ACCESS TO IMPROVED SANITATION: IMPLICATION FOR SUSTAINABLE IMPLEMENTATION OF HYGIENE PRACTICES SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA

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Abstract

The purpose of the study was to investigate the extent to which access to improved sanitation influences the implementation of hygiene practices in public secondary schools in Machakos County with a view to come up with practical and affordable strategies for achievement of Millennium Development Goals(MDGs) on sanitation. The study was guided by the following research questions: To what extent does the (i) type,(ii) maintenance and(iii) adequacy of sanitation facilities influence sustainable implementation of hygiene practices in public secondary schools in Machakos County. Descriptive survey research design was adopted. A sample size of 28 schools, 354 students and 28 principals was selected by use of simple random sampling from a target population of 30 schools, 4481 students and 30 principals from Central Division. A questionnaire and an interview schedule were used to collect data. 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 study established that availability of sanitation facilities in public secondary schools was a significant factor in determining the extent of implementation of hygiene practices in such schools and indeed any other learning institution. Availability of sanitation facilities accounted for 60.1 percent of the change in the level of implementation of hygiene factors in secondary schools. The study recommends that the Ministry of Education and the

school management should ensure adequate number of sanitation facilities in every school. The sanitation facility should be appropriate for both normal students and students with special needs, and be located at site where privacy of the users is ensured. This will ensure effective implementation of hygiene practices by both students and other members in the school community.

Keywords: Hygiene practices, improved sanitation, secondary schools, sustainable implementation

1. Introduction

The Millennium Development Goal 7, Target 7c calls on countries to 'Halve' by 2015, the proportion of people without sustainable access to basic sanitation (Hutton, Guy and Haller, 2007). Provision of basic sanitation facilities in secondary schools is key to healthy physical learning environment. This involves provision of improved sanitation facilities that ensure hygienic separation of human excreta from human contact. Improved facilities include but not limited to: flush or pour-flush toilet or latrine to a piped sewer system, septic tank or a pit latrine. The toilets should be well ventilated and with slab on the floor. Composting toilets are also recommended. The provision of these facilities by itself is not enough if the user hygiene behavior is not considered as far as how the students use the facilities, user friendliness of the facilities, appropriateness of the facility and availability to all.

Hygiene is very important to healthy living and survival of humanity. 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.

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, overstretching 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).

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 student toilet ratio in many public secondary schools was a core concern with hundreds of students sharing a single toilet (WHO, 2009). 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 sanitation facilities was pathetic with broken doors, foul smell and alarming grubbiness. In some schools students used either pit latrines without slabs or open pit bucket, hanging toilets and others use bushes behind the toilets. 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. It is against this back drop that this study sought to establish the extent to which access to improved sanitation influences sustainable implementation of hygiene practices particularly in public secondary schools in Central Division of Machakos County in order to come up with workable solutions to the hygiene practices that attract diseases.

2. Purpose of the study

The purpose of the study was to establish the relationship between access to improved sanitation and sustainable implementation of hygiene practices in public secondary schools with a view to come up with strategies that can be used by stakeholders and policy makers to initiate practical and affordable methods that enhance the sanitation situation and hygiene practices in public secondary schools in Machakos County.

3. Research Questions

The study sought to answer the following research questions:

i)). To what extent does the type of sanitation facility influence sustainable implementation of hygiene practices in public secondary schools in Machakos County

ii). Is there any relationship between maintenance of sanitation facilities and sustainable implementation of hygiene practices in public secondary schools in Machakos County

iii). How does the number of sanitation facilities influence sustainable implementation of hygiene practices in public secondary schools in Machakos County

4. Literature Review

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 facilities 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 posse 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.

5. Conceptual Framework

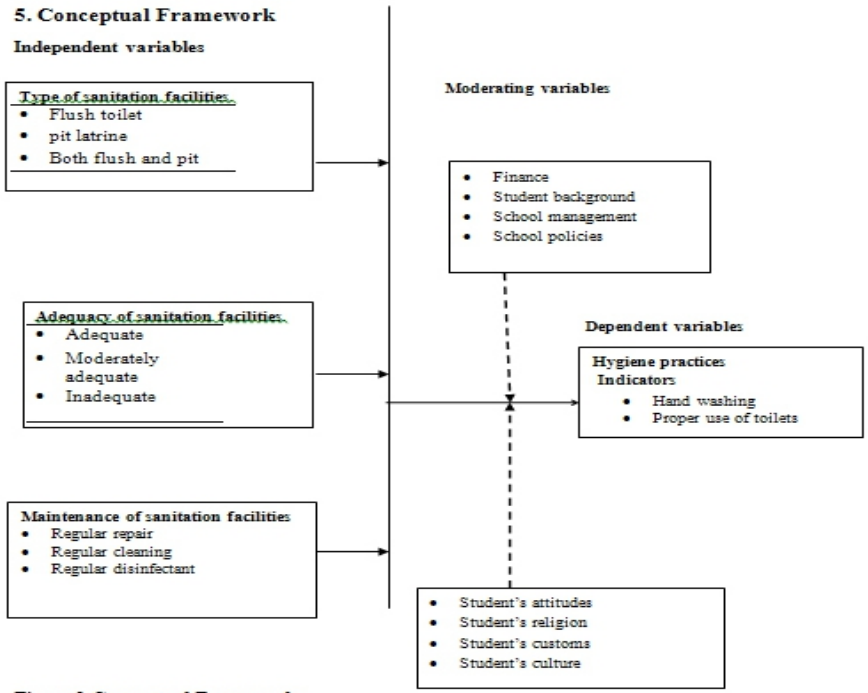

Figure 1 Conceptual Framework

6. Research Methodology

This study adopted the cross-sectional descriptive survey research design data was collected from a sample of 354 students and 28 randomly selected from a total of 4481 in 30 public secondary schools of which 2 boys' schools, 3 girls' schools and 25 mixed schools from Machakos Central District of Machakos County, Kenya. The study involved form 2 and form 3 students.

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.

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. Split-half method was used to determine the reliability of the instrument.

Data was analyzed using descriptive statistics for quantitative data, by use. 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.

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 toilets can predict implementation of hygiene practices when practices are measured by proper use of toilets at a significant level of 0.05.

7. Findings of the Study

The condition of learners' sanitation facilities reflect the image of a school and 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 and maintenance of sanitation facilities on implementation of hygiene practices in secondary schools in Machakos County.

To what extent does the type of sanitation facility influence sustainable implementation of hygiene practices in public secondary schools in Machakos County?

Respondents were asked to indicate the type of sanitation facilities used by students. The findings from the students and principals are summarized in Tables 1 and 2 respectively

Table 1. Type of sanitation facilities 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 1, 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 2 Type of sanitation facilities used by Students as revealed by Principals

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

The results of the findings presented in Table 2 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.

Is there any relationship between adequancy of sanitation facilities and sustainable implementation of hygiene practices in public secondary schools in Machakos County?

The researcher further requested the respondents to indicate the adequacy of sanitation facilities used by students in the schools under study. 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 sanitation facilities which were being used by students. Table 3 gives a summary of the study findings.

Table 3 Adequacy of sanitation facilities 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, 229 (66.4%) of the students involved in the study indicated that sanitation facilities 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 sanitation facilities for use by their students.

How does the maintenance of sanitation facilities influence sustainable implementation of hygiene practices in public secondary schools in Machakos County?

Table 4. Frequency of Repairing of Student Sanitation Facilities 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 Sanitation facilities 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.

The extent to which Sanitation Facilities 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 5 contains a summary of the data obtained from students while Table 5 has findings collected from the principals.

Table 5. Extent to which Sanitation Facilities 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 5, 177 (51.3%) of the sampled students revealed regular cleaning and disinfection of Sanitation Facilities with 108 (31.3%) indicating that toilets in the schools under study were not regularly cleaned and disinfected.

Table 6. Extent of Regular Cleaning and Disinfection of Sanitation Facilities

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

The responses in Table 6 show that the principals had similar observations to those of the students regarding cleanliness and disinfection of Sanitation Facilities with 60.7% of them revealing that student Sanitation Facilities 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 Sanitation Facilities 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 following study hypothesis was tested by use of ANOVA.

Hypothesis $H_0$3: There is no Significant Relationship between Availability of Sanitation Facilities 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 Sanitation Facilities 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 Sanitation Facilities and implementation of hygiene practices in public secondary schools in Central Division of Machakos District. The results of ANOVA are summarized in Tables7.

Table 7. Influence of Sanitation Facilities 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 7 indicate that, availability of Sanitation Facilities 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 Sanitation Facilities would 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 Sanitation Facilities 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 Sanitation Facilities. The findings of the regression are summarized in Tables 8 and 9 respectively.

Table 8. Regression Model for Availability of Sanitation Facilities 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
maintenance		.130	.419	.111	.310	.022
Type		.187	.193	.066	.967	.019
adequacy		.286	.111	.188	2.572	.013

The results indicated in Table 7 reveal that implementation of hygiene practices is positively influenced by type, adequacy and maintenance of Sanitation Facilities, when hygiene practices are measured on the basis of hand washing. On the basis of the results obtained, the following regression equation is developed:

$$\mathbf{R_{s4} = 1.151+0.111_{x1}+0.066_{x2}+0.188_{x3}}$$

Where,

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

$\mathbf{x_1}$ = Composite index for maintenance of Sanitation Facilities

$\mathbf{x_2}$ = Composite index for type of Sanitation Facilities

$\mathbf{x_3}$ = Composite index for adequacy of Sanitation Facilities

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 $\mathbf{r^2}$ value of **0.197,** meaning that **19.7%** of a schools change in implementation of hygiene practices could be contributed by availability of Sanitation Facilities. The model also indicates that, the most important indicator in determining proper hand washing as a hygiene practice is the adequacy of Sanitation Facilities whose beta value is **0.188.** Since water and soap are located next to these Sanitation Facilities, then it could be argued here that, more students will most likely use the Sanitation Facilities and consequently use the hand washing facilities located to wash hands after visiting the Sanitation Facilities. Adequacy of Sanitation Facilities is then followed by maintenance with a beta value of **0.111** and type of toilets whose beta value is **0.066** respectively.

Table 9. Regression Model for Availability of Sanitation Facilities 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
maintenance		.130	.419	.111	.310	.022
Type		.187	.193	.066	.967	.019
Adequacy		.286	.111	.180	2.572	.013

From the results indicated in Table 9, it is revealed that maintenance, type and adequacy of Sanitation Facilities in public secondary schools have a positive effect on implementation of hygiene practices. On the basis of the results indicated in 9, the following regression equation is derived:

$$\mathbf{Rt3 = 1.151+0.111_{x1}+0.066_{x2}+0.180_{x3}}$$

Where,

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

$\mathbf{x_1}$ = Composite index for maintenance of Sanitation Facilities

$\mathbf{x_2}$ = Composite index for type of Sanitation Facilities

$\mathbf{x_3}$ = Composite index for adequacy of Sanitation Facilities

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 Sanitation Facilities. The model has an $^{\mathbf{r2}}$ 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 adequacy of Sanitation Facilities (with a beta value of **0.180**) compared with maintenance and type which have beta values of **0.11** and **0.66** respectively. From the model, it can be assumed that since the Sanitation Facilities 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.

8. Discussion

The researcher found out that type, adequacy and maintenance of sanitation facilities make significant contribution to hand washing and proper use of sanitation facilities by students although adequacy of sanitation facilities 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 sanitation facilities 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 sanitation facilities. A similar study which was conducted by Siwolo (2004),

Asyago (2005) and Mugo (2006) in Machakos and Embu found out that most of the sanitation facilities were not adequate.

9. Conclusion and recommendation

After studying the research findings, it emerged evident that toilets have a positive significant influence on implementation of hygiene practices. However, adequacy of toilets is the most important indicator followed by type and maintenance. School management should try and improve on maintenance, type and adequacy of sanitation facilities in their schools but give more emphasis to the adequacy of the sanitation facilities. This will ensure that all the students access the sanitation facilities without struggle. Further, water should also be located in these facilities, so that the students are in position to wash their hands after visiting the sanitation facilities.

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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