanitary towel disposal bins. A percentage is defined as the proportion of a sub-group to the total group or sample. Frequencies of variables under study can be expressed as percentages. This study used percentages because the researcher needed to compare responses of respondents from many schools. Content analysis was used for qualitative data. Multi-linear regression model was used to analyze the degree of relationship between the independent variables and the hygiene practices as the dependent variable. The hypotheses were then tested using ANOVA since the study was comparing implementation of hygiene practices in different schools. Multiple linear regression was then used to find out whether availability of water, soap, toilets and sanitary towel disposal bins predict implementation of hygiene practices when practices are measured by proper hand washing and use of toilets at a significant level of 0.05. All the data in the answered questionnaire were coded before analysis. Completed questionnaires were reviewed for completeness and consistency. The data was coded and checked for any errors and omissions. Items with similar themes were categorized and put under the same topics. Responses from the questionnaires were tabulated, coded and processed by use of Statistical Package for Social Sciences (SPSS) version 20 software.

3.9 Ethical Issue

The researcher observed fundamental clauses in social research ethics. Confidentiality was guaranteed for all respondents verbally and in writing and they were instructed not to write their names in the questionnaire. The researcher also explained to the respondents that the research was purely for academic purposes. Permission was sought from the National Council of Science

and Technology and the District Education Office before actual field work commenced. Authorization letters were attached at the appendices in the final project report.

3.10 Operationalization of Variables

Table 3.1 on operationalization of variables was formulated to give the study a frame work on how the variables were going to be researched. It shows the measuring levels for each variable, measuring tools and tools for analysis.

Table 3.1 Operationalization of Variables

Objectives	Variables	Indicators	Measuring levels	Tools of data collection	Tools of data analysis
To determine the influence of soap on implementation of hygiene practices	Soap	Availability of soap Type of soap Location of the soap	Ordinal Nominal	Questionnaires	Percentages and frequencies ANOVA
To establish the influence of availability of water on implementation of hygiene practices	Water	Adequacy of water Availability of water Location of water points	Ordinal Nominal	Questionnaires	Percentages and frequencies ANOVA
To determine the influence of availability of toilets on implementation of hygiene practices	Toilets	Type of toilets Adequacy of toilets Location of the toilets	Ordinal Nominal	Questionnaires	Percentages and frequencies ANOVA
To establish the influence of availability of sanitary towel disposal bins on implementation of hygiene practices	Sanitary towel disposal bins	Availability of sanitary towel disposal bins Adequacy of sanitary towel disposal bins Location of sanitary disposal bins	Ordinal Nominal	Questionnaires	Percentages and frequencies ANOVA

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter contains the analysis, presentation and interpretation of data collected from students and principals of public secondary schools in Central Division of Machakos District in Machakos County on factors influencing implementation of hygiene practices. Interpretation of data is according to the research questions and data collected. Data was collected from both students and principals from the schools under study by use of questionnaires and interview schedules respectively. The analysis was done through descriptive statistics. The responses were summarized and presented in form of frequencies, percentages and mean and the results used to make key judgment regarding the various objectives of the study. The discussion of the outcome was based on the output from the statistical package for social sciences (SPSS) version 20.

4.2 Questionnaire Return Rate

The research study had targeted 354 students and 28 principals in the schools under study because of their typicality. Out of this selected sample, the researcher managed to gather information from 345 students which translate to 97.46% while all the 28 principals (100%) in the selected schools responded to the questionnaires. This rate of return is within the acceptable range and therefore the researcher proceeded to analyze and interpret the data.

4.3 Demographic Characteristics of the Respondents

Among the demographic characteristics studied were: gender and type of school for the principals and gender, type of school and class for the students.

The study looked at the gender of the respondents and collected data in Table 4.1

Table 4.1(a) Distribution of Students by Gender

Gender	Frequency	Percentage (%)
Male	129	37.4
Female	215	62.3
No response	1	0.3
Total	345	100.0

From the data shown in Table 4.1 (37.4%) of the respondents interviewed were male students while (62.3%) were female. The mean for the gender in secondary schools was 1.63. It is evident from the findings that more females than males attend secondary school in the area under study. This may be an indication that the availability of sanitary towel disposal bins and their regular emptying has encouraged the attendance and retention of adolescent girls in schools particularly during their menstruation period.

Table 4.1 (b) Distribution of Principals by Gender

Gender	Frequency	Percentage (%)
Male	23	82.14
Female	5	17.86
Total	28	100.0

Out of the 28 principals involved in the study, 82.14% of them were male while only 17.86% were female. This shows that not many females have risen to the level of secondary school principals in Central Division of Machakos County.

4.3.2 (a) Distribution of Principals by Type of School

Responses were sought from the principals involved in the study to indicate the type of schools that they headed. The results of the findings are summarized in table 4.2 (a)

Table 4.2 (a) Distribution of Principals by school category

School Category	Frequency	Percentage (%)
Girls	2	7.15
Boys	3	10.71
Mixed boys and girls	23	82.14
Total	28	100.0

The results in Table 4.2 (a) indicate that 23 (82.14%) of the principals involved in the study headed mixed boys and girls schools while only 2 (7.15%) headed girls schools. This may imply that not many females are interested in heading mixed schools in Central Division of Machakos District.

4.3.2 (b) Distribution of Students by Type of School

The students who formed part of the sample size were asked to indicate the type of school that they attended. The results of the findings are summarized in Table 4.2 (b)

Table 4.2 (b) Distribution of Students by their School Categories

School category	Frequency	Percentage (%)
Girls	94	27.25
Boys	35	10.14
Mixed boys and girls	216	62.61
Total	345	100.0

From the findings in Table 4.2, (27.25%) of the respondents who were involved in the study were in girls' schools, 35 (10.14%) in boys' secondary schools while 216 (62.61%) were in mixed schools. This data shows that majority of the schools in Central Division in Machakos

District are mixed with a mean of 2.36. It is evident from the results that majority (27.25%) of the students in the area of study are from girls schools, an indication that girls in Central Division of Machakos District are realizing the importance of education and are even graduating to secondary schools.

4.3.3 Class of Students

The study further sought to find out the classes in which the students involved in the study were. The results of the findings are summarized in Table 4.3

Table 4.3 Distribution of Students by their Classes

Response	Frequency	Percentage (%)
Form 2	184	53.33
Form 3	161	46.67
Total	345	100.0

The responses presented in Table 4.3 show that majority of the students 184 (53.33%) were in form three while 161 (46.67%) were in form two with a mean of 1.54. This data showed that in public secondary schools majority of the students are in form two. This indicates that more students graduate to form two and are sustained there while the fewer form three students could be an indication of high dropout rate in this class and wastage as some of them repeat form two. This problem may probably be caused by a contaminated environment and poor hygiene practices which account for a greater percentage of the total burden of disease among students, a situation that affects their regular attendance of school.

4.4 Availability of Water and its Influence on Implementation of Hygiene Practices

In relation to the study the researcher looked at availability of water and how it influences implementation of hygiene practices. The indicators of water which were the focus in this study included: provision, type of water, regular availability, adequacy of water points and location. The findings of their influence are discussed in Table 4.4

4.4.1 Provision of Water for Hand Washing after visiting the Toilet

The students were asked to indicate whether their schools provided water for hand washing after visiting the toilet. Table 4.4 represents the results of the findings.

Table 4.4 (a) Provision of Water for Hand Washing after visiting the Toilet

Response	Frequency	Percentage (%)
Yes	277	80.3
No	66	19.1
No response	2	0.6
Total	345	100.0

According to the findings in Table 4.4 majority of the students 277 (80.3%) indicated that water for hand washing after visiting the toilet was provided while 66 (19.1%) revealed that the schools in which they studied did not provide water for this important hygiene practice. It is therefore evident that most schools in the area under study provide students with water and therefore students in these schools are likely to wash hands after visiting the toilet.

4.4.2 Type of Water provided for Hand Washing

The researcher further requested the respondents in the schools under study to indicate the type of water which their schools provided for hand washing. The summary of the findings from the students and principals are presented in Table 4.5 (a) and 4.5 (b) respectively.

Table 4.5(a) Type of Water provided as revealed by Students.

Response	Frequency	Percentage (%)
Tapped	260	75.4
Water in basins	5	1.4
Water in buckets fitted with taps	62	18.0
Other	17	4.9
No response	1	0.3
Total	345	100.0

The results of the findings in Table 4.4 (a) indicated that most students 260 (75.4%) were provided with tapped water, 62 (18%) used water in buckets fitted with taps while 5 (1.4%) used water in basins.

Table 4.5(b) Type of Water provided as reported by Principals

Type of water	Frequency	Percentage (%)
Water in buckets fitted with taps	2	7.1
Tapped water	4	14.3
Water in buckets fitted with taps and tapped water	22	78.6
Total	28	100.0

From Table 4.5(b), majority of the principals (78.6%) indicated that they provided both water in buckets fitted with taps and tapped water to students for hand washing after visiting the toilet. It is therefore evident that majority of schools provide tapped water for hand washing after visiting the toilet. This was supported by the principals' mean of 3.14 and that of students of 1.53. The findings indicate that there is a possibility of students to use running water while washing hands, a practice which helps in eliminating germs since the water unlike that in basins is not contaminated and it therefore ensures healthy living among the students.

4.4.3 Regular Availability of Water for Hand Washing after visiting the Toilet

The study also sought response from the students on whether water for hand washing after visiting the toilet was always available. This indicator used a Likert scale ranging from Strongly Agree to Strongly Disagree and respondents were asked to write their level of agreement. The study findings from both the students are summarized in table 4.6

Table 4.6 Regular Availability of Water for Hand Washing after visiting the Toilet

Response	Frequency	Percentage (%)
Strongly agree	113	32.8
Agree	78	22.6
Neutral	49	14.2
Disagree	33	9.6
Strongly disagree	72	20.9
Total	345	100.0

From the findings in table 4.6, 191 (55.4%) of the students strongly felt that there was regular availability of water for hand washing after visiting the toilet while 105 (30.5%) revealed lack of regular availability of water. A small number of the students 49 (14.2%) were indifferent. The results indicate that majority of the students strongly felt that water for hand washing is always available as was supported by their mean of 2.63. The regular availability of water could have been contributed by the availability of boreholes and water tanks in most of the schools as indicated by the principals who revealed that their schools have water tanks for storing water and also have boreholes.

4.4.4 The extent to which Water Points for Hand Washing are adequate

Responses were sought from the respondents on the adequacy of water points for hand washing after visiting the toilet. The results from the findings from students are summarized in Table 4.7 (a) while those from the principals who participated in the study are found in Table 4.7 (b)

Table 4.7 (b): Adequacy of Water Points as reported by Students

Response	Frequency	Percentage (%)
Strongly agree	63	18.3
Agree	68	19.7
Neutral	40	10.7
Disagree	71	20.6
Strongly disagree	103	29.9
Total	345	100.0

According to the findings in Table 4.7 (a) 131 (38%) of the students involved in the study indicated that water points were adequate while 174 (50.5%) strongly felt that water points provided for hand washing were not adequate.

Table 4.7(b) Adequacy of Water Points as reported by Principals

Response	Frequency	Percentage (%)
Adequate	24	85.71
Not adequate	4	14.3
Total	28	100.0

Table 4.7 (b) shows that majority 23 (85.71%) of the principals were of the opinion that the water points were adequate with only 4 (17.9%) reporting that the water points were not adequate. This adequacy could have contributed to more students washing their hands after

visiting the toilet, a good hygiene practice which helps in eliminating germs among the students and therefore making them stay longer in school.

4.4.5 Location of Water in relation to Nearness to the Toilet

The study further sought to find out the level of agreement of the respondents' opinion regarding the proximity of the location of water for hand washing in relation to its nearness to the toilets. The indicator used a Likert scale ranging from Strongly Agree to Strongly Disagree in which the respondents were to indicate their levels of agreement. The findings from the students and principals are summarized in Tables 4.8 (a) and 4.8 (b)

Table 4.8(a) Location of Water in relation to Proximity to the Toilets as revealed by Students

Response	Frequency	Percentage (%)
Strongly agree	124	35.9
Agree	128	37.1
Neutral	17	4.9
Disagree	23	6.7
Strongly disagree	53	15.4
Total	345	100.0

From the study findings in Table 4.8 (a), the researcher observed that 252 (73%) of the students indicated that water for hand washing is located near the toilets while 76 (22.1%) revealed that water was not located near the toilets. 17 (4.9%) were indifferent. A similar response was gotten from the principals since the 28 (100%) of them agreed that water is located near the toilets and

this was supported by their mean of 1.00. The results indicate that generally, water for hand washing is located near the toilets. It can therefore be argued that this location may make it convenient and much more likely for students to wash their hands after visiting the toilet.

Table 4.8 (b): Location of water in relation to nearness to the toilets as reported by Principals

Response	Frequency	Percentage (%)
Next to the toilets	28	100.0

From Table 4.8 (b), all the principals 28 (100%) indicated that water for hand washing was located near the toilets. It can be concluded that the location of the water points near the toilets could have contributed to the 41.1% of the students who revealed that students wash hands after visiting the toilet (a good hygiene practice which aids in eliminating germs and therefore making most of them stay longer in school instead of staying away from school due to water related diseases).

4.4.6 The extent to which Students Wash Hands after visiting the Toilet

Students were requested to indicate whether learners in the schools under study always wash hands after visiting the toilet. A Likert scale ranging from Strongly Agree to Strongly Disagree was used in which students were asked to write their levels of agreement. The results of the findings are summarized in Table 4.9 which shows the responses from the students.

Table 4.9: the extent of Hand Washing after visiting the Toilet

Response	Frequency	Percentage (%)
Strongly agree	68	19.7
Agree	75	21.7
Neutral	80	22.6
Disagree	53	15.4
Strongly disagree	71	20.6
Total	345	100.0

From the responses in Table 4.9, majority of the students, 143 (41.1%) who formed the sample size for the study revealed that students always wash hands after visiting the toilet while 124 (36%) indicated that students do not observe hand washing as a hygiene practice after visiting the toilet. 80 (22.6%) of the students were indifferent. The findings imply that hand washing as a hygiene practice is not fully implemented and therefore secondary school principals should try and address this issue and encourage students to wash hands by showing them the dangers associated with lack of proper hand washing after visiting the toilet.

The study used ANOVA in order to test the following hypothesis and ascertain answers to the research question regarding the outcome of availability of water and its influence on implementation of hygiene practices.

4.4.7 Hypothesis H₀₁ There is no Significant Relationship between Availability of Water and Implementation of Hygiene Practices in Public secondary schools in Central Division of Machakos District.

This hypothesis was formulated to examine the influence of water on implementation of hygiene practices in public secondary schools. The researcher computed the one-way analysis of variance

(ANOVA) in order to test and make judgment on the null hypothesis which stated that, there is no significant relationship between availability of water and implementation of hygiene practices. Table 4.10 presents a summary of the results of ANOVA.

Table 4.10 the Influence of Water on Implementation of Hygiene Practices.

INDICATORS	ANOVA	Sum of squares	Df	Mean square	F	Sig
Implementation of hygiene practices, subject to proper hand washing after visiting toilet.	Between Groups	306.015	5	61.203	54.215	.000(a)
	Within groups	375.920	333	1.129		
	Total	682.035	338			
Implementation of hygiene practices, subject to proper use of toilets.	Between Groups	306.065	5	61.213	54.215	.000(a)
	Within groups	375.970	333	1.29		
	Total	682.035	338			

The results in Table 4.10 reveal that, water has some influence on implementation of hygiene practices, as measured by hand washing and proper use of toilets as hygiene practices. This influence is statistically significant where the results indicate,

F (5, 333) =54.215, P> 0.05 for hand washing and **F (5, 333) = 54.215, p > 0.05** for proper use of toilets. This implies that availability of water will cause significant influence on hand washing as a hygiene practice in public secondary schools. Based on the findings in Table 4.10, we reject the null hypothesis which stated that “there is no significant relationship between availability of water and implementation of hygiene practices” and accept the alternative. Regression prediction models were developed for estimating implementation of hygiene practices, based on availability of water. The findings of the regression model are summarized in Table 4.11 and 4.12, respectively.

Table 4.11 Regression Model for Availability of Water and Implementation of Hygiene Practices, Subject to Proper Hand Washing as a Hygiene Practice

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.670		.449	.440	1.062	
ANOVA	Sum of squares	Df	Mean square	F	Sig	
Regression	306.065	5	61.203	54.265	.000(a)	
Residual	375.920	333	1.129			
Total	682.035	338				
Coefficients	Unstandardized coefficients		Standardized coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	1.152	.181		6.364	.000	
Provision	.167	.118	-.066	1.421	.000	
Type	.039	.064	-.026	.611	.023	
Location	.327	.054	.326	6.072	.000	
Adequacy of water points	.150	.051	.161	2.938	.004	
Availability	.315	.055	.339	5.689	.000	

The results in Table 4.11 indicate that the four indicators of water: provisions, type, location, adequacy of the water points and availability of water have a positive significant influence on implementation of hygiene practices where implementation is measured on the basis of hand washing. Based on the results obtained, the following regression equation for estimating implementation of hygiene practices in terms of hand washing when given availability of water is derived:

$$R_{S5} = 1.152 - .066x_1 - .026x_2 + .326x_3 + .161x_4 + .339x_5$$

Where;

R_{S5} = Composite index for implementation of hygiene practices in terms of hand washing

x_1 = Composite index for provision

x_2 = Composite index for type

x_3 = Composite index for location

x_4 = Composite index for adequacy of water points

x_5 = Composite index for availability

The model has an r value of **.670** and an F value of **54.215** where the critical level is $P = .000$. This shows that there is a strong positive correlation between hand washing as a hygiene practice and availability of water, location and adequacy of water points but a strong negative correlation between hand washing and provision and type of water. The model has an r^2 value of **.449**, an indication that **44.9** percent in a school's level of implementation of hygiene practices is accounted for by availability of water. The model indicates that the most important indicator in determining implementation of hygiene practices as far as water is concerned is its availability (with a beta value of **0.339**), followed by location and adequacy of water points (with beta values of **0.326** and **0.016** respectively). The model further indicates that provision and type of water negatively influence implementation of hygiene practices in terms of hand washing as indicated by their beta values of **-0.066** and **-0.022** respectively.

Table 4.12 Regression Model for Availability of Water and Implementation of Hygiene Practices, Subject to Proper use of Toilets

Model summary	R	R square	Adjusted R square	Std. Error of the estimate	
	.790 (a)	.640	.361	1.042	
ANOVA	Sum of squares	Df	Mean square	F	Sig
Regression	306.065	5	61.213	54.265	.000(a)
Residual	375.97	333	1.129		
Total	682.035	338			
Coefficients	Unstandardized coefficients		Standardized coefficients	T	Sig
	B	Std. Error	Beta		
(constant)	1.152	.181		6.364	.000
Provision	.167	.118	.066	1.421	.019
Type	.039	.064	.026	.611	.032
Location	.327	.054	.326	6.072	.000
Adequacy of water points	.150	.051	.161	2.0938	.004
Regular availability	.315	.055	.339	5.689	.000

According to the results summarized in Table 4.12, there is evidence that implementation of hygiene practices, based on proper use of toilets, is positively influenced by provision, type, location, adequacy and regular availability of water. Based on the results obtained, the researcher formulated the following regression equation for estimating implementation of hygiene practices in terms of proper use of toilets, given the indicators of water:

$$R_{t2} = 1.152 - 0.116 + 0.076 + 0.376 + 0.211 + 0.389$$

Where,

R_{t2} = Composite index for implementation of hygiene practices in terms of proper use of toilets

x_1 = Composite index for provision

x_2 = Composite index for type

x_3 = Composite index for location

x_4 = Composite index for adequacy

x_5 = Composite index for availability

The model has an r value of **.790** and an F value of **54.215** whose critical level is $P = .000$. This reveals that there is a strong positive relationship between availability of water and proper use of toilets as a hygiene practice. The model has an r^2 value of **0.624**, an indication that 62.4 percent of change in a school's implementation of hygiene practices, when the practice is measured by proper use of toilets, is accounted for by availability of water. The model also reveals that availability of water is the most important indicator in determining implementation of proper use of toilets as a hygiene practice (with a beta value of **0.339**), while location of water is more important than adequacy of water points as far as implementation of hygiene practices are concerned since their beta values are **0.326** and **0.161** respectively. This implies that schools where water is available are more likely to implement proper use of toilets than those where there is lack of water. Similarly, schools in which water is located near the toilets are more likely to implement this practice than their counterparts whose toilets are located far from water. It could be argued that students from these schools are likely to use this water in their flush toilets or even pour water in the pit latrines to keep the clean, as a sign of using them properly. It is important to note that provision of water, as a factor, has no significant influence on both proper hand washing and proper use of toilets, while type could slow down the rate of hand washing, but, positively facilitate proper use of toilets.

4.5 Availability of Soap and its Influence on Implementation of Hygiene Practices

The Global Hand Washing Day has been calling for improved hygiene practices both locally and globally with its guiding vision being a culture of hand washing with soap. In relation to the study therefore, the researcher sought to examine the influence of soap in implementation of hygiene practices in the schools under the area of study. The indicators of soap which formed the focus of this study were: provision, type, location and adequacy.

4.5.1 Provision of Soap for Hand Washing after visiting the Toilet

The respondents were asked to indicate whether their schools provided soap for hand washing. Table 4.13 gives a summary of the findings.

Table 4.13 Provision of Soap for Hand Washing as reported by Students

Response	Frequency	Percentage (%)
Yes	36	10.43
No	306	88.70
No response	3	0.87
Total	345	100.0

From the results in Table 4.13, 36 (10.43%) of the students involved in the study revealed that their schools provided them with soap for hand washing after visiting the toilet.

The students were requested to indicate the type of soap provided. Table 4.14 represents the findings from the students.

4.5.2 Type of Soap provided for Hand Washing

The students were asked to indicate the type of soap which was provided for hand washing after visiting the toilet. Table 4.14 gives a summary of the findings.

Table 4.14 Type of Soap provided for Hand Washing

Response	Frequency	Percentage (%)
Bar soap	4	1.16
Liquid soap	32	9.28
No response	309	89.57
Total	345	100.0

Out of the 36 students who revealed that soap for hand washing was provided, 4 of them talked of bar soap while 32 indicated liquid soap as shown in Table 4.14. The results imply that in most cases where soap was provided, it was in liquid form but when this type was not available, the principals issued them with bar soap. It is therefore evident that some public schools in Central Division of Machakos District provide students with soap for hand washing although the percentage (10.44%) is insignificant when compared to (89.57%) of students not provided.

4.5.3 Location of Soap for Hand Washing after visiting the Toilet

The students and the principals who were involved in the study were requested to indicate how far from the toilets the soap was located. Since the principals had indicated that their schools did not provide students with soap, they did not respond to this question. 36 students who were part of the study sample responded and their responses are summarized in table 4.15

Table 4.15 Location of Soap for Hand Washing

Response	Frequency	Percentage (%)
Next to the toilets	35	97.2
Far from the toilet	1	2.8
Total	36	100.0

From the findings Table 4.15, 35 (97.2%) of the students who had indicated that they are provided with soap revealed that this soap was located next to the toilets while 1 (2.8%) indicated that this soap was located far from the toilet. The location of the soap next to the toilets could have contributed to the 25% of the respondents who indicated that students washed hands with soap after visiting the toilet as shown in Table 4.16

4.5.4 The extent to which Students Washed Hands with Soap after visiting the Toilet

In relation to the study, the students were asked to indicate their level of agreement regarding students' hand washing with soap as a hygiene practice after visiting the toilet. The results from the analysis of the students' level of agreement are summarized in Table 4.16.

Table 4.16 Extent of Hand Washing with Soap by Students after visiting the Toilet

Opinion	Frequency	Percentage (%)
Strongly agree	5	13.9
Agree	4	11.1
Neutral	3	8.3
Disagree	4	11.1
Strongly disagree	20	55.6
Total	36	100.0

Out of the 36 students who had indicated that their schools provided them with soap, majority (66.7%) revealed that students did not always use soap during hand washing after visiting the toilet while 25% of them felt that students practiced hand washing with soap. From these

findings it is evident that majority of students do not always observe hand washing with soap as a hygiene practice. This could mean that schools in which students do not practice proper hand may have low enrolments as students suffer from diarrhea and other water and sanitation related diseases, making them to stay away from school for the better part of their school life.

4.5.5 The extent to which Soap for Hand Washing is Always Available

The study further sought students' opinion on whether soap for hand washing after visiting the toilet was always available. A Likert scale ranging from Strongly Agree to Strongly Disagree was used and students were requested to write their level of agreement concerning this indicator. A summary of the findings is contained in Table 4.17

Table 4.17: The extent to which Soap for Hand Washing is Always Available

Opinion	Frequency	Percentage (%)
Strongly agree	10	27.8
Agree	4	11.1
Neutral	2	5.6
Disagree	1	2.8
Strongly disagree	19	52.8
Total	36	100.0

According to the results of the findings indicated in Table 4.17 , majority, 19 (55.6%) of the students who had indicated that their schools provided them with soap for hand washing after visiting the toilet revealed that this soap was not always readily available. This problem may be caused by the Free Primary Education (FPE) which was introduced in Kenya in 2003 and which caused a lot of strain on sanitation facilities not only in primary schools but also secondary schools in Central Division of Machakos District when many students were admitted in the schools under study. This situation may force most of the schools in the area under study not to prioritize provision of soap.

4.5.6 Effective use of Soap for Hand Washing after Visiting the Toilet

The researcher also sought students response on effective use of soap for hand washing after visiting the toilet and summarized the findings as shown in table 4.18

Table 4.18 Effective use of Soap for Hand Washing after Visiting the Toilet

Response	Frequency	Percentage (%)
Strongly agree	10	27.8
Agree	4	11.1
Neutral	2	5.6
Disagree	1	2.8
Strongly disagree	19	52.8
Total	36	100.0

From the findings in table 4.18, 20 (55.6%) of the 36 students who had indicated that their schools provided soap for hand washing further revealed that students did not use this soap effectively while 14 (38.9%) of them indicated effective use of soap during hand washing. The findings reveal lack of effective use of soap during hand washing among the students under study, a practice which may lead to increased cases of water borne diseases. This is because use of soap has been found to be the most effective way of preventing germs from getting into our bodies and causing infection. Ineffective use of soap may cause diseases which may eventually result to absenteeism in schools. This may explain the poor enrolment (46.67%) in form three in the schools involved in the study.

The researcher fitted a multi-linear regression model in order to ascertain answers to the research question regarding the outcome of availability of soap and its influence on implementation of hygiene practices and used ANOVA to test the following hypothesis:

4.5.7 Hypothesis Ho2: There is no Significant Relationship between Availability of Soap and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District

The one-way analysis of variance (ANOVA) was computed in order to make judgment on the null hypothesis which stated that, there is no significant relationship between availability of soap and implementation of hygiene practices in public secondary schools in Central Division of Machakos District. The results of ANOVA are summarized in Table 4.19

Table 4.19 Influence of Soap on Implementation of Hygiene Practices

INDICATORS	ANOVA	Sum of squares	Df	Mean square	F	Sig
Implementation of hygiene practices, subject to proper hand washing after visiting toilet.	Between groups	297.325	4	74.331	48.715	000(a)
	Within groups	509.631	334	1.526		
	Total	806.956	338			
Implementation of hygiene practices, subject to proper use of toilets.	Between groups	300.523	4	75.131	38.235	.001 (a)
	Within groups	656.421	334	1.965		
	Total	924.002	338			

The results in Table 4.19 indicate that, availability of soap has a positive significant influence on implementation of hygiene practices when based on hand washing and proper use of toilets as hygiene practices where the results indicate,

F (4, 334) = 48.715, P>0.05 for hand washing and **(4,338) = 38.235, p > 0.05** for use of toilet when soap is seen as a utility in the toilets. This implies that the differences in secondary schools level of implementation of hygiene practices, which is caused by regular availability of soap, type, provision and location is statistically significant when measured by hand washing and proper use of toilets. Based on the results in Table 4.19, the study did not support but rejected the null hypothesis which stated that “there is no significant relationship between availability of soap and implementation of hygiene practices”. To affirm the extent to which availability of soap

would determine implementation of hygiene practices, regression prediction models were developed. The findings are summarized in Tables 4.20 and 4.21 respectively.

Table 4.20 Regression Model for Availability of Soap and Implementation of Hygiene Practices, Subject to Proper Hand Washing

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.607 (a)		.368	.361	1.235	
ANOVAs	Sum of squares	Df	Mean square	F	Sig	
Regression	297.325	4	74.331	48.715	.009(a)	
Residual	509.631	334	1.526			
Total	806.956	338				
Coefficients	Unstandardized coefficients		Standardized coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	.659	.713		.924	.000	
Type	-.338	.265	-.097	-1.276	.000	
Location	.708	.223	.284	3.173	.000	
Provision	.078	.327	.016	.237	.000	

The results in Table 4.20 indicate that the 3 indicators of soap: type, location and provision have a positive significant effect on implementation of hygiene practices where implementation is measured on the basis of hand washing.

Based on the results obtained, the following regression equation for estimating implementation of hygiene practices in terms of hand washing after visiting the toilet when given availability of soap is derived:

$$R_{S2} = 0.659 - 0.097x_1 + 0.284x_2 + 0.016x_3$$

Where,

R_{S2} = Composite index for implementation of hygiene practices in terms of hand washing

x_1 = Composite index for type of soap

x_2 = Composite index for location of soap

x_3 = Composite index for provision of soap

The model has an **r** value of **.670** and an **F** value of **48.715** whose critical value is **P = 0.000**. The model has an **r²** value of **0.368**, an indication that **36.8** percent of change in a school's implementation of hygiene practices is accounted for by availability of soap.

The model indicates that location of soap has the strongest positive influence on implementation of hygiene practices (with a beta value of **0.284**), followed by its provision whose beta value is **0.016**. This could be interpreted to mean that when students are convinced that hygiene practices will benefit them by reducing risk in diseases and saving them an estimated 1.9 billion school days that are lost due to diarrhea and other water and sanitation- related diseases, then their first priority would be to ensure that soap is always located next to the toilets and also pressurize their principals to always provide this soap.

Table 4.21 Regression Model for Availability of Soap and Implementation of Hygiene Practices, Subject to Proper use of Toilets

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.557(a)		.310	.314	1.212	
ANOVAs	Sum of squares	Df	Mean square	F	Sig	
Regression	300.523	4	75.131	38.235	0.001	
Residual	656.421	334	1.965			
Total	924.002	338				
Coefficients	Unstandardized coefficients		Standardized coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	.659	.713			.924	.000
Type	-.238	.265	-.097		.276	.003
Location	.608	.223	.284		.173	.012
Provision	.781	.327	.016		.237	.012
Ready availability	.544		.467		.234	.022

The results in Table 4.21 reveal that all the four indicators of soap have a positive influence on implementation of hygiene practices. On the basis of the results obtained, the following regression equation for estimating implementation of hygiene practices, given availability of soap is derived:

$$R_{12} = .659 - .097_{x1} + .284_{x2} + .016_{x3} + .467_{x4}$$

Where,

R_{t2} = Composite index for implementation of hygiene practices on use of toilet

x_1 = Composite index for type

x_2 = Composite index for location

x_3 = Composite index for provision

x_4 = Composite index for ready availability

The model has an r value of **0.557** and an F value of **38.235** whose critical value is $P = 0.001$. This implies that proper use of toilet in a school could be estimated on the basis of availability of soap when soap is considered as a toilet utility. It could be argued here that, its availability in the toilets will encourage more students to use the toilets since they know that soap is there for them to use after visiting the toilets as opposed to toilets which lack soap. The model has an r^2 value of **.310**, an indication that **31.0** percent of a school's change on implementation of hygiene practices based on proper use of toilets is accounted for by availability of soap. The most important attribute in estimating implementation of hygiene practices in terms of proper use of toilets is ready availability of soap with a beta value of **0.467**, followed by location and provision with beta values of **0.284** and **0.016** respectively. The results of the findings could imply that when students in the schools under study are convinced that using soap will benefit them by reducing risk in diseases and saving them many school days that are lost due to diarrhea and other water and sanitation- related diseases, then their first priority would be to continually ask their principals to not only provide soap always but also ensure that it is located in all the toilets. This would then imply that toilets in which soap is not located may not be used always and effectively by students.

4.6 Availability of Toilets and their Influence on Implementation of Hygiene Practices

Learners' toilets project an image of the school and can have an influence on their hygiene practices and health. It is in view of this that the study was carried out to gather information from

respondents regarding the influence of type, number, adequacy and privacy of toilets on implementation of hygiene practices.

4.6.1 Type of Toilets used by Students

Respondents were asked to indicate the type of toilets used by students. The findings from the students and principals are summarized in Tables 4.22 and 4.23 respectively

Table 4.22 Type of Toilets used by Learners as indicated by Students

Response	Frequency	Percentage (%)
Pit latrine	60	17.4
Flush toilet	26	7.5
Both pit and flush toilets	259	75.1
Total	345	100.0

From the findings in Table 4.22, 60 (17.4%) of the students who formed the sample of the study indicated that students use pit latrines, 26 (7.5%) talked of flush toilets while 259 (75.1%) revealed that students used both pit and flush toilets.

Table 4.23 Type of Toilets used by Students as revealed by Principals

Response	Frequency	Percentage (%)
Flush toilet	1	3.6
pit latrine	6	21.4
Both flush and pit	21	75.0
Total	28	100.0

The results of the findings presented in Table 4.23 indicate that just like the students, majority 21 (75%) of the principals revealed that students use both flush toilets and pit latrines. Only 3.6% of the principals and 7.7% of the students indicated use of flush toilets. The small percentage in the use of flush toilets in the area under study may be due to the fact that the area is semi-arid, an indication of inadequacy of water to be used in the flush toilets. Pit latrines are therefore more preferred in secondary schools in the area under study since they do not require a lot of water for maintenance of their cleanliness.

4.6.2 Number of Toilets for Students

The researcher further requested the respondents to indicate the number of toilets used by students in the schools under study. Tables 4.24 and 4.25 give a summary of the findings from the students and principals respectively.

Table 4.24 Number of Toilets for Students as revealed by Students

Frequency	Frequency	Percentage (%)
Many	17	4.9
Several	9	2.6
Not certain	3	0.9
Adequate	5	1.4
5	8	2.3
6	2	0.6
7	3	0.9
8	4	1.2
9	1	0.3
10	26	7.5
12	10	2.9
13	2	0.6
14	52	15.1
15	4	1.2
16	60	17.4
18	12	3.5
19	2	0.6
20	12	3.5
21	1	0.3
22	4	1.2
24	13	3.8
25	3	0.9
26	4	1.2
27	5	1.4
28	41	11.9
30	11	3.2
32	7	2.0
33	3	0.9

34	1	0.3
36	2	0.6
37	4	1.2
40	2	0.6
45	1	0.3
48	2	0.6
50	1	0.3
52	2	0.6
56	1	0.3
60	1	0.3
80	1	0.3
Not adequate	2	0.6
No response	1	0.3
Total	345	100.0

From the research findings in Table 4.24, 40.1% of the students revealed that students had more than 18 toilets with more than 50% of them indicating less than 18 toilets in a school. The mean for their response was 18.47. The results of the findings imply that the number of toilets in the public secondary in the area under study can comfortably be used by the students.

Table 4.25 Number of Toilets for Students as revealed by Principals

Response	Frequency	Percentage (%)
18	1	3.6
20	3	10.7
22	4	14.3
24	3	10.7
26	2	7.1
28	7	25.0
32	1	3.6
34	4	14.3
38	1	3.6
40	2	7.1
Total	28	100.0

The study findings in Table 4.25 shows that all (100%) the principals indicated that their schools have 18 toilets for students with 96% of them revealing that they have more than 18 toilets which were being used by students. It is evident from the study findings from the respondents that majority of the schools in the area under study have toilets which can comfortably be used by their students.

4.6.3 The extent to which Toilets are Adequate for Students

The researcher used a Likert scale ranging from Strongly Agree to Strongly Disagree in which respondents were further asked to indicate their level of agreement concerning the adequacy of the toilets which were being used by students. Table 4.26 gives a summary of the study findings.

Table 4.26 Adequacy of Toilets used by Students

Response	Frequency	Percentage (%)
Strongly agree	132	38.3
Agree	97	28.1
Neutral	31	9.0
Disagree	32	9.3
Strongly disagree	49	14.2
No response	4	1.2
Total	345	100.0

From the findings in Table 4.26, 229 (66.4%) of the students involved in the study indicated that toilets were adequate while 81 (23.5%) were opposed to this since they indicated that student toilets were not adequate. All the 28 principals supported the students since they also revealed that toilets which were being used by students were adequate. This means that public secondary schools in Central Division of Machakos District provide adequate toilets for use by their students.

4.6.4 The extent to which Students Toilets provide Privacy

This indicator used a Likert scale ranging from Strongly Agree to Strongly Disagree in which students in the schools under study were requested to indicate their level of agreement as far as privacy provided by their toilets is concerned. Table 4.27 represents the findings from the students.

Table 4.27: The extent to which Toilets used by Students provide Privacy

Response	Frequency	Percentage (%)
Strongly agree	104	30.1
Agree	91	26.4
Neutral	25	7.2
Disagree	48	13.9
Strongly disagree	73	21.2
No response	4	1.2
Total	345	100.0

According to the findings in Table 4.27, 195 (56.5%) of the students who had been sampled for the study revealed that the toilets provided privacy. 77 (24.4%) of the sampled students indicated that their toilets did not provide privacy. It is therefore evident that most of the toilets in the schools in the area under study provide privacy when students are using them. The researcher also requested the principals to indicate how often the toilets were repaired so as to ensure privacy to the students. Table 4.28 represents a summary of the study findings

Table 4.28: Frequency of Repairing of Student Toilets so as to provide Privacy

Response	Frequency	Percentage (%)
When repair is needed	23	82.1
Once a year	1	3.6
Once a year/when need arises	2	7.1
When condition deteriorates	2	7.1
Total	28	100.0

All the principals 28 (100%) in the schools under study reported some degree of repairing the student toilets with majority revealing that the said toilets were repaired whenever such repair was needed. This is a clear indication that most of the toilets were in good condition and therefore provided students with privacy when they were using them. This was also supported by

their mean of 2.69. Generally all the respondents felt that the toilets provided privacy to the students.

4.6.5 The extent to which Toilets are Cleaned and Disinfected

Responses were also sought from the respondents on how often the toilets are cleaned and disinfected. A Likert scale ranging from Strongly Agree to Strongly Disagree was used where the respondents were asked to write their level of agreement regarding the extent to which this hygiene practice was carried out. Table 4.29 contains a summary of the data obtained from students while Table 4.30 has findings collected from the principals.

Table 4.29 Extent to which Toilets are Cleaned and Disinfected

Response	Frequency	Percentage (%)
Strongly agree	82	23.8
Agree	95	27.5
Neutral	60	17.39
Disagree	40	11.6
Strongly disagree	68	19.7
Total	345	100.0

From the findings in Table 4.29, 177 (51.3%) of the sampled students revealed regular cleaning and disinfection of toilets with 108 (31.3%) indicating that toilets in the schools under study were not regularly cleaned and disinfected.

Table 4.30 Extent of Regular Cleaning and Disinfection of Toilets

Response	Frequency	Percentage (%)
Once a day	11	39.3
Twice a day	17	60.7
Total	28	100.0

The responses in Table 4.30 show that the principals had similar observations to those of the students regarding cleanliness and disinfection of toilets with 60.7% of them revealing that student toilets in their schools were cleaned and disinfected twice a day while their counterparts 39.3% indicated that this practice was carried out once a day. This was supported by their mean of 2.76. There is a clear indication that majority of the respondents revealed a significant level of toilet cleaning and disinfection in the schools under study, a practice which may encourage students to use the toilets properly because of their good state.

The researcher used ANOVA to test the following hypothesis and to ascertain answers to the research question regarding toilets and their influence on implementation of hygiene practices.

4.6.6 Hypothesis H₀₃: There is no Significant Relationship between Availability of Toilets and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District.

This hypothesis was formulated to investigate the extent to which implementation of hygiene practices is influenced by type, privacy, number and adequacy of toilets in public secondary schools. The study computed the one- way analysis of variance (ANOVA) in so as to make judgment on the null hypothesis which stated that, there is no significant relationship between availability of toilets and implementation of hygiene practices in public secondary schools in Central Division of Machakos District. The results of ANOVA are summarized in Tables 4.31

Table 4.31 Influence of Toilets on Implementation of Hygiene Practices

INDICATORS	ANOVA	Sum of squares	Df	Mean square	F	Sig
Implementation of hygiene practices, subject to proper hand washing after visiting toilet.	Between groups	136.624	3	45.541	27.416	.000 ^a
	Within groups	558.138	336	1.661		
	Total	694.762	339			
Implementation of hygiene practices, subject to proper use of toilets.	Between groups	297.325	4	74.331	48.715	.000 ^a
	Within groups	509.631	334	1.526		
	Total	806.956	338			

The results in Table 4.31 indicate that, availability of toilets has some influence on implementation of hygiene practices, as measured by proper hand washing and proper use of toilets. The influence is significant where the results were $F(3,336) = 27.416, P < 0.05$. This implies that availability of toilets will cause significant influence on implementation of hygiene practices in public secondary schools. The result of the influence of toilets on their proper use was $F(4, 334) = 48.175, P < 0.05$ indicating significant influence. Since the F was significant, the researcher therefore rejected the null hypothesis which stated that “there is no significant relationship between availability of toilets and implementation of hygiene practices in public secondary schools” and accepted the alternative. It can therefore be assumed that when students are convinced that proper hygiene practices can greatly aid in preventing the spread of preventable diseases, they could possibly request their principals to provide them with water for hand washing after visiting the toilet and always ensure that they use the available toilets in the best hygienic manner possible since the toilets are adequate. Regression prediction models were developed for estimating a school’s level in implementation of hygiene practices based on availability of toilets. The findings of the regression are summarized in Tables 4.32 and 4.33 respectively.

Table 4.32 Regression Model for Availability of Toilets and Implementation of Hygiene Practices, Subject to Proper Hand Washing as a Hygiene Practice

Model summary	R	R square	Adjusted R square	Std. Error of the estimate	
	.443 (a)	.197	.189	1.289	
ANOVAs	Sum of squares	Df	Mean square	F	Sig
Regression	136.624	5	45.541	27.416	.000(a)
Residual	558.138	336	1.661		
Total	694.762	339			
Coefficients	Unstandardized coefficients		Standardized coefficients	T	Sig
	B	Std. Error	Beta		
(constant)	1.151	.39		2.401	.022
Privacy	.130	.419	.111	.310	.022
Type	.187	.193	.066	.967	.019
Number	.286	.111	.188	2.572	.013

The results indicated in Table 4.32 reveal that implementation of hygiene practices is positively influenced by type, number and privacy of toilets, when hygiene practices are measured on the basis of hand washing. On the basis of the results obtained, the following regression equation is developed:

$$R_{s4} = 1.151 + 0.111x_1 + 0.066x_2 + 0.188x_3$$

Where,

R_{s4} = composite index for implementation of hygiene practices in terms of proper hand washing

x_1 = Composite index for privacy

x_2 = Composite index for type

x_3 = Composite index for number of toilets

The model has an **r** value of **.443** and an **F** value of **27.416** whose critical value of **P = .000**

The model has an r^2 value of **0.197**, meaning that **19.7%** of a schools change in implementation of hygiene practices could be contributed by availability of toilets. The model also indicates that,

the most important indicator in determining proper hand washing as a hygiene practice is the number of toilets whose beta value is **0.188**. Since water and soap are located next to these toilets, then it could be argued here that, more students will most likely use the toilets and consequently use the hand washing facilities located to wash hands after visiting the toilets. Number of toilets is then followed by privacy with a beta value of **0.111** and type of toilets whose beta value is **0.066** respectively.

Table 4.33 Regression Model for Availability of Toilets and Implementation of Hygiene Practices, Subject to Proper use of Toilets

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.781		.601	.189	1.319	
ANOVA	Sum of squares	Df	Mean square	F	Sig	
Regression	297.325	4	74.331	48.715	.000(a)	
Residual	509.631	334	1.526			
Total	806.956	338				
Coefficients	Unstandardized Coefficients		Standardized Coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	1.151	.390			2.401	.022
Privacy	.130	.419	.111		.310	.022
Type	.187	.193	.066		.967	.019
Number	.286	.111	.180		2.572	.013

From the results indicated in Table 4.33, it is revealed that privacy, type and number of toilets in public secondary schools have a positive effect on implementation of hygiene practices. On the basis of the results indicated in Table 4.33, the following regression equation is derived:

$$R_{t3} = 1.151 + 0.111x_1 + 0.066x_2 + 0.180x_3$$

Where,

R_{t3} = composite index for implementation of hygiene practices in terms of proper use of toilets

x_1 = Composite index for privacy

x_2 = Composite index for type

x_3 = Composite index for number of toilets

The model has a multiple regression of $r = .781$ and an F value of **48.715** whose critical value is $P = .000$. The model indicates that implementation of hygiene practices in public secondary

schools could be well estimated based on availability of toilets. The model has an r^2 value of **.601**, meaning that all the indicators for availability of toilets could account for **60.1** percent of change in the implementation of hygiene practices. However, the model indicates that the most important indicator is the number of toilets (with a beta value of **0.180**) compared with privacy and type which have beta values of **0.11** and **0.66** respectively. From the model, it can be assumed that since the toilets in the schools under study are many, then students can use them with ease and without scrambling, a practice that is likely to ensure their proper use as opposed to situations where the toilets are fewer in number compared to the number of students accessing them.

4.7. Sanitary Towel Disposal Bins and their Influence on Implementation of Hygiene Practices in Public Secondary Schools

Sanitary towel disposal bins are very essential in schools since without them most of the adolescent girl students would find it hard to practice proper hygiene. Some of the adolescent girl students may even fail to attend school when they have their menstruation and therefore increase gender disparity in education. It is in view of this that the researcher studied the influence of sanitary towel disposal bins on implementation of hygiene practices in public secondary schools in the area under study. The study used indicators for this variable namely: their provision, location, adequacy, cleanliness and proper use by the secondary school students under study.

4.7.1 Provision of Sanitary Towel Disposal Bins

The respondents were requested to indicate whether their schools provided students with sanitary towel disposal bins. The summary of the findings are enumerated in Tables 4.34.

Table 4.34 Provision of Sanitary Towel Disposal Bins as revealed by Students

Response	Frequency	Percentage (%)
Yes	234	67.8
No	95	27.5
No response	16	4.6
Total	345	100.0

From the findings in Table 4.34, 234 (67.8%) of the students indicated that their schools were provided with bins for disposing used sanitary towels, and this was also supported by their mean of 1.29 with only 95 (27.5%) revealing lack of provision of the bins. All the 28 principals supported the response from the students since they also revealed that they provided girls with sanitary towel disposal bins. It can therefore be argued here that since the students are provided with sanitary towel disposal bins, then they should use the toilets properly by avoiding dropping used sanitary towels on the floor of toilets or even in the pit latrines as had earlier on been observed in some studies, and instead dispose the used towels in the bins. This would be a good hygiene practice.

4.7.2 Location of Sanitary Towel Disposal Bins

The researcher further requested the responses to indicate where the sanitary disposal bins were located. Tables 4.35 and 4.36 give a summary of the findings.

Table 4.35: Location of the Sanitary Towel Disposal Bins as revealed by Students

Response	Frequency	Percentage (%)
Inside the toilet	158	45.8
In the bathroom	60	17.4
Toilets/bathroom	93	26.9
No response	34	9.9
Total	345	100.0

From the findings summarized in table 4.36, majority 158 (45.8%) of the students indicated that the bins were located in the toilets, 60 (17.4%) talked of the bins being located in the bathrooms while 93 (27%) revealed that the bins were located in both the toilets and bathrooms. This shows that it is possible for the students to dispose used sanitary towels in the bins instead of throwing them in the pit latrines.

Table 4.36 Location of Sanitary Towel Disposal Bins as reported by Principals

Response	Frequency	Percentage (%)
In the toilets	2	7.1
Both in the toilets and bathrooms	26	92.9
Total	28	100.0

From Table 4.36, sanitary towel disposal bins were located in either toilets or bathrooms as was indicated by majority 26 (92.9%) of the principals who were involved in the study. The findings indicate a mean response of 1.80 from the students and one of 2.93 from the principals. It is therefore evident that sanitary towel disposal bins are strategically located both in the toilets and bathrooms to necessitate proper disposal of used sanitary towels and washing of hands after disposing them since water is located in the toilets. It can be argued here that students in the schools under study can use the toilets properly since they already have disposal bins for the used

sanitary towels. They therefore have no reason for using the toilets inappropriately by disposing used sanitary towels in them. This may also imply that since water is located next to the toilets, then the students in the schools under study can wash their hands after disposing the used sanitary towels.

4.7.3 Degree of Disposing of Used Sanitary Towels in the Disposal Bins

This indicator used a Likert scale ranging from Strongly Agree to Strongly Disagree and students were asked to write their level of agreement concerning disposal of used sanitary towels by students in the schools under study. Table 4.37 represents a summary of the findings.

Table 4.37 Extent of Disposal of used Sanitary Towels in Disposal Bins

Response	Frequency	Percentage (%)
Strongly agree	83	24.1
Agree	70	20.3
Neutral	56	16.2
Disagree	47	13.6
Strongly disagree	89	25.8
Total	345	100.0

The findings in Table 4.37 indicated that 153 (44.4%) of the students who formed part of the sample population indicated proper disposal of used sanitary towels in the bins by students while 122 (35.3%) of them revealed that students did not dispose used sanitary towels in the sanitary towel disposal bins which were provided by the schools. The mean for the students' responses was 3.08. From the findings, it is clear that majority of secondary school students do dispose used sanitary towels in sanitary towel disposal bins. This practice may partly be influenced by the fact that the bins are located both in the toilets and bathrooms which form part of important sanitation facilities in almost all schools.

4.7.4 The extent to which Sanitary Towel Disposal Bins are Emptied

The study used a Likert scale ranging from Strongly Agree to Strongly Disagree in order to get the students response concerning the rate at which sanitary towel disposal bins were emptied. The results of the findings are summarized in Table 4.38

Table 4.38: The extent to which Sanitary Towel Disposal Bins are Emptied

Response	Frequency	Percentage (%)
Strongly agree	85	24.6
Agree	77	22.3
Neutral	44	12.8
Disagree	37	10.7
Strongly disagree	102	29.6
Total	345	100.0

From Table 4.38, 162 (46.9%) of the students from the schools under study indicated that sanitary towel disposal bins were emptied regularly while 139 (40.3%) revealed that there was no regular emptying of the bins. Failing to empty the used sanitary towels could have made the students concerned with cleaning them not to do so.

4.7.5 The extent to which Sanitary Towel Disposal Bins are Cleaned

The researcher used a Likert scale ranging from Strongly Agree to Strongly Disagree in which the respondents were requested to indicate their level of agreement concerning the extent to which sanitary towel disposal bins were cleaned using soap. The results of the findings are summarized in Table 4.39

Table 4.39: The extent of Regular Cleaning of Sanitary Towel Disposal Bins

Response	Frequency	Percentage (%)
Strongly agree	97	28.1
Agree	86	24.9
Neutral	39	11.3
Disagree	46	13.3
Strongly disagree	76	22.0
Total	345	100.0

The results from Table 4.39 indicated that 183 (53%) of the students indicated that sanitary towel disposal bins were regularly cleaned using soap. 122 (35.3%) of the students who were part of the study sample revealed that these bins were regularly cleaned. The students mean for the response was 2.77. Regular cleaning of the bins may have been necessitated by their being located in the toilets where water was available.

4.7.6 Testing of the Hypothesis

The researcher used ANOVA to test the following hypothesis and to ascertain answers to the research question regarding availability of sanitary towel disposal bins and their influence on implementation of hygiene practices

4.7.7 H₀4: There is no Significant Relationship between Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices in Public Secondary Schools in Central Division of Machakos District

This hypothesis was formulated to examine the influence of sanitary towel disposal bins on implementation of hygiene practices in secondary schools. The researcher computed One-way analysis of variance (ANOVA) in order to make judgment on the null hypothesis which stated that, availability of sanitary towel disposal bins does not have a significant influence on

implementation of hygiene practices in public secondary schools. The findings are presented in Table 4.40.

Table 4.40: Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices

INDICATORS	ANOVA	Sum of squares	Df	Mean square	F	Sig
Implementation of hygiene practices, subject to proper hand washing after visiting toilet.	Between groups	278.467	4	69.617	10.966	.000 ^a
	Within groups	1847.316	291	6.34816		
	Total	2125.784	295			
Implementation of hygiene practices, subject to proper use of toilets.	Between groups	269.265	4	67.31663	11.3461	.022 ^a
	Within groups	1726.568	291	5.933		
	Total	2456.211	295			

The results in Table 4.40 indicate that, availability of sanitary towel disposal bins has some influence on implementation of hygiene practices, as measured by proper hand washing and proper use of toilets. For example, it is evident that from the results that, availability of sanitary towel disposal bins causes significant differences on a schools level of implementation of hygiene practices when based on both hand washing and proper use of toilets as hygiene practices where the results indicate,

F (4, 291) = 10.966, P = > 0.05 for hand washing and **F (4,291) = 11.346, P = > 0.05** for proper use of toilets. This implies that the differences in secondary school’s level on implementation of hygiene practices, that is caused by availability of sanitary towel disposal bins is statistically significant when measured by both hand washing and proper use of toilets. Based on the results in Table 4.41, we reject the null hypothesis which stated that “there is no significant relationship between availability of sanitary towel disposal bins and implementation of hygiene practices in public secondary schools in Central Division of Machakos District” and accept the alternative. On the basis of the results obtained, regression prediction models were developed so as to

estimate a school's implementation of hygiene practices, based on availability of sanitary towel disposal bins. The results of the findings are summarized in Tables 4.41 and 4.42 respectively.

Table 4.41: Regression Model for Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices, Subject to Proper Wand washing after Disposing Used Sanitary Towels.

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.362		.131	.119	2.520	
ANOVAs	Sum of squares	Df	Mean square	F	Sig	
Regression	278.467	4	69.617	10.966	.000	
Residual	1847.316	291	6.348			
Total		295				
Coefficients	Unstandardized coefficients		Standardized coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	1.151	.479			2.401	.017
Provision	.130	.419	0.111		.310	.037
Location	.187	.193	.066		.967	.032
Adequacy	.286	.111	.180		2.572	.011
Emptying	.449	.113	.254		3.978	.000

The results in Table 4.41 indicate that, the four indicators of availability of sanitary towel disposal bins: provision, location, adequacy and emptying have a positive effect on implementation of hygiene practices where implementation is measured on the basis of proper hand washing after visiting the toilet. Based on the results obtained, the following regression equation for estimating implementation of hygiene practices, in terms of proper hand washing, when given availability of sanitary towel disposal bins was developed:

$$Rh\ 5 = 1.151 + .111_{x1} + .066_{x2} + .180_{x3} + .254_{x4}$$

Where,

Rh₅ = Composite index for hygiene practices in terms of proper hand washing after disposing used sanitary towels in the disposal bins.

x₁ = Composite index for provision

x₂ = Composite index for location

x₃ = Composite index for adequacy

x₄ = Composite index for emptying

The model has an **r** value of **.362** and an **F** value of **10.966** whose critical level is **P = .000**. The model has an **r²** value of **.131**, an implication that **13.1** percent of change in implementation of hygiene practices is accounted for by availability of sanitary towel disposal bins. The most important attribute in estimating implementation of hygiene practices in terms of proper hand washing is emptying of the sanitary towel disposal bins with a beta value of **0.254**, followed by adequacy with a beta value of **0.168** while location and provision have beta values of **0.062** and **0.021** respectively.

This could be interpreted to mean that, when students in the schools under study are convinced that hand washing as hygiene practice could benefit them by reducing health risks involved in poor hygiene behaviors, then could ensure that sanitary towel disposal bins are always located in toilets where water is available to enable them wash hands after disposing used towels in the bins.

Table 4.42: Regression Model for Availability of Sanitary Towel Disposal Bins and Implementation of Hygiene Practices, Subject to Proper use of Toilets.

Model summary	R		R square	Adjusted R square	Std. Error of the estimate	
	.513		.263	.255	1.808	
ANOVA	Sum of squares	Df	Mean square	F	Sig	
Regression	269.265	4	67.3163	48.715	0.222(a)	
Residual	1726.568	291	5.933			
Total	5456.211	295				
Coefficients	Unstandardized coefficients		Standardized coefficients		T	Sig
	B	Std. Error	Beta			
(constant)	1.221	.652		1.652	.011	
Provision	.130	.419	.021	.310	.034	
Location	.120	.110	.062	.967	.023	
Adequacy	.224	.021	.168	2.572	.011	
Emptying	.324	.152	.254	3.978	.000	

According to the results summarized in Table 4.42, there is evidence that implementation of hygiene practices based on proper use of toilets is positively influenced by provision, location, adequacy and emptying of sanitary towel disposal bins. On the basis of the results indicated in Table 4.42, the following regression equation is derived:

$$Rt_5 = 1.221 + .021x_1 + .062x_2 + .168x_3 + .254x_4$$

Where,

Rt_5 = Composite index for implementation of hygiene practices based on proper use of toilets

x_1 = Composite index for provision

x_2 = Composite index for location

x_3 = Composite index for adequacy

x_4 = Composite index for emptying

The model has an **r** value of **.513** and an **F** value of **11.3461** whose critical value is **P = .222**. The value of **F** is significant and therefore the researcher concluded that there is a positive significant relationship between availability of sanitary towel disposal bins and implementation of hygiene practices in public secondary schools in the area under study. The model has an **r²** value of **.263**, an indication that **26.3** percent change in the implementation of hygiene practices could be accounted for by availability of sanitary towel disposal bins. The model also indicates that, the most important indicator of sanitary towel disposal bins in determining proper use of toilets is emptying whose beta value is **0.254** compared with **0.168** for adequacy, **0.062** for location and **0.021** for provision. It could be argued here that, students in the sampled schools are more likely to use the toilets properly by not dropping used sanitary towels in them but disposing them in the sanitary towel disposal bins which are emptied regularly as opposed to those schools where the said bins are always full and not emptied when need be.

4.8 Opinion on how to Improve Hygiene Practices in Public Secondary Schools

The researcher also sought respondents response on what they thought could be done to improve hygiene practices in schools. The research findings are summarized in Table 4.44 (a) and 4.44 (b).

Table 4.43: (a) How to Improve Hygiene Practices in Public Secondary Schools as reported by Students

Response	Frequency	Percentage (%)
Hygiene to be taught	24	6.95
Hygiene to be encouraged	23	6.67
Hygiene to be taught and encouraged	298	86.38
Total	345	100.0

From the findings in Table 4.43 (a), 298 (86.38%) of the students indicated that hygiene should be taught and encourage in schools so as to improve its practices.

Table 4.43: (b) How to Improve Hygiene Practices in Public Secondary Schools as Revealed by Principals

Response	Frequency	Percentage (%)
Hygiene to be taught	12	42.9
Hygiene to be encouraged as a practice	11	39.3
Hygiene to be taught and encouraged	5	17.8
Total	28	100.0

From the findings in Table 4.43 (b), (42.9%) of the principals revealed that hygiene should be taught as a way of trying to improve hygiene practices. From the result findings in Table 4.43 (a) and 4.43 (b), it is evident that the respondents in the schools under study were for the idea that if hygiene is taught and encouraged in schools, then implementation of hygiene practices would improve greatly in public secondary schools in Central Division of Machakos District. It may be assumed that teaching of hygiene in the schools under study will help in instigating hygiene practices in these schools and consequently students may learn these practices and implement them both in school and at home.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The researcher investigated factors influencing implementation of hygiene practices in public secondary schools in central division in Machakos district in Machakos County. This was after a thorough literature review which revealed a dominance of poor hygiene practices in most schools in the area under study. The study was guided by research objectives namely; to establish whether availability of soap influences hygiene practices in public secondary schools in central division of Machakos district, to establish whether availability of water influences hygiene practices in public secondary schools in central division of Machakos district, to establish the relationship between availability of toilets and implementation of hygiene practices in public secondary schools in central division of Machakos district and to investigate the relationship between availability of sanitary towel disposal bins and implementation of hygiene practices in public secondary schools in central division of Machakos district. The researcher targeted 4481 form two and three students and 30 principals from the 30 public secondary schools in central division of Machakos. Questionnaire and interview schedules were used to collect data from the students and principals respectively from the schools under study. Data was analyzed by use of descriptive statistics such as frequency tables, percentages and measures of central tendency while hypotheses were tested by use of ANOVA.

5.2 Summary of the Findings

The researcher gave the key findings based on the four objectives outlined in the introduction and their influence on hygiene practices in the schools under study.

5.2.1 Influence of Water on Implementation of Hygiene Practices

The study found out that majority of students 80.3% were provided with both tapped water and water in buckets fitted with taps. This water was adequate and strategically located next to the toilets to allow students to wash hands after visiting the toilet. It is evident from the study findings that although location, adequacy of water points and provision of water influence hand washing and proper use of toilets as hygiene practices, availability has the greatest influence.

5.2.2 Influence of Soap on Implementation of Hygiene Practices

From the study findings, it is evident that 80% of the students who had indicated that their schools provided them with soap revealed that this soap was located next to the toilets. Out of the indicators of soap which were used in the study namely; type, location and provision, the researcher found out that location had the most significant influence on implementation of hygiene practices when the practices were measured under hand washing after visiting the toilet and proper use of toilets.

5.2.3 Influence of Toilets on Implementation of Hygiene Practices

The researcher established that majority of the schools (75.1%) in the area under study provided both pit latrines and flush toilets for students, with a very small percentage (7.5%) providing flush toilets. The study also established that out of the three indicators of toilets which formed the focus of the study namely; number, privacy and type, number of toilets was the most important factor in influencing implementation of hygiene practices.

5.2.4 Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices.

The study found out that most of the schools were provided with sanitary towel disposal bins some of which were located in the toilets while others were located in both the toilets and bathrooms. However majority of the students, 29.6%, strongly felt that the bins were not adequate although they were emptied regularly. The researcher found out that although provision, regular emptying, adequacy and location of sanitary towel disposal bins influenced hand washing and proper use of toilets as hygiene practices, regular emptying had the greatest influence.

5.3 Discussion of the Study Findings

This section presents the discussion of the major findings from the study. The discussion is guided by the study objectives and the information gathered from the respondents. The section also compares the study findings with the findings in the literature earlier on reviewed based on the study objectives.

5.3.1 Availability of Water and its Influence on Implementation of Hygiene Practices in Public Secondary Schools

Water is very essential for regular hand washing and proper use of toilets as recommendable hygiene practices. Majority of the respondents acknowledged that their schools provided water for washing hands after visiting the toilet and that this water was available. The study is very different from one which was carried out by Maria (2010) in a school in South Africa where she reported that most of the toilets in the schools she studied had no water for hand washing and therefore students did not wash hands after visiting the toilet. However, the study compares with an assessment which was conducted by the Schools Sanitation and Hygiene Working Group in public schools in several places including Machakos that found out that 10% of the schools which were visited had water for hand washing although only a few students washed their hands after visiting the toilet. The study also revealed availability of tippy taps for hand washing.

5.3.2 Influence of Soap on Implementation of Hygiene Practices in Public Secondary Schools

Based on the second objective on availability of soap, the study aimed at establishing if soap had any influence on implementation of hygiene practices in schools. The researcher found out that most of the students were not provided with soap and therefore did not wash hands with soap after visiting the toilet. This was in line with a study that was carried out in a rural school in Atbara region of Ethiopia by Kumie *et al.*, (2005) who reported that out of all the available toilets, none contained soap for hand washing and a survey that was carried out in several districts in Kenya including Machakos, which reported that hand washing with soap was almost non-existent as only 1% used soap while washing hands. However, a few students who indicated that their schools provided them with soap revealed that the soap was located next to the toilets, a situation which could have influenced them to use it for hand washing after visiting the toilet.

5.3.3 Influence of Toilets on Implementation of Hygiene Practices in Public Secondary Schools

The researcher found out that number, adequacy and privacy of toilets make significant contribution to hand washing and proper use of toilets by students although number of toilets had the greatest contribution. This was in contrast with a study which was carried out in two schools in Zimbabwe where Sommer (2009) noted that the toilets used by the students had no doors to provide privacy and therefore adolescent school girls could not practice proper hygiene especially when they had their menstruation. Similar observations were made by Maria (2010) who reported that students could not use toilets in a school in South Africa since some of them had badly rusted corrugated iron sheets and broken doors thus passersby could see into the toilets. A similar study which was conducted by Siwolo (2004), Asyago (2005) and Mugo (2006) in Machakos and Embu found out that most of the toilets were not adequate.

5.3.4 Influence of Sanitary Towel Disposal Bins on Implementation of Hygiene Practices in Public Secondary Schools

Based on the study objectives the researcher investigated the relationship between adequacy, location and emptying of sanitary towel disposal bins as the independent variables and hand washing and proper use of toilets as the dependent variable. The researcher found out that out of these indicators, emptying of the sanitary towel disposal bins has the greatest influence on implementation of hygiene practices. The study findings compare with a study which was carried out in Zimbabwe where school girls revealed that they dumped used sanitary towels in pit latrines since the disposal bins in their toilets were always full and filthy (Maria, 2001).

5.4 Conclusion of the Study

Based on the research findings the researcher made the following conclusion:

Implementation of hygiene practices, with regard to hand washing and proper use of toilets in public secondary schools in the area under study is influenced by provision, availability, type, location and adequacy of water points. However, availability of water has the greatest influence.

Location of soap has the most significant influence on implementation of hand washing as a hygiene practice while its availability is the most important indicator for implementation of proper use of toilet as a hygiene practice.

After studying the research findings, it emerged evident that toilets have a positive significant influence on implementation of hygiene practices. However, number of toilets is the most important indicator followed by adequacy and privacy.

Emptying of sanitary towel disposal bins has the greatest significant influence on implementation of proper use of toilets as a hygiene practice when compared to provision, location and adequacy of the bins.

Based on the study topic, the researcher found out that despite the fact that availability of water, soap, toilets and sanitary towel disposal bins significantly influence implementation of hygiene practices in public secondary schools in Central Division of Machakos District, water and soap have the most significant influence when these practices are based on both proper use of toilets and hand washing.

5.5 Recommendations of the Study

From the findings and conclusions drawn from the study, the researcher made recommendations which were divided into two categories as follows:

1. Recommendations for Policy Action

Since hygiene practices are very essential in helping to enhance effective learning, attracting large student enrolment in schools and ensuring a reduced burden on diseases, the researcher recommended that the following should be done to improve these practices in the area under study:

The ministry of education should develop a school curriculum with guidelines for hygiene practices. The curriculum should then be used by teachers to incorporate the theme of hygiene into their teaching subjects and encourage students to practice the knowledge which they will gain so as to adopt better hygiene practices. Such a curriculum, if well implemented, may result into improved hygiene practices which will lead to a reduction on diarrhea morbidity and respiratory infections.

School principals should direct efforts towards providing water and ensuring that water points are adequate so as to encourage students to wash their hand after visiting the toilets. They should also review availability and location of water provided in the schools with an aim of improving them so that students can use the water to clean their toilets after use as a sign of their proper use.

Public secondary school principals in the schools under study should regard soap as a utility and therefore strive to provide and locate it in all the toilets so as to encourage more students to effectively use the toilet facility and easily success the soap during hand washing.

School management should try and improve on privacy, type and number of toilets in their schools but give more emphasis to the number of the toilets. This will ensure that all the students access the toilets without struggle. Since water will also be located in these toilets, then the students will be in a position to wash their hands after visiting the toilets.

5.5.2 Recommendations for Further Research

Based on the scope of the study, the researcher made the following suggestion

1. A similar study should be carried out in tertiary institutions to establish whether similar factors influence implementation of hygiene practices in these organizations.
2. Since the study was carried out in Central Division due to limited time, a similar study should be carried out in the other division in Machakos District.
3. A similar study should be carried out in the other Counties in Kenya so as to compare the study findings with this one which was carried out in Machakos County.

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APPENDICES

APPENDIX I

LETTER OF INTRODUCTION

University of Nairobi
School of Continuing and
Distance Education
P.O. Box 92,
KIKUYU
24th April 2013

Dear respondent,

RE: RESEARCH STUDY

I am a student at the University of Nairobi pursuing a Master of Arts in Project Planning and Management degree. I am carrying out a study on factors influencing the implementation of hygiene practices in public secondary schools in Machakos district. Your school has been selected for the study and consequently you have been chosen to provide this information.

Please spare sometime and fill the attached questionnaire. Any information which you will provide will be treated purely for academic purposes.

Kindly fill the questionnaire as honestly and truthfully as possible and do not indicate your name or the name of your school on the questionnaire. Your assistance will be highly appreciated.

Thanking you in advance.

Yours faithfully,

Snow Mbula Eliud

APPENDIX II

Questionnaire for Students

Introduction

This study is meant for academic purposes. It is designed to gather information on factors influencing the implementation of hygiene practices in public secondary schools in Central Division of Machakos District. The results of this study are expected to contribute in the improvement of the implementation of hygiene practices in public secondary schools.

Kindly respond to the questions and statements as honestly and precisely as possible. Your identity will be treated with utmost confidentiality. Please do not write your name or that of your school anywhere on this questionnaire. Please tick where or fill in the required information on the spaces provided.

Section 1: Background Information

Please tick/fill in the spaces provided

1. What is your gender?

a) Male b) Female

2. In what category is your school?

a) Girls b) Boys c) Mixed boys and girls

What class are you in?

a) Form 2 b) Form 3

Section 2: Availability of Soap

4. Does the school provide students with soap for hand washing after visiting the toilets?

- a) Yes b) No

If yes, what type of soap does the school provide?

- a) Bar Soap b) Powder Soap c) Liquid Soap

5. How far is the soap located from the toilets?

- a) Next to the toilets b) Far from the toilets

6. Please tick under the level that best represents your opinion on the adequacy of soap as indicated in the key below

Strongly Agree (SA) Agree (A) Neutral (N) Disagree (D) Strongly Disagree (SD)

Statement	SA	A	N	D	SD
	5	4	3	2	1
Soap for hand washing after visiting the toilets is always available					
Soap for hand washing is used effectively by the students					

Section 3: Availability of Water (Please tick/fill where appropriate)

7. Does the school provide students with water for washing hands after visiting the toilets?

- a) Yes b) No

If yes, what type of water does the school provide?

- a) Tapped b) Water in basins c) Water in buckets fitted with taps

d) Any other specify

8. Please tick under the level that best represents your opinion as indicated in the key below

Strongly Agree (SA) Agree (A) Neutral (N) Disagree (D) Strongly Disagree (SD)

Statement	SA 5	A 4	N 3	D 2	SD 1
Water for washing hands after visiting the toilets is always available					
The number of water points are adequate for hand washing after visiting the toilets					
Water for washing hands after visiting the toilets is located near the toilets					
Students always wash hands after visiting the toilets					

Section V: Availability of Toilets

9. What type of toilet does the school have?

a) Pit latrines

b) Flush toilets

c) Any other specify

10. How many student toilets does the school have? _____

11. Please tick under the level that best represents your opinion as indicated in the key below

Strongly Agree (SA) Agree (A) Neutral (N) Disagree (D) Strongly Disagree (SD)

Statement	SA 5	A 4	N 3	D 2	SD 1
The number of toilets is adequate for all students in the school					
All toilets have lockable doors that provide privacy					
The school toilets are regularly cleaned and disinfected					
Toilets are always used properly by students					

Section V: Sanitary towel disposal bins (Please tick/fill where necessary)

12. Does the school provide girl students with sanitary towel disposal bins?

a) Yes b) No

If yes, where are the disposal bins located?

a) Inside the toilets

b) In the bathrooms

c) Any other specify

13. Please tick under the level that best represents your opinion as indicated in the key below

Strongly Agree (SA) Agree (A) Neutral (N) Disagree (D) Strongly Disagree (SD)

Statement	SA	A	N	D	SD
	5	4	3	2	1
Sanitary towel disposal bins in the school are emptied regularly					
Sanitary towel disposal bins are cleaned regularly					
Students always dispose used sanitary towels in the disposal bins					

14. What do you think can be done to improve hygiene practices in the school?

APPENDIX III

Interview Schedule for Principals

1. What type of students' toilets does the school have?
2. Are the toilets adequate compared to the number of students in your school?
3. How often are the toilets cleaned?
4. How often are the toilets repaired?
5. What do you think can be done to improve the condition of the toilets in the school?
6. Does the school have a reliable source of water for the students?
7. Does the school provide the students with water for hand washing after visiting the toilets?
8. How far from the toilets is the water for hand washing located?
9. Does the school provide soap to the students for hand washing after visiting the toilets?
10. Does the school provide bar soap, liquid soap or powder soap to the students for hand washing after visiting the toilets?
11. Is the soap adequate in relation to the number of students in the school?
12. Does the school provide sanitary towel disposal bins for the female students?
13. Where are the sanitary towel disposal bins located?
14. How many sanitary towel disposal bins does the school have?
15. Do you think they are enough compared to the number of female students in the school?
16. What do you think should be done to improve hygiene practices in the school?

APPENDIX IV

Table of schools in the study

Table 3.1 Total population of form two and three students in public secondary schools in central division, Machakos district

School	Girls	Boys	Total
Machakos School	0	500	500
Mumbuni Boys	0	485	485
Ngoleni Secondary	0	188	188
Kwanthanze	86	104	190
Machakos Baptist	78	102	180
S.A. Mutituni	62	84	146
Kamuthanga	21	44	65
Kyaani	22	46	68
Ngomeni	65	109	174
Mumbuni Girls	180	0	180
Mikuini Secondary	64	96	160
Muvuti Secondary	90	210	300
Kathekakai Secondary	18	47	65
Kyanguli Secondary	80	220	300
Mung'alaSecondary	29	50	79
Katelembo Secondary	20	46	66
Kusyomuomo	26	42	68
Katoloni Secondary	110	130	240
Kyambuko Secondary	31	34	65
MuindiMbingu	64	100	164
AIC Mbembani	58	62	120
Kamweleni Secondary	53	87	140
Upper Kitanga Secondary	43	62	105

AIC kiimaKimwe	21	41	62
Kyasila Secondary	22	43	65
Mua Girls Secondary	158	0	158
Kyemutheke Secondary	27	43	70
Kimutwa Secondary	32	46	78
Total	1460	3021	4481

Source: DEO's office Machakos (2013)

Table 3.2 Krejcie sample sizes for given population size

Population Size	Sample	Population Size	Sample
10	10	250	162
20	19	300	169
30	28	400	196
40	35	1500	306
50	44	2000	322
60	52	3000	341
70	59	4000	351
80	66	5000	307
90	73	10,000	370
100	80	20,000	377
150	108	50,000	381
200	132	10,000	384

Source: Krejcie (1970)

Table 3.3 Sample Population of form two and three students in schools in central division

School	Total population	Sample size	Total
Machakos School	500	$(500/4481) \times 354$	40
Mumbuni Boys	485	$(485/4481) \times 354$	38
Ngoleni Secondary	188	$(188/4481) \times 354$	15
Kwanthanze Secondary	190	$(190/4481) \times 354$	15
Machakos Baptist	180	$(180/4481) \times 354$	14
S.A Mutituni	146	$(146/4481) \times 354$	12
Kamuthanga	65	$(65/4481) \times 354$	5
Kyaani	68	$(68/4481) \times 354$	5
Ngomeni	174	$(174/4481) \times 354$	14
Mumbuni Girls	180	$(180/4461) \times 354$	14
Mikuini Secondary	160	$(160/4481) \times 354$	13
Muvuti Secondary	300	$(300/4461) \times 354$	24
Kathekakai Secondary	65	$(65/4481) \times 354$	5
Kyanguli Secondary	300	$(300/4481) \times 354$	24
Mung'ala Secondary	79	$(79/4481) \times 354$	5
Katelembo Secondary	66	$(66/4481) \times 354$	5
Kusyomuono Secondary	68	$(68/4481) \times 354$	5
Katoloni Secondary	240	$(240/4481) \times 354$	18
Kyambuko Secondary	65	$(65/4481) \times 354$	5
MuindiMbingu	164	$(164/4481) \times 354$	13
AIC Mbembani	120	$(120/4481) \times 354$	9
Kamweleni Secondary	140	$(140/4481) \times 354$	11
Upper Kitanga Secondary	105	$(105/4481) \times 354$	8
AIC Kiima Kimwe	62	$(62/4481) \times 354$	5
Kyasila Secondary	65	$(65/4481) \times 354$	5
Mua Girls Secondary	158	$(158/4481) \times 354$	13
Kyemutheke Secondary	70	$(70/4481) \times 354$	6
Kimutwa Secondary	78	$(78/4481) \times 354$	6
Total	4481		354

Table 3.4 Sample population per gender in form two and three students in public secondary schools in central division, Machakos district

School	Total population	Girls	Boys	Total sample	Girls sample	Total	Boys sample	Total
Machakos Boys	500	0	500	40	0		500/500x40	40
Mumbuni Boys	485	0	485	38	0		485/485x38	38
Ngelani Sec	188	0	188	15	0		188/188x15	15
Kwanthanze Sec	190	86	104	15	86/190x15	7	104/190x15	8
Machakos Baptist	180	78	102	14	78/180x14	6	102/180x14	8
S.A Mutitutni	146	62	84	12	62/146x12	5	84/146x12	7
Kamuthanga	65	21	44	5	21/65x5	2	44/65x5	3
Kyaani	68	22	46	5	22/68x5	2	46/68x5	3
Ngomeni	174	65	129	14	65/174x14	5	109/174x14	9
Mumbuni Girls	180	180	0	14	180/180x14	14	0	0
Mikuini Sec	160	64	96	13	64/160x13	5	96/160x13	8
Muvuti Sec	300	90	210	24	90/300x24	7	212/300x24	17
Kathekakai Sec	65	18	47	5	18/65x5	1	47/65x5	4
Kyanguli Sec	300	80	220	24	80/300x24	6	220/300x24	18
Mung'ala Sec	79	29	50	6	29/79x6	2	52/79x6	4

Katelembo Sec	66	20	46	5	20/66x5	2	46/60x5	3
Kusyomuomo	68	26	42	5	26/68x5	2	42/68x5	3
Katoloni Sec	240	110	130	19	110/240 x19	9	130/240x19	10
Kyambuko Sec	65	31	34	5	31/65x5	2	34/65x5	3
MuindiMbingu	164	64	100	13	64/164x 12	5	100/164x13	8
AIC Mbembani	120	58	62	9	58/120x 9	4	62/120x9	5
Kamweleni Sec	140	53	87	11	53/140x 11	4	87/140x11	7
Upper Kitanga	105	43	62	8	43/105x 8	3	62/105x8	5
AIC Kiimakimwe	62	21	41	5	21/62x5	2	41/62x5	3
Kyasila Sec	65	22	43	5	22/65x5	2	43/65x5	3
Mua Girls Sec	158	158	0	13	158/158 x13	13	0	0
Kyemutheke Sec	70	27	43	6	27/70x6	2	43/70x6	4
Kimutwa Sec	78	32	46	6	32/78x6	2	46/78x6	4
Totals	4481	1460	3041	354		114		240

Appendix V

Authorization Letter from Machakos District Education Office

Appendix VI

Authorization letter from National Council for Science and Technology