Original Research Article

Examining the Effectiveness of the WASH Programme on Public Health in Public Schools in Kisumu East Sub-County, Kenya

ABSTRACT

As a result of poor hygiene in schools, public health and the status of public schools are adversely affected. There have been limited programs addressing sanitation issues in Kisumu East schools. This study therefore aimed at evaluating the effectiveness of the WASH program and teachers' contributions to improving the quality of latrines in Kisumu East and investigating the environmental factors that have had an impact on the quality of latrines. A total of 20 schools participated in the study interviews, of which 16 schools were involved in the WASH program, and 4 were not involved in the WASH program, with a target population of 384 students and 40 teachers. A descriptive research design was used to guide the investigation. The data was processed and analyzed using the Statistical Package for Social Sciences Version 25.0 software package, and data was presented in the form of means and variance. Tables were also used to display the data. Students and teachers in non-WASH schools agreed that the latrines were filthy. For instance, 62.5 percent of teachers and 62.3 percent of students from schools implementing the WASH program reported that latrines were dirty. Still, only 37.7 percent of teachers and 37.5 percent of students reported that they were very dirty. The study found an association between teachers' contributions and cleanliness, with a correlation coefficient (r) of -3.18 and a significance level of (p0.05). There was also a correlation between the implementation of WASH and the number of cases of diarrheal disease among students, with a significance value of 0.001*. It was concluded that the WASH program had a significant impact on the state of public health in public schools. Therefore, the study recommended that more effort be put into addressing the challenges facing toilet cleanliness and hygiene practices.

Key Words: Hygiene, Water Access, Effectiveness, Public Health, and Program

1.0 INTRODUCTION

At the Sanitation and Water for All high-level meeting on April 19th, 2012, UNICEF executive director Tony Lake laid out the UNICEF's WASH (Water, Sanitation, and Hygiene) initiative as a fundamental human necessity and right (Gizaw & Addisu, 2020). About 1.1 billion people worldwide continue to defecate in the open because they don't have basic sanitation facilities. Additionally, one in ten people on the planet does not have access to better drinking water sources (Laitala & Klepp, 2016). To achieve a sustainable world, we need clean drinking water, basic sanitation, and good personal hygiene for everyone (Christian & Bartram, 2012). Access to these supplies can help cut down on child deaths (Du Monde, 2011).

As stated by Borja-Vega (2020), the goal of the WASH program was to halve the number of people without sustainable access to safe drinking water and basic sanitation by 2020. They wanted to make sure that every school in the country had simple, straightforward facilities for providing clean water

and sanitation and promoting good hygiene among students. WASH's primary goals were children's survival and growth (Daniel, Djohan & Nastiti, 2021).

A thriving environment for entrepreneurial innovation should have policies that are well-suited to their situation, diverse capabilities across organizational levels, decentralized management, and private sector involvement (Daniel, Djohan & Nastiti, 2021). Hand-washing, water safety, and environmental sanitation practices are part of the "behavioral change" that needs to be implemented to enhance hygiene (Rahman et al., 2018). Water and sanitation services in homes, communities, and schools should offer more options and allow for greater safe, reliable, and clean sanitary facilities (Daniel, Djohan & Nastiti, 2021).

There are numerous public health risks and hazards that school-aged children face worldwide. Situations in countries with a history of recurrent and prolonged humanitarian crises are particularly dire for developing countries (Chard *et al.*, 2019). According to S.D.G. 4, Quality Education, the newly adopted Sustainable Development Goals have reinvigorated a global commitment to supporting high-quality education (Popkin, Adair & Ng, 2012).

In schools, WASH efforts include providing clean drinking water, lavatories, and other areas for sanitation. School sanitation and hygiene programs, which aim to change students' habits, are part of this effort, as are community resources from health care facilities and schools (Gizaw, & Addisu, 2020). Children's educational environment is enhanced by both components, which encourage academic achievement and school attendance, respectively (LaVergne *et al.*, 2012). For example, adolescent girls' retention rates can be improved by providing access to private restrooms. It is terrible for the environment, but it also encourages students to spread diseases like diarrhea, bacterial infections, and parasites in their intestines (Jamieson, & Saunders, 2020).

Studies by Campbell *et al.* (2014) show that extensive, affordable, good-quality, safe drinking water, sanitation, and hygiene are essential to human well-being. Safe WASH helps promote health and contributes to overall well-being, academic success, school attendance, and the general health of a community. Drinking untreated water or ground-water pollution impacts health via diseases such as diarrhea, cholera, and other water-borne diseases. The level of contaminants in water, whether naturally occurring, such as arsenic and fluoride, or caused by human activity, such as nitrate, remains an ongoing threat to public health. Preventing multiple Neglected Tropical Diseases (N.T.D.s) such as schistosomiasis depends on clean water. An estimated 50% reduction in diarrhea deaths due to suboptimal WASH occurred between 1990 and 2015 due to notable progress in water and sanitation provision (Freeman *et al.*, 2013). Research shows that enhancements in WASH services, such as controlled piped water and sewage system connections in developed economies, can immensely benefit

Huda et al. (2012) argue that it is critical to increase the use of promising WASH programs in schools because of the urgent need for better sanitation in schools. But the transition from a small-scale public health intervention to a large-scale public health intervention can be difficult due to a lack of preparation and resources, aside from the fact that funding priorities and grant cycles support short-term testing. As a result, many promising pilot projects are abandoned before they can fully develop. However, the inefficient use of resources may occur through isolated, small-scale projects. This is unfortunate from a public health perspective (Bailie, Stevens, & McDonald, 2012).

School water, sanitation, and hygiene are essential for students to realize their human rights and contribute to the world's long-term well-being (S.D.G.s). Children's education and development need to have access to better water, sanitation, and proper sanitation in the community (Ananga *et*

al.,2017). Since students and faculty spend five or six days a week in school, WASH is a critical learning environment component. The health and well-being of children can be significantly affected by the physical environment and school cleanliness, as schools are frequently the source of illness (Chard *et al.*, 2019).

In developing countries, particularly in Kenya, poor hygienic practices and inadequate health conditions contribute significantly to increasing the burden of infectious diseases. Children who have proper access to water, sanitation, and hygiene at school become excellent ambassadors and change agents in their families and communities because they learn to incorporate these lessons into their daily lives. That's why good hygiene and sanitation practices should be emphasized among students so that they can share this information with family members and neighbors (Bartram et al., 2009).

Students' knowledge and practice of water, sanitation, and hygiene are still lacking (Wash, & Rader, 2015). According to student test scores, urban students have a higher level of WASH knowledge than rural students (Kumar *et al.,* 2011). Some of the most dynamic hygiene practices and skills are learned by school-aged children, and many parents may not be able to replicate these behaviors at home (Wash, & Rader, 2015). Hygiene education and environmental health settings must be balanced to achieve effective health preferment, and both are necessary for this (Wash & Rader, 2015).

Health officials were elected and appointed by most schools at a parent meeting in most schools when an initiative for implementing WASH was launched (Arriola et al., 2020). Students can choose parents who support the program at all schools, which involves a health representative visiting the school weekly to monitor WASH facilities and activities. Following this research, the health official was directly responsible for assisting the school in procuring supplies like soap, brooms, and cleaning solutions. Little participation or understanding of the budgeting process by health representatives is apparent, even though they send WASH information to the School Management Committee and parent body in support of WASH's priority budgeting needs. Teachers in intervention schools almost universally supported health representative programs (LaVergne et al., 2012).

According to participants of the 2014 WASH School Teacher Education Workshop in Nyanza, WASH education in schools is characterized by the number of times students and teachers spend together. Diarrhea-related illnesses are less common, so teachers and students devote more time to teaching and learning pedagogical processes (Laitala, & Klepp, 2016). With the help of WASH, school attendance has seen a marked improvement. A lack of basic facilities, such as water and sanitation, electricity, suitable housing, and healthcare, can make teachers reluctant to work in rural areas. In schools with better WASH facilities, the number of students registering has increased, creating a safe and enabling learning environment for children (Rahman *et al.*, 2018). If students and their families can experience the health benefits of handwashing, sanitation, managerial hygiene and water supply in their day-to-day school and at home, the above reasons for supporting WASH in Schools are even more substantial (Chard et al., 2019).

Environmental factors that may impact health are evaluated and monitored as part of this process. Environmental health is the best approach to solving water supply and waste disposal (Ahmad *et al.*, 2011). Pathogens and other agents that can harm emergency population settlements must be controlled through an integrated and effective environmental health management system. Every service protecting the population from ecological diseases must be managed in an integrated manner, with the most critical but not omitting the rest (Jamieson, & Saunders, 2020). Ensuring that

drinking water is available; shelter is available; adequate water treatment and disposal; protection against vectors, pests, and pollutants; delivery of clean food stocks; noise and physical hazards protection must all be coordinated in an integrated way that optimizes health. Disease transmission and human well-being can be linked to many environmental factors. As an umbrella term, it includes a wide range of activities intended to promote human well-being by creating a conducive environment and indicators that interrupt the disease cycle (Nguyen et al., 2009).

An essential aspect of personal hygiene is the proper management and disposal of animal excrement, human waste, and wastewater and the prevention of pollution, sewage treatment, and disposal of hazardous materials. Ethical behavior and access to the right amenities are essential to creating a clean atmosphere. An estimated 32 percent of people living in rural areas participated in the Joint Monitoring Programme, and 72 percent of them used simple pit latrines with varying levels of safety and privacy (Kumar, Kar & Jain, 2011). Open defecation continues to be a problem in Kenya, despite the government's efforts in 2013 to combat it (Campaign Roadmap Open Defecation Free). The national open defecation rate is 14 percent, but there are huge differences between counties. In some counties, such as Wajir, Turkana, and Samburu, open defecation is still common (Gizaw, & Addisu, 2020). However, parents in areas with lower rates of open defecation are less likely to restrict access to children's feces because they know that children can accidentally fall into latrines and that their waste is safe. Open defecation is more common because some adults decompose during the rainy season and at night (Mara et al., 2010).

Based on the above literature, this paper is based on these three objectives;

1. To examine the effectiveness of the WASH Programme on public health in public schools in Kisumu East Sub-County;
2. To evaluate the contribution of teachers in enhancing the WASH program and quality of latrines in relation to community health in Kisumu East Sub-County;
3. To investigate the environmental factors affecting the quality of latrines in public schools in Kisumu East Sub-County.

2.0 METHODOLOGY

2.1 Scope

This study was carried out in Kisumu East Sub-County. The Sub-County is located in the larger Kisumu County, formerly known as Nyanza province in Kenya. Water catchment in the region is mainly from the Cherangany Hills. It has five educational zones, namely Nyando, Sondu, Gucha-Migori, Northern and Southern Shoreline Streams, and Sirare; a transboundary resource shared between Kenya and Tanzania. The study area is located on the global map at 0°04'08.6"S 34°44'27.4"E, as shown in Figure 1 below.

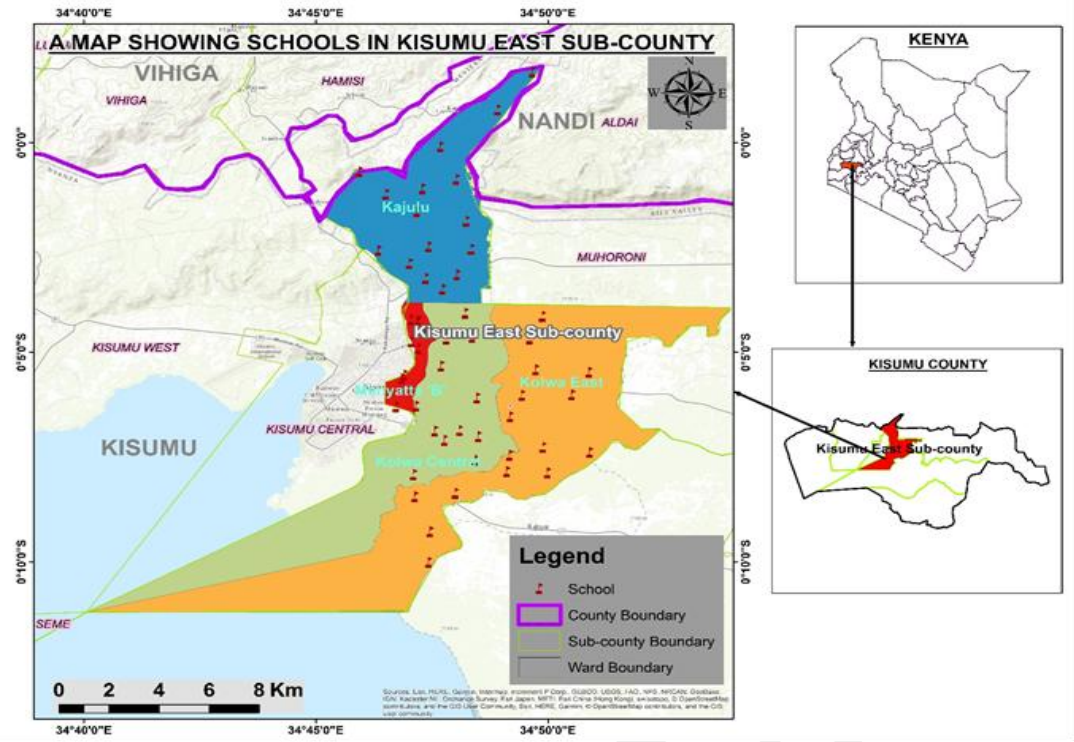

Figure 1: Map of Kisumu East Sub-County

2.2 Demographic information of the Respondents

A total of 384 students and 40 teachers participated in the field study conducted in 20 different schools. From the teachers and students, both male and female participants were surveyed. Table 1 summarizes and presents the demographic characteristics of respondents.

Table 1: Demographic information

Category	Sample Size	Percentage
Primary School	287	74.7%
Secondary School	97	25.3%
Teachers	40	100%

2.3 Sampling and Exclusion Criteria

The respondents were randomly sampled from the different classes in primary and secondary schools, while the teachers were purposively sampled. A total of 20 schools were randomly sampled to represent the total of 99 schools in the region. Students in primary schools were sampled from the upper classes. Those who mostly knew about health and sanitation from the health clubs in the schools and the secondary schools were sampled randomly without any consideration.

2.4 Data Collection and Analysis

Data was collected using closed-ended questionnaires that contained the required measure parameters for both students and teachers. A checklist was also used to measure all the research variables before the data was key in excel and analyzed using SPSS version 25. Data were analyzed descriptively with identifiable frequencies and percentages and presented through tables and figures.

A statistical test assessing the impact of water access, sanitation, and hygiene was done by Chi-Square at a significance of ($P \leq 0.05$).

3.0 RESULTS AND DISCUSSION

3.1 Participation in the WASH program and its Effectiveness on Public Health

The study's findings established that out of the 20 sampled schools, 16 (80.0%) are participating in the WASH program. According to the result in Table 2, the partners they were working with were SANA (43.8%) and LWSC (18.7%), while 37.5% worked with both.

Table 2: Partners the Schools Were Working within the WASH Program

Partner	n	%
SANA	7	43.8
LWSC	3	18.7
Both	6	37.5
Total	**16**	**100.0**

The effectiveness of the water, sanitation, and health program was determined by first comparing latrine quality and availability of water and soap for handwashing between WASH and non-WASH schools. Further, a comparison was made on the reported rate of the frequency of diarrheal diseases by the teachers between WASH and Non-Wash schools. The latrine cleanliness level was determined in two ways, first, from the responses of the study participants and secondly, through observation of the conditions of the latrines at the time of visit by the researcher. The classification was done by how the latrines looked, either dirty or very dirty. Most of the latrines from the Wash and Non-Wash programs were generally dirty, but the scale was relative. According to the results presented in Tables 2 a and b, all the teachers and students from non-WASH schools indicated that the latrines were very dirty. While up to 62.5% of the teachers and 62.3% of the students from schools implementing the WASH program indicated that the latrines were dirty, only 37.5% of the teachers and 37.7% of the students indicated that they were very dirty. The researcher confirmed these findings through observation.

Table 2a: Wash and Non-Wash Latrine Cleanliness Level by Teachers

Latrine level of cleanliness	Implementation of WASH					
	WASH		NON-WASH		Total	
	n	%	N	%	n	%
Dirty	20	62.5	0	0.0	20	50.0
Very dirty	12	37.5	8	100.0	20	50.0
Total	**32**	**100.0**	**8**	**100.0**	**40**	**100.0**

Table 2b: Wash and Non-Wash Latrine Cleanliness Level by Students

Latrine level of cleanliness	Implementation of WASH					
	WASH		NON-WASH		Total	
	n	%	n	%	n	%
Dirty	192	62.3	0	0.0	192	50.0
Very dirty	116	37.7	76	100.0	192	50.0
Total	**308**	**100.0**	**76**	**100.0**	**384**	**100.0**

From the above results, the condition of the latrines was worse before the roll-up of the WASH program in Kisumu East. But consultation from the health club teacher and other teachers who had spent significant time in the school acknowledged that the program impacted. The students were taught hygiene lessons and were responsible for cleaning their latrines. The school provided disinfectors and bathroom brooms to aid in the cleaning process.

3.2 Contribution for Teachers in Enhancing Good Public Health Practices in Schools

Teachers are key determinants of the success of good public health practices in schools. They sensitize and monitor students' hygiene, supervise the cleaning and inspect the cleanliness of sanitary areas like the latrine (Campbell et al., 2014). The study sought to establish how the teachers were undertaking these responsibilities to improve health outcomes among the students. It was first necessary to find out from the teachers they thought were responsible for ensuring that the sanitation facilities were available and in good condition. The findings are presented in Table 3.

Table 3: Persons Responsible for Sanitation Facilities in Schools

Responsible person	n	%
Government	10	25.0
School	29	72.5
N.G.O.s	1	2.5
Total	**40**	**100.0**

The findings indicate that majority of the teachers (72.5%) believe that the school community is responsible for the sanitation facilities in schools. This shows that as part of the school community, the teachers were aware that they were responsible for ensuring that the facilities were in good condition through monitoring and supervision.

It was essential to determine whether the teachers sensitize students on the importance of good hygiene practices like washing hands after visiting the latrine to promote better public health in schools (Christian, & Bartram, 2012). The results in Table 4. indicate that majority of the teachers (92.5%) reported they sensitize their students about good hygiene.

Table 4.: Sensitizing Students About Good Hygiene

Sensitization	n	%
Yes	37	92.5
No	3	7.5
Total	**40**	**100.0**

When we compared the level of the cleanliness of students' latrines and the frequency of visits by the teachers, the results revealed that the majority of those who visit daily (60.0%) indicated that the latrines were dirty, while the majority of those who indicated other times (75.0%) and all those who indicated that they visit weekly reported that the toilets were very dirty. We sought to establish whether this difference was significant by performing Pearson Moments' correlation (Table 5).

Table 5: Relationship Between Teachers' Visit and Level of Cleanliness of Latrine

			Level of cleanliness	Teachers' visit
R-value	Level of cleanliness	Pearson Cor	1	**-.318***
		Sig. (2-tailed)		.046
		N	40	40
	Teachers' visit	Pearson Cor	**-.318***	1
		Sig. (2-tailed)	.046	
		N	40	40
*. Correlation is significant at the 0.05 level (2-tailed).				

The correlation shows a significant relationship between teachers' visits to the latrine and the level of cleanliness r = -3.18; p< 0.05. As the teachers persistently visited the student latrines, the latrine improved cleanliness. This shows that teachers play a significant role in latrine quality and cleanliness; therefore, teachers' contribution to latrine cleanliness was crucial (Jamieson, & Saunders, 2020). Besides, the results of the ANOVA test indicate that there is a significant relationship between the implementation of the WASH program and cases of diarrheal diseases among the students. Schools implementing the WASH program register moderate cases, while those have not reported high instances.

3.3 Environmental Factors Affecting Quality of Latrines in Schools

Environmental factors highly determine the model of the latrine constructed hence the quality. The study findings (Table 6) indicated that most teachers (50.0%) reported that poor soil structure was the main environmental factor affecting the quality of the latrines in the schools. This was followed by flooding (25.0%), the shallow water level (15.0%), and lastly, scarce land and availability of construction materials (5.0% respectively).

Table 6: Environmental Factors Affecting Quality of Latrines

Factor	**n**	**%**
Poor soil structure	20	50.0
Flooding	10	25.0
Shallow water level	6	15.0
Inadequate land	2	5.0
Availability of construction materials	2	5.0
Total	**40**	**100.0**

From the study, poor soil structure was the primary concern affecting the toilets' stability. The toilets most likely sink with time due to the poor soil structures and the kind of soil that covered the areas of study. From observation, there were cases of latrines that were not being used because they were not safe and lost their stability due to increased floods and poor soil structures (Bain et al., 2014). Therefore, it was clear that the soils did not support the latrines for a long time, especially when they were about to get filled up. Generally, the life span of a latrine around the areas was between 8 to 12 years.

The research was interested in determining the environmental factors that affect the quality of the latrines in the school. The outputs below show that analysis of these environmental factors and how they influence the perception of the status of school latrines among interviewed students.

Table 7: Impact of Flooding on Latrine Quality

		The school experienced problems with latrines set up due to flooding					
		Yes		No		Total	
		N	%	N	%	N	%
Perception of the status of the latrine in the school	Good	6	6.0	94	94.0	100	100.0
	Fair	5	2.4	201	97.6	206	100.0
	Poor	0	0.0	78	100.0	78	100.0

χ^2 *(2) = 5.975, p-value 0.04*

In the above cross-tabulation, an investigation was being performed to determine if the problems the schools experienced with their latrines were due to flooding, which was associated with the perception of the status of the respective restrooms. A chi-square analysis was performed, and it emerged that the perception of the quality of the latrine of the school was significantly dependent on one's belief that the problems of the latrines are caused by flooding $\chi^2(2) = 5.975$, p-value < 0.05. Using the crosstab generated above, it can be seen that most of the respondents do not believe that flooding is largely responsible for the problems that they are having with their latrines. All the respondents (n=78) who believe that their school latrines are in poor condition do not believe that it is due to the flooding in the region.

4.0 CONCLUSION

From the findings, it can be concluded that the WASH Program Schools have little significance than Non-WASH Program Schools. There was not much difference between WASH and Non-WASH Program schools. Most of the Schools in both WASH and Non-WASH Programs did not meet the required ratio of pupils per toilet, as stated by School Health Policy 2009. More than 80% of the schools had handwashing facilities, and if the structures were there, they were faulty. Students do not wash their hands before meals and after visiting toilets, meaning they are at risk of contracting diseases such as cholera, diarrhea, and worm infections. The cleanliness of the school's latrine had no significant difference in schools, and most of the schools had an equal critical performance of public health issues relations. Also, teachers played an important role in imparting knowledge on public health, water use, sanitation, and hygiene to the student through teaching programs reinforcing public health practices to students and generally improving the quality of Water, Sanitation, and Hygiene in schools. The geographical environment for the latrine location also affected latrine quality. Based on this, most parts of the environment had poor soil quality to develop latrines; therefore, it was uneasy to maintain the latrine in its state for an extended period without collapsing.

5.0 RECOMMENDATIONS

- To improve the WASH Programs, there is a need for school stakeholders to harmonize and develop a National Self-Assessment Tool cascading for WASH Program that will help monitor and evaluate school health programs on water, sanitation, and hygiene.
- The Ministry of education should avail the National School Health Policy (2009) to schools through awareness creation and building the student capacity by introducing obligatory health lessons in schools.

- To help attain the Sustainable Development Agenda of 2030, universal, quality education, sanitation, and health, schools should consider constructing toilets or latrines with better conditions of good infrastructures.
- To develop a health and sanitation toolkit that can be used to teach the students, teachers, and the community about good health practices

6.0 RESEARCH ETHICS

The study was conducted under the Graduate School of Kenyatta University's protocol approval and Kenya's National Council of Science and Technology (NACOSTI). The Confidentiality of the participants was adhered to when participants signed the consent form after being explained the nature and purpose of the study. According to Hu *et al.* (2021), hypothetical findings espouse the reliability of findings from the study.

Funding

This research received no external funding.

Declaration of interest

The authors declare no conflict of interest.

Data Availability Statement

Not applicable.

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