



**EFFECT OF WATER AVAILABILITY ON SUCCESSFUL HYGIENE PRACTICES IN
SELECTED PRIMARY SCHOOLS IN KENYA**

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Abstract

Water availability remains a challenge in many parts of the world. Globally, there exists a recommendable progress in water conditions. This research was conducted to analyze the effect of water availability on successful hygiene practices in primary schools in Kirinyaga East Sub County. The study was based on descriptive design. 89 schools were targeted. 89 head teachers, 1780 teachers and 10680 class seven and eight pupils were targeted. Head teachers and teachers/pupils were sampled through purposive and simple random sampling consecutively. A total of 100 respondents were sampled. Pupils and teachers were issued with questionnaires while Interview guide was used on head teachers. Observation check list was also used. SPSS helped analyze quantitative data. descriptive methods (tables and graphs) were used to present findings. The qualitative data is bound to analysis through content analysis where the data was grouped into themes. The study revealed that most of the primary schools had only one single water source. This study concludes that there is lack reliable clean source of drinking water in primary schools. This study recommends that the national government in collaboration with county government institute measures that ensure continuous availability of clean drinking water in all primary schools in Kirinyaga County.

Key words: *Water Availability; Accessible Sources; Water Points; Hygiene Practices*

Introduction

Water availability remains a challenge in many parts of the world. Globally, there exists a commendable progress in water conditions (Pichardo, 2016). However, many people (more than 663 million) were still drinking unsafe water in 2015. The most affected group is the pupils who have had issues with water availability in their schools and communities. Pichardo (2016) notes that currently over 600 million people in the world do not get to acquire clean water with more than 2 billion having inadequate water resources globally. The poor water condition has put people especially pupils at the risk of water related diseases and sanitation infections. According to WHO (2014), majority of the third world countries in Africa are prone to water related diseases since the challenges of adequate water remains in question. Availability of adequate water at schools is a motivation to both the pupils and the society and this impact positively on their attitudes towards hygiene.

Some movements to do with hygiene have been pushed in Kenya. However, water programs have failed despite the allocation of a lot of resources toward such programs. Failure of the national health policy by the ministry of education and health has also not been effectively implemented and adopted leading to failed hygiene in primary schools. Additionally, no efforts or concern on matters to do with water availability and hygiene in schools has been seen and this creates opportunities for research on the same so as to promote positive hygiene behaviours in these schools. Considering that, the researcher takes up the challenge and focuses to establish the effect of water availability on successful hygiene practices in selected primary schools in Kenya.

The study will be based on the Biome Depletion Theory. Biome depletion theory or hygiene hypothesis dates from 1989 when Strachan proposed that the rapid rise of allergic diseases in the 20th century (for example asthma) was as a result of the lower incidence of infection in early stages of childhood. This theory indicates that absence of early childhood subjection to communicable agents, such as probiotics and parasites raises vulnerability to allergic diseases by squashing the biological development of the immune system. That means, the lack of exposure or subjection to such diseases is thought to weak immune system to tolerate such diseases at later stages in life.

Strachan (2000) dwelled on the idea that there was lack of enough microbial exposure in small families due to reduced body contact and hence less or no infections. As well small families are

associated with higher standards of personal cleanliness and availability of sufficient household amenities and therefore remain at a lower risk to microbial exposure. Even though such health measures such as sanitation, potable water and garbage collection were key to cholera, typhoid prevention, they separated people from interactions with their very friends who lived with them

Biome depletion theory relates to the study in that the availability of water for pupils and teachers seeks to reduce cases of disease due to germs that exist within the schools. The schools need to ensure that water is available in order to prevent children from infectious agents that may cause diseases and hence suppress the immunity system of the children.

Water Availability

Water is a crucial factor in the health of pupils which determines their ability to learn. Important for pupils' health and ability to learn (Mathew, 2010). Primary schools should ensure that the health and development of the pupils is promoted by giving them water other than other beverages like soda. They should link with the government to provide water in schools. Strategies put in place relating to water should aim at providing water in primary schools and mostly those in dry areas.

The school management should be mobilized and motivated in order to ensure the availability of water in primary schools. The management can be trained on water and hygiene which would be transferred to the pupils and teachers hence leading to improved hygiene. Water availability leads to improved hygiene practices in schools and community at large. In addition, water availability and access in primary schools leads to improvement in the sanitation, hygiene and water conditions of the learning environment. Inadequate access of water may waste learning time or even lead to missing school as pupils' search for water not coming to schools (Mathew, 2010).

Despite the change in school leadership, there is need for water programs in primary schools to be sustainable (Pandey, 2013). This can be done through a policy cutting across all schools in order to implement the school health program. The policies should create an environment where water is available for the pupils for improved hygiene of the pupils and the school at large. Learning institutions should provide adequate water that is safe for drinking to the pupils and other people working within the schools. This water should be available day and night in

installed in accessible areas in order to ensure hygiene and proper sanitation among the pupils and staff (Pandey, 2013).

The size of the school should concur with the water points in the school (Richard, 2011). The water points should be determined by the water needs of the school-the number of the pupils and staff, and the water availability and accessibility in the area. The water points should have drinking vessels and other delivery options for the staff and pupils. The water should be available all time to ensure that whoever needs water gets it, be it the pupils or the staff like teachers.

When pupils consume water unlike sugary beverages, they are less likely to be associated with diabetes, dental cavities amongst other diseases that are associated with sugars. You can recognize a child who attends to meals at school. Therefore, schools play a major role in sanitizing schools by holding school districts accountable for adhering to laws that require water availability in schools. The following can be taken to improve water access and consumption among pupils: Have a team of key stakeholders to monitor water availability and that the water is consumed. Ensure that the water meets basic standards for human consumption. Choose a favourable water delivery mechanism for pupils. Encourage pupils to drink the water and can even involve promotion activities like for example water-related language in your school's wellness structured strategies (Richard, 2011).

Availability of water has been a factor of concern in enhancing hygiene in learning institutions. In this regard the availability of water should be enhanced in order to ensure that the pupils were their hands after latrines and other situations like playing. Before taking food, the pupils should be provided with water in order to ensure that they maintain the hygiene. The availability of water will be based on the number of water points, accessible sources of water and the number of days water is available.

Empirical studies have been done relating to water and hygiene in schools. Jordanova, Cronk, Obando, Medina, Kinoshita and Bartram (2015) did a cross-sectional survey on water, sanitation, and hygiene in schools in low socio-economic regions in Nicaragua. The survey gathered information on: school characteristics; teacher and community participation; water and sanitation infrastructure; and hygiene education and habits. Survey results were analyzed for associations between variables. WaSH coverage was significantly higher in urban than rural areas.

Presence of drinking water infrastructure (43%) was lower than sanitation infrastructure (64%). Eighty-one percent of schools had no hand washing stations and 74% of schools lacked soap. Sanitation facilities were not in use at 28% of schools with sanitation infrastructure and 26% of schools with water infrastructure had non-functional systems. Only 8% of schools had budgets to purchase toilet-cleaning supplies and 75% obtained supplies from students' families.

McMichael (2019) did a review of evidence of impact water, sanitation and hygiene (WASH) in schools in low-income countries. Thirty-eight peer reviewed papers were identified that met the inclusion criteria. The typically unmeasured and unreported 'output' and/or 'exposure' of program fidelity and adherence was also examined. Several studies provide evidence of positive disease-related outcomes among students, yet other assessments did not find statistically significant differences in health or indicated that outcomes are dependent on the nature and context of interventions. Thirteen studies provide evidence of changes in WASH knowledge, attitudes and behaviours, such as hand-washing with soap due to water availability within the schools. Egbinola and Amanambu (2015) studied water supply, sanitation and hygiene education in secondary schools in Ibadan, Nigeria.

Dube and January (2012) studied the factors leading to poor water sanitation hygiene among primary school going children in Chitungwiza. A random sample of 400 primary school children (196 males, 204 females) in four schools in Chitungwiza town, Zimbabwe was interviewed. Behavioural factors were assessed through cross examination of the PROCEED PRECEDE Model. The respondents had been stratified through the random sampling where strata were classes. A structured observation checklist was also administered to assess hygiene enabling facilities for each school. The study found that water availability was a major factor contributing to poor water sanitation hygiene among primary school going children.

Alexander, Dreibelbis, Freeman, Ojeny and Rheingans (2013) did a cluster-randomized trial in western Kenya on improving service delivery of water, sanitation, and hygiene in primary schools. The study employed a cluster-randomized trial to examine if schools could improve WASH conditions within existing administrative structures. Seventy schools were divided into a control group and three intervention groups. All intervention schools received a budget for purchasing WASH-related items. One group received no further intervention.

A second group received additional funding for hiring a WASH attendant and making repairs to WASH infrastructure, and a third group was given guides for student and community monitoring of conditions. Intervention schools made significant improvements in provision of soap and handwashing water, treated drinking water, and clean latrines compared with controls. Teachers reported benefits of monitoring, repairs, and a WASH attendant, but quantitative data of WASH conditions did not determine whether expanded interventions out-performed our budget-only intervention.

Conceptual Framework

The study variables are conceptualized into independent and dependent variables. The independent variable is water availability as measured by number of water points, accessible sources of the water and the number of days water is available in the schools. The dependent variable is hygiene in primary schools as measured by the behaviour of washing hands.

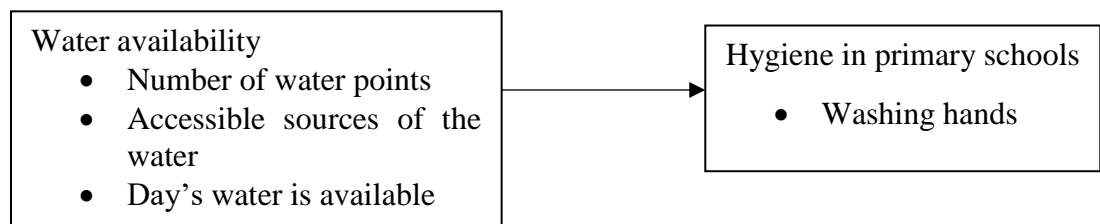


Figure 1: Conceptual Framework

Methodology

Mixed methodology was used. This involved qualitative and quantitative data which enriched the study. This study collected quantitative and qualitative data that was also analyzed to produce both quantitative and qualitative results. Descriptive research was used. This is done by conducting interviews or issuing questionnaires to a particular population to address the questions at hand (Orodho, 2003). This design is relevant in that the study is using a questionnaire as the main instrument. The researcher sought to determine effect of water availability on hygiene of primary schools. The research was conducted in Kirinyaga sub-county which has four Sub-Counties. The study targeted public primary schools in Kirinyaga East sub-county. According to Kirinyaga County (2016), 89 primary schools exist in Kirinyaga East (10 day & boarding schools, 3 boarding and 76-day schools). The schools have a total of 12549 respondents (89 heads of schools, 1780 teachers and 10680 class seven and eight pupils) who

formed the target population. The justifying factor for the selection of pupils in the second cycle, that is, standard 7&8 is due to their maturity and seniority in primary schools. Pupils below class six and lower-class unit's schools, People who are not parents or guardians from the schools were not included; this is to ensure quality and reliability of data collected.

The hygiene of 89 schools was observed. The study sampled 100 respondents (82 pupils, 3 head teachers and 15 teachers). Purposive sampling was used to make a choice of head teachers which enabled the researcher to use their expertise and knowledge to select the respondents based on their knowledge on hygiene. Simple random sampling gave respondents an equal chance of being chosen and hence was suitable for selecting sample sizes for both the pupils and teachers.

Structured questionnaire, interview guide and observational checklist were used as data collection instruments. A structured questionnaire contains closed ended questions where the respondent is expected to tick one of the options given. Questionnaires were used on the pupils. Research assistants were used in data collection and trained by researcher for two days. The questionnaire was pre-tested on five pupils to enhance reliability. Some amendments were made after the pretest to enhance validity of the questionnaire. The questionnaires have both open and closed ended questions. An interview guide was used for the head teachers. The interview guide contained open questions relating to the variables of the study. Interview is qualitative for in depth interviews with know-how on what school health policy entails and its guidelines. The guide enabled researcher to collect vital information at the management levels using head teachers and members of Parents Teachers Associations (PTA). The interviews were done in areas convenient for the respondents.

Observation method was used to spot check on the structured elements of questionnaire around the schools' compound. Observation to check was done on key steps in hand washing especially during the main break time to check on knowledge and skills, general cleanliness of pupils and the school compound. Other key areas were done by use of a check list to counter check on water points.

So as to ascertain validity, the instruments were reviewed by the supervisors and any changes were recommended. The necessary adjustments and revision were done to the research instrument to ensure validity. A pilot test was carried out by disseminating the questionnaires to 20 respondents in Kirinyaga West sub-county to make sure that the research instruments are

suitable and the features examined are comprehensible. Pearson Product Moment Correlation was used to measure correlation coefficients of the study variables. Cronbach alpha value was calculated using SPSS to establish the reliability of the questionnaires. After gathering data, it was checked adequately for accuracy and its dependability levels. Quantitative and qualitative methods were used to examine this data. SPSS version 20 helped in the analysis of quantitative data from questionnaires and observation check lists through frequencies, percentages, standard deviation and mean. Simple linear regression analysis was done to establish the relationship between the variables.

Results and Discussions

The finding of this study revealed that water availability affected hygiene levels. Results gathered showed that most of the schools in Kirinyaga County sourced its water from rivers/streams/dams. Other sources were piped water, pupils bring from home, borehole or water vendors, and rainfall. Results on methods used to treat water in the institutions showed that, most of the primary schools in Kirinyaga County used various means of water treatment among which include use of water guard, boiling, and filtering. Results further revealed that most of school in Kirinyaga county had only one water point. The water points in the school were accessible, water available in the school was safe for drinking and that the water for the school was got from outside the school. However, the study revealed that most of the primary schools in Kirinyaga county only one single water source, the water in the school was not always available throughout the week and that most of the schools lacked water programs. These findings concur with Mathew (2010) noted that water access is important for pupils' health and ability to learn.

Simple linear regression was done to establish the effect of water availability on hygiene practices in selected primary schools in Kenya. The findings are as shown by tables 1, 2 and 3.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.452 ^a	.204	.194	1.9867193

a. Predictors: (Constant), long term debt

Table 2: Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	84.065	1	84.065	2.346	.022 ^a
	Residual	2795.583	78	35.841		
	Total	2839.648	79			

a. Predictors: (Constant), long term debt

b. Dependent Variable: Quick ratio

Table 3: Regression Coefficients

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.075	1.003		9.046	.000
	Water Availability	.492	.183	.425	2.687	.009

a. Dependent Variable: hygiene practices

From the regression analysis, table 1 shows that the predictor variable (water availability) explains 45.2% of the variation in hygiene practices as shown by R of 0.452. Therefore, this implies that other factors not investigated under this study contribute up to 54.8% of hygiene practices in primary schools in Kirinyaga. Table 2 show the significance value of the model (0.022) was less than 0.05 critical value at 95% significance level. Thus, the model was statistically significant in predicting the relationship between dependent variables (hygiene practices in primary schools) and independent variable (water availability). The F value as indicated in the table is 2.346 indicating a significant model for the relationship as given by regression coefficients which shows that the model was statistically significant in explaining the dynamics of hygiene in primary schools. Table 3 shows that the effect of water availability on the hygiene practices in primary schools is significant as shown by p value of 0.000 which is less than 0.05. The regression constant of -9.075 shows that when the predictor variable is held constant, the hygiene practices in primary schools would be at -9.075. Water availability displayed a regression coefficient of 0.5249 and p value of 0.009. Thus, the study inferred that water availability has a positive and significant effect on hygiene practices in primary schools.

Conclusions

From the findings, the study concludes that:

- i. Most public primary schools in Kirinyaga east lack reliable clean source of drinking water;
- ii. Public primary schools in Kirinyaga east mainly rely on rivers/streams/dams for water source;
- iii. Very few public primary schools in Kirinyaga east have piped water or borehole;
- iv. Primary schools in Kirinyaga County seldom use water treatment;
- v. Majority of the public primary schools in Kirinyaga east have only one single water source;
- vi. Public primary schools in Kirinyaga east do not have running water available daily for pupils

Recommendations

Given that most schools lacked clean, reliable sources of water, this study recommends that the national government in collaboration with county government need to institute measures that will ensure continuous availability of clean drinking water in all primary schools in Kirinyaga County. This should entail measures such as drilling of boreholes or linking primary schools with piped water. A similar research should be investigated on other factors influencing hygiene in primary schools other than water availability. A similar study is recommended on private primary schools for comparison of results.

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