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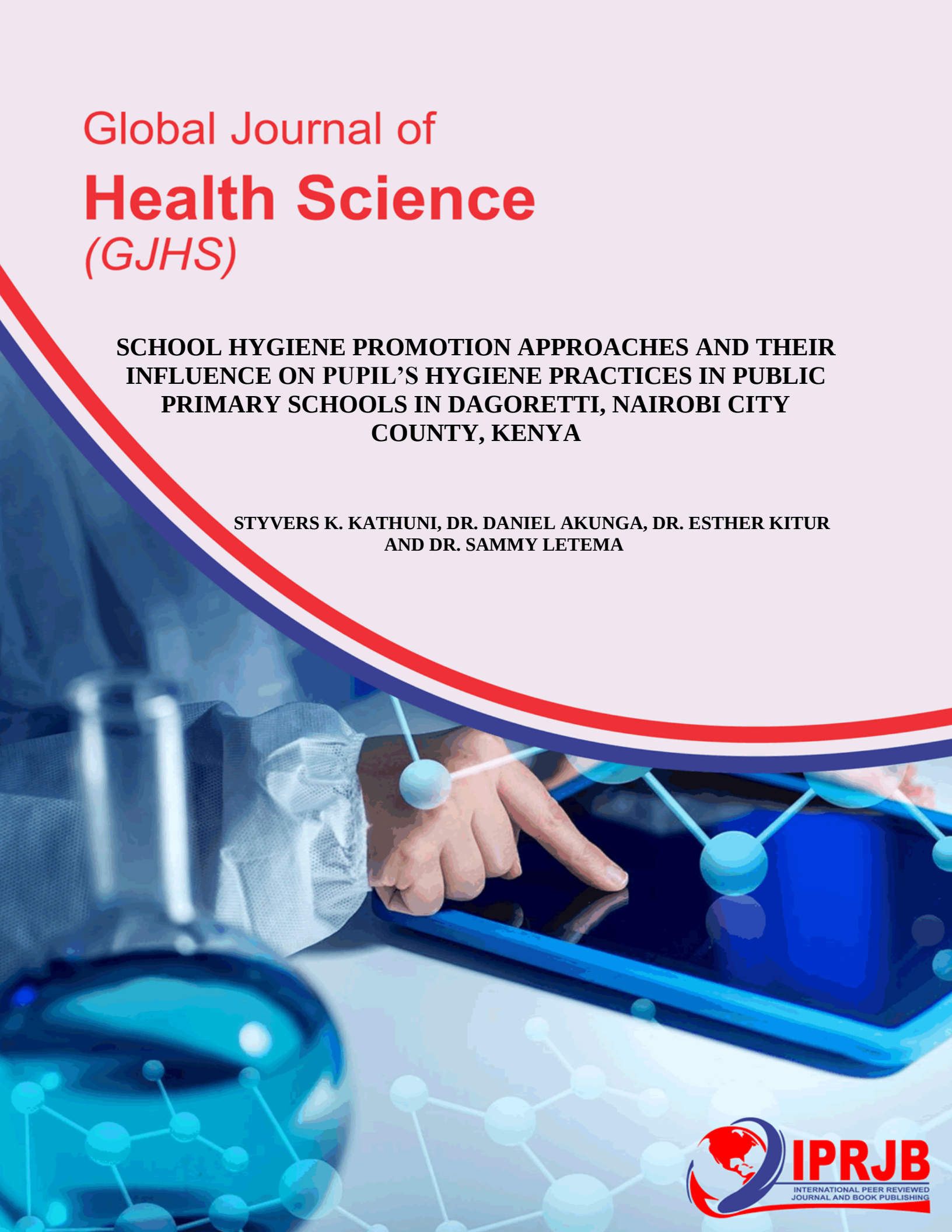

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SCHOOL HYGIENE PROMOTION APPROACHES AND THEIR INFLUENCE ON PUPIL'S HYGIENE PRACTICES IN PUBLIC PRIMARY SCHOOLS IN DAGORETTI, NAIROBI CITY COUNTY, KENYA

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Abstract

Purpose: The purpose of this study was to examine hygiene promotion approaches that were being employed by public primary schools in Dagoretti North and South Sub Counties in Nairobi City County and whether the approaches influenced hygiene behaviors that were practiced by pupils.

Methodology: The study applied a descriptive cross-sectional design. Questionnaires were administered to 384 pupils with the aim of collecting data on hygiene knowledge and practices. A questionnaire was also used to collect data on hygiene promotion approaches from 32 school health teachers. Pupils' demographic data was collected from school head teachers. Five key informant interviews were conducted with Nairobi City County public health and education officers and a staff from a non-governmental organization that was implementing school hygiene activities in Dagoretti South and North Sub Counties. Observation checklists were used to triangulate information on hygiene practices by pupils. Analysis was done using SPSS software.

Findings: Results indicate that 95.6% of the pupils practiced hand washing at critical times, 98.7% used the toilet while 85.4% safely disposed solid waste. The study reveals that water, sanitation and hygiene in schools approach is implemented by 31.3% of the school health teachers. There was a significant relationship between school health clubs approach and hand washing at critical times (p=0.04) and proper solid waste disposal (p=0.02). One way analysis of variance established that there is a significant difference among hygiene promotion approaches and pupils hygiene knowledge, $F(5, 162) = 6.41$, $p < .05$ $\eta^2_p = 0.076$.

Unique contribution to theory, practice and policy: The study establishes that different hygiene promotion approaches have the potential to influence hygiene practices and in particular, hand washing at critical times and proper solid waste disposal amongst pupils. The study recommends the use of school health clubs approach for hygiene promotion at public primary schools.

Key words: *Hygiene practices, Hygiene promotion approaches, Hand washing at critical times*

1. INTRODUCTION

Globally, some 842,000 people are estimated to die each year from diarrhea because of unsafe drinking water, sanitation and hand hygiene (WHO, 2017). About 27% of diarrhea deaths occur among children younger than 5 years, with about 90% of diarrhea deaths occurring in South Asia and sub-Saharan Africa (Mohsen *et al*, 2017). Diarrhea diseases are a leading cause of death in children under 5 years in developing countries (Bartram & Cairncross, 2010). Young children are especially vulnerable bearing 68% of the total burden of diarrhea disease (Bartram, 2003), which is also detrimental to the health of school-aged children (UNICEF, 2012). In sub-Saharan Africa, evidence shows that poor WASH is a common phenomenon within the school environment (Jewitt & Ryley, 2014). Water, sanitation and hygiene in schools lack attention despite its impact on children's health, school attendance, particularly for girls, and its contribution to fostering lifelong healthy hygiene habits (WHO, 2014). This calls for preventive measures geared at raising awareness on cost effective interventions that can contribute to the reduction of water, sanitation and hygiene related diseases.

Primary school access in Kenya has improved, increasing the importance of school services (Halliday *et al*, 2014), such as handwashing, which has been shown to reduce school absenteeism (Talaat *et al*, 2011). There is increasing attention towards the impact of improved water, sanitation, and hygiene conditions in low-income school settings; where poor conditions are thought to result in disease transmission among pupils (UNICEF, 2010). The school environment represents an important setting because many children's social habits and behaviors are learned at school (Christian *et al*., 2012).

Schools provide an efficient and effective channel to reach large portions of the population for introducing health promotion practices (MoPHS & MoE, 2009a), with studies noting a modest transfer of hygiene messages from children to parents (MoE & Care International, 2010). The success of hygiene promotion interventions requires strategic partnerships aimed at sustainably expanding hygiene projects to attain wider coverage and improve on service delivery (Care International, 2012). Such strategic partnerships were observed in a study in Western Kenya, which revealed that 76% of the schools reported to have received Water, Sanitation and Hygiene (WASH) support from a non-governmental organization (Kelly *et al*, 2014).

Numerous hygiene promotion approaches have been used to improve hygiene behaviors amongst pupils, which include school led total sanitation (Vincent, 2013), child hygiene and sanitation transformation (Bockhorn-Vonderbank, 2004), child to child (Farah, 2007) and school health clubs (Population Service International, 2009). With so many alternative approaches to hygiene promotion, it may be difficult for programmers to select the most appropriate approach (Peal *et al.*, 2010). This study examined the influence of hygiene promotion approaches on hygiene practices of public primary school pupils.

1.1 Statement of the Problem

Health promotion in schools improves children's health and well-being (Stewart-Brown, 2006). In Kenya, the national school health guidelines stipulated that hygiene education should be organized at least every four months in collaborations with ministry officers, school administrators, teachers, health workers and community leaders; to organize activities aimed at identifying health issues and take steps through the school to improve and learn (MoPHS & MoE, 2009b, MoPHS & MoE,

2009c). However, Peal *et al.*, (2010) notes that there are many hygiene promotion approaches and there is often confusion over what a particular approach is designed to achieve, what it comprises, when and where it can be used, how it should be implemented and how much it costs.

Evidence based school health interventions and approaches are rare, so the choice for theory based is a logical one (Stephen & Bjarne, 2005). Various stakeholders have implemented small and large-scale school health programs in Kenya, whereby most of the efforts have been piece meal and not planned on a sustainable basis (MoPHS & MoE, 2009a). Kenya is listed as one of the countries that does not monitor hygiene indicators in the education management information system (UNICEF, 2015). Njuguna (2008) notes that the interface of software and hardware deserves further investigation in the design of hygiene promotion interventions, which this study aims at.

The existence of numerous hygiene promotion approaches and absence of monitoring mechanisms in the education system in Kenya, may hamper the realization of the full benefits that would have emerged if appropriate hygiene approaches were employed and monitored. Use of effective health promotion strategies and approaches eliminates the use of ineffective trial and error approach (Stephen & Bjarne, 2005). This study examined hygiene promotion approaches employed in public primary schools and whether the approaches influence hygiene practices amongst pupils in public primary schools in Dagoretti North and South Sub Counties, Nairobi City County.

2. LITERATURE REVIEW

Globally the convention on rights of the child stipulates that state parties should ensure that all children are supported in the use of basic knowledge of child health, hygiene and environmental sanitation (UN, 1989). In Kenya, the Children Act, recognizes that every child has a right to health and medical care, the provision of which is the responsibility of the parents and the government (RoK, 2001). Schools are focal points for promotion and empowering of children to be agents of hygiene behavior change (MoH, 2016a). Pupils centered hygiene promotion is an ongoing process aimed at positively influencing behavior change (MoPHS & MoE, 2009b). School clubs should be established to enhance participation and learning of school children on hygiene and environmental sanitation (MoH, 2016a). However, amidst the policy framework environment, Kenya is classified amongst the countries that did not have a government defined financing plan or budget for the WASH sector which is published and agreed (WHO, 2014).

There exist several hygiene promotion approaches that schools could implement to improve hygiene practices amongst pupils. School health clubs approach affords pupils the opportunity to become 'Agents of Change' who carry home and translate into action healthy habits and information they learn at school; thus, influence their sibling, parents and friends who might be out of school (Annemarieke *et al.*, 2013). School Led Total Sanitation (SLTS) approach sees children as ready recipients for new learning and ambassadors of hygiene and sanitation messages to peers, families and their community members (Vincent, 2013). Child Hygiene and Sanitation Transformation (CHAST) approach uses tools that are meant to be fun - involving games, exercises and role-plays that prompt the children to discuss and genuinely understand the key issues related to personal cleanliness and hygiene (De Vreed, 2004). Child to Child approach facilitates children's understanding of healthy behavior and allows them to identify health and development priorities in a fun, challenging and interesting way (WaterAid, 2013). WASH in schools is a holistic approach that deals with both hardware and the software aspects needed to bring about

changes in hygiene behavior of students and, through these students, in the community at large (Peal *et al.*, 2010).

The Kenya Environmental Sanitation and Hygiene policy (MOH, 2016a) points at the establishment of school clubs as the only hygiene promotion approach to enhance participation and learning of school children on hygiene and environmental sanitation. Njuguna *et al.* (2008) noted that there is no evidence that schools with active WASH clubs have better handwashing practice, cleaner facilities or more soap available for children. Prochaska *et al*. (1992) illustrates in the trans-theoretical model that health behavior change is not an easy step from risk behavior to healthy behavior and that there are at least five stages to be distinguished namely, pre-contemplation, contemplation, preparation, action and maintenance. Brug *et al.* (2007) notes that the concept of relapse, which is part of the model, is not a stage in itself but describes a return from action or maintenance to an earlier stage.

3. METHODOLOGY

The study applied a descriptive, cross sectional design. The study was undertaken in public primary schools in Dagoretti North and South, Nairobi City County. The study focused on the 25 public primary schools in Dagoretti North and South Sub Counties. However, three of the schools exclusively served pupils with special needs while one served nursery pupils hence, were excluded from the study. Six schools that were not implementing hygiene promotion activities, were also excluded from the study therefore, 15 schools were eligible for the study with a total enrolment of 14,505 pupils (6,904 boys and 7,601 girls).

Pupils in upper primary (class 4-8) participated in the study. Pupils in lower primary were exempted due to the data collection methods that were employed in this study. Data collection amongst pupils in lower primary would require the use of child friendly tools, which were not within the scope of this study. To triangulate and validate the research findings, data was also collected from key informants who include head teachers, school health teachers, county and sub county education and health staff and non-governmental organization staff.

To establish the number of pupils for interview, the sample size was determined by using the formula of Fisher *et al.*, (1991) which yielded 384 pupils. Probability proportion to size sampling technique was used to identify the respondents from the pupil population. A questionnaire was the main tool used for collecting data and other information relevant to the study. Separate structured questionnaires were administered to 384 school pupils and 32 school health teachers. In each of the 15 schools, a questionnaire was also used to collect enrolment data from the school's head teacher. An interview guide was used to collect data from key informants while an observation checklist was used to cross check hygiene practices amongst the pupils in the schools. Data was analyzed using SPSS software and presented using tables, graphs and pie charts.

4. RESULTS AND DISCUSSION

4.1 Results

Table 1 presents the social demographic characteristics of the study population.

Table 1 Social demographic characteristics of study population

Variable	N or mean	Percent
Population in target schools		
Boys	9,483	49.9%
Girls	9,524	50.1%
Total	19,007	100%
Pupils interviewed		
Boys	183	47.7%
Girls	201	52.3%
Pupils mean age in years	12.2	
Pupils interviewed per grade		
Grade 4	61	15.9%
Grade 5	69	18.0%
Grade 6	95	24.7%
Grade 7	81	21.1%
Grade 8	78	20.3%
School health teachers interviewed		
Male	8	25%
Female	24	75%

A total of 15 eligible schools participated in the study and 384 pupils participated in the knowledge, attitudes and practices survey while 32 teachers drawn from all the participating schools responded to the school health teacher's key informant interview tool. It was found that 52.3% (201, $n = 384$) of the respondents were girls while 47.7% (183, $n = 384$) were boys. The mean age of the respondents was 12.2 years and a majority of them (66.1%) were in grade 6, 7 and 8. Majority of the school health teachers (75%) were female.

The research sought to establish if pupils practice safe hygiene behaviors using three indicators, hand washing at critical times, toilet use and safe disposal of solid waste. The results indicate that 95.6% of the pupils practiced hand washing at critical times, 98.7% used the toilet while in school and at home while 85.4% safely disposed solid waste. However, 4.7% of the respondents only used the toilet at home while 7.8% do not practice safe disposal of solid waste both at school and home. Table 2 presents the reported number of safe hygiene practices that were practiced by the pupils.

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Table 2 Number of safe hygiene practices reported to be practiced by the pupils

Number of safe hygiene practices	Boys	Percentage of boys	Girls	Percentage of girls	Total pupils	Total percentage of pupils
One safe hygiene practice	0	0.0%	3	100.0%	3	0.8%
At least two safe hygiene practices	22	47.8%	24	52.2%	46	12.0%
All three safe hygiene practices	161	48.1%	174	51.9%	335	87.2%
Total	183		201		384	100.0%

From table 2 above, 87.2% of the pupils were practicing all three safe hygiene practices while 12% were practicing at least two safe practices. Less than 1% of the pupils were practicing one safe hygiene practice.

From the key informant interviews with sub county and county education and health officers, it was noted that school WASH infrastructure is not adequate with reference to the Ministry of Education guidelines.

Table 3 presents pupil's responses on hand washing at critical times compared to adequacy, functionality and accessibility to hand washing points in school.

Table 3 Comparison of hand washing at critical times and adequacy, functionality and accessibility of hand washing points in school.

		We have adequate hand washing points in school		We have functional hand washing points in school		We have hand washing points in school but they are not accessible	
		Disagree	Agree	Disagree	Agree	Disagree	Agree
Do you wash your hands at critical times	No	16	1	11	6	12	5
	Yes	215	152	200	167	262	105
Total		231	153	211	173	274	110
Percent		60.2%	39.8%	54.9%	45.1%	71.4%	28.6%
p-value		0.03		0.41		1.00	

From the pupil's responses in table 3, 39.8%, 45.1% and 71.4% noted that hand washing facilities in school are adequate, functional and accessible respectively. There was a significant relationship between hand washing at critical times and adequacy of hand washing points, $\chi^2(1) = 8.6$, $p<0.05$. There was no significant relationship between hand washing at critical times and functionality of hand washing points in school $\chi^2(1) = 0.68$, $p>0.05$ and between hand washing at critical times and accessibility of the hand washing point in school ($p=1.00$).

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Table 4 presents pupil's responses to toilet use compared to adequacy, accessibility and cleanliness of toilets in school.

Table 4 Comparison of toilet use and adequacy, accessibility and cleanliness of toilets in school.

		We have toilets in school but they are not adequate		We have toilets in school but they are not accessible		We have toilets in school but they are not clean	
		Disagree	Agree	Disagree	Agree	Disagree	Agree
Do you have a habit of using the toilet when in school and at home	Yes, in school and at home	275	83	307	51	207	151
	Yes, in school only	1	2	3	0	2	1
	Yes, at home only	18	0	16	2	8	10
	Not at all	5	0	5	0	2	3
Total		299	85	331	53	219	165
Percent		77.9%	22.1%	86.2%	13.8 %	57%	43%
p-value		0.02		0.47		0.59	

From the pupil's responses in table 4, 77.9%, 86.2% and 57% noted that their school had toilets and they are adequate, accessible and clean respectively. Through the observation check list, the average toilet to pupil ratio is 1:55 for boys and 1:43 for girls. Pupils were observed using toilets. There was a significant relationship between toilet use and adequacy of toilets, ($p=0.02$). There was no significant relationship between toilet use and accessibility to the toilets ($p=0.47$) and cleanliness of the toilets in school ($p=0.59$).

This study aimed at establishing the hygiene promotion approaches employed by public primary schools in Dagoretti North and South Sub Counties to improve hygiene practices amongst pupils. Most (68.8%) school health teachers noted that they were applying more than one hygiene promotion approach. Figure 1 presents the dominant hygiene promotion approaches applied in the 15 schools considered for this study.

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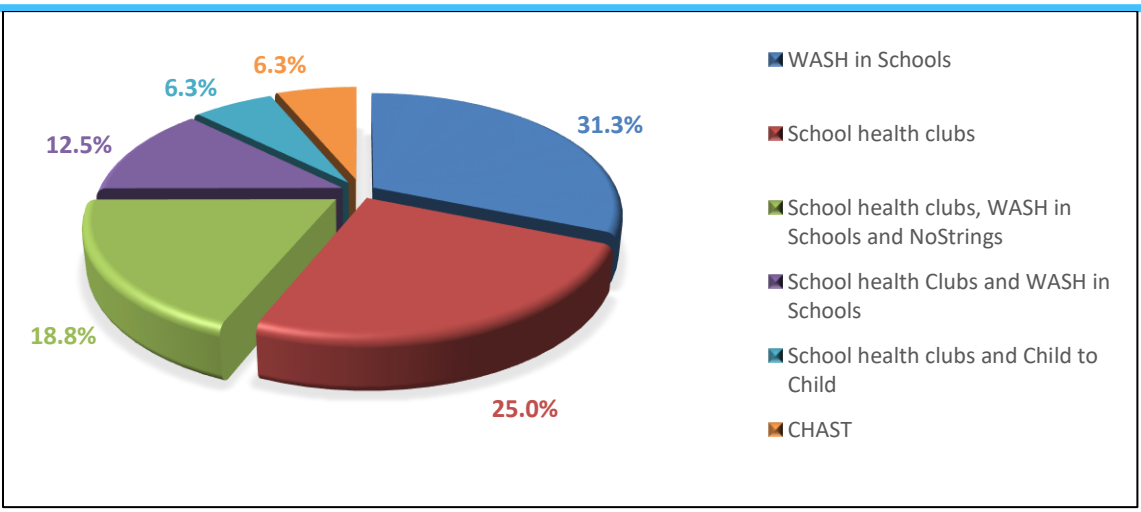

Figure 1 Dominant hygiene promotion approaches applied in public primary schools in Dagoretti North and South Sub County, Nairobi City County.

Results in Figure 1 indicate that 31.3% of the school health teachers were implementing WASH in schools approach while school health clubs approach was implemented by 25%. A combination of school health clubs, WASH in schools and No Strings was implemented by 18.8% of the school health teachers. A combination of school health clubs and WASH in schools was implemented by 12.5% of the school health teachers. A combination of school health clubs and Child to Child approaches was implemented by 6.3%, with CHAST being implemented by 6.3% of the school health teachers. None of the school health teachers was applying SLTS.

The study sort to establish if the school health teachers perceived the approaches they were using as successful in improving hygiene practices amongst pupils in their respective schools. It was noted that 50% of the school health teachers perceived the hygiene promotion approach they employed as being successful while, 46.9% and 3.1% perceived it is partially successful and not successful respectively.

Results indicate that 92.7% of the pupils reported to have received hygiene messages in the current school term while in school. This was affirmed by 90.6% of the school health teachers who agree to having held hygiene promotion activities in their respective schools in the current school term. Multiple messages were received by the pupils with the most common hygiene message being the need for hand washing with soap at critical times (77.1%). Other messages received include, good food hygiene (60.2%), water treatment (60.2%), proper solid waste disposal or management 52.3%, latrine use (48.2%) and safe disposal of infants' faeces (46.1%).

Hygiene practices were then compared with the dominant hygiene promotion approach that was used to pass hygiene messages to the pupils as illustrated in figure 2.

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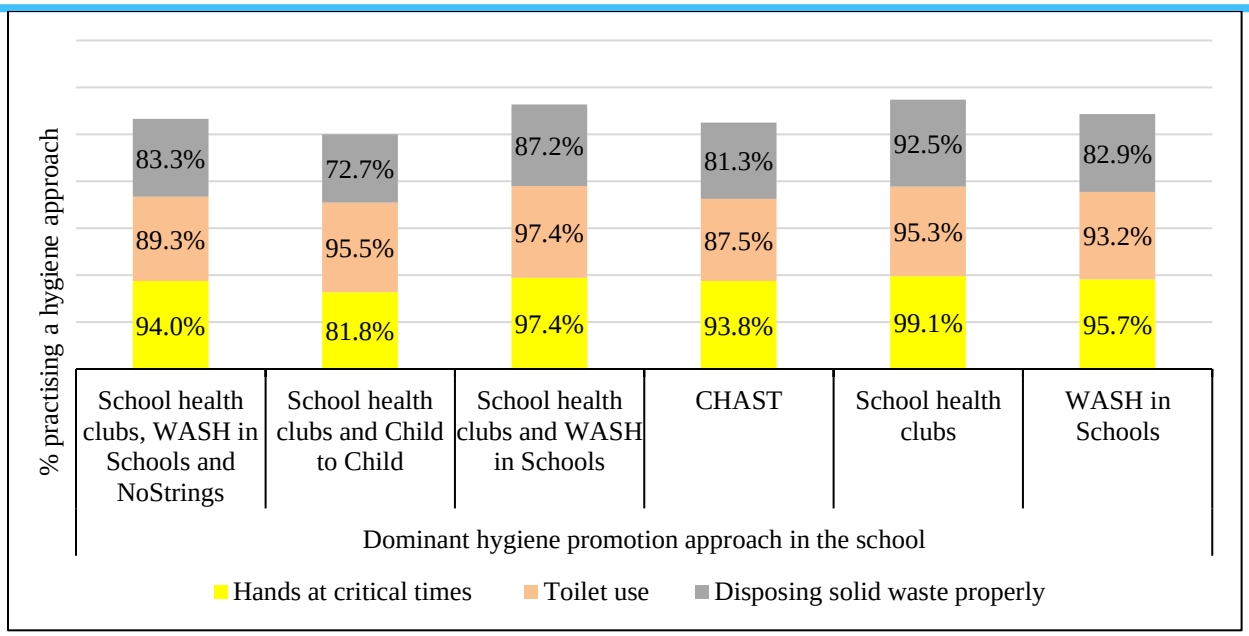

Figure 2 Comparison of dominant hygiene promotion approaches and hygiene practices.

From figure 2, hand washing (99.1%) and safe solid waste disposal (92.5%) practices is highest amongst pupils who had received hygiene messages through the school health clubs. Toilet use is highest (97.4%) amongst pupils who received hygiene messages through a combination of school health clubs and WASH in schools. School health clubs approach had a reduced percentage outcome to hand washing at critical times when combined with Child to Child (81.8%), WASH in Schools (97.4%) and No Strings approach (94%). School health clubs approach (95.3%) and WASH in school (93.2%) had a synergistic support (97.4%) to toilet use when implemented concurrently. WASH in schools (82.9%) had a synergistic support to proper solid waste disposal when implemented with School health clubs (87.2%). School health clubs (92.5%) had a reduced percentage outcome to proper solid waste disposal when implemented with Child to Child (72.7%) and a combination of WASH in schools and No Strings (83.3%).

Table 5 presents a comparison of each of the hygiene practices and hygiene promotion approaches implemented in the schools.

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Table 5 Comparison of hygiene practices and hygiene promotion approach

		Dominant hygiene promotion approach in the school					
		School health clubs, WASH in Schools and No Strings	School health clubs and Child to Child	School health clubs and WASH in Schools	CHAST	School health clubs	WASH in Schools
Do you wash your hands at critical times	No	5	4	1	1	1	5
	Percent	6.0%	18.2%	2.6%	6.3%	0.9%	4.3%
	Yes	79	18	38	15	105	112
	Percent	94.0%	81.8%	97.4%	93.8%	99.1%	95.7%
	Total	84	22	39	16	106	117
	p-value	0.54	0.01	1.00	0.52	0.04	1.00
Do you have a habit of using the toilet when in school and at home	Yes, in school and at home	75	21	38	14	101	109
	Percent	89.3%	95.5%	97.4%	87.5%	95.3%	93.2%
	Yes, in school only	2	0	0	0	0	1
	Percent	2.4%	0.0%	0.0%	0.0%	0.0%	0.9%
	Yes, at home only	6	1	1	2	3	5
	Percent	7.1%	4.5%	2.6%	12.5%	2.8%	4.3%
	Not at all	1	0	0	0	2	2
	Percent	1.2%	0.0%	0.0%	0.0%	1.9%	1.7%
	Total	84	22	39	16	106	117
	p-value	0.24	0.81	0.52	0.52	0.32	0.97
Do you have a habit of disposing solid waste properly while in school and at home	Yes, in school and at home	70	16	34	13	98	97
	Percent	83.3%	72.7%	87.2%	81.3%	92.5%	82.9%
	Yes, in school only	5	2	0	0	0	3
	Percent	6.0%	9.1%	0.0%	0.0%	0.0%	2.6%
	Yes, at home only	4	1	2	0	3	6
	Percent	4.8%	4.5%	5.1%	0.0%	2.8%	5.1%
	Not at all	5	3	3	3	5	11
	Percent	6.0%	13.6%	7.7%	18.8%	4.7%	9.4%
	Total	84	22	39	16	106	117
	p-value	0.22	0.3	0.52	0.25	0.02	0.8

From table 5, there was a significant relationship between school health clubs approach and hand washing at critical times (p=0.04) and proper solid waste disposal (p=0.02). There was no significant relationship between toilet use and all the hygiene promotion approaches (School health clubs, WASH in Schools and No Strings (p=0.24), School health clubs and Child to Child

(*p*=0.81), School health clubs and WASH in Schools (*p*=0.52), CHAST (*p*=0.52), School health clubs (*p*=0.32), WASH in schools (*p*=0.97)).

Table 6 presents a comparison of hand washing, toilet use and training on each of these two practices.

Table 6 Comparison of hand washing at critical times, toilet use and training on the importance of hand washing and toilet use respectively

		I practice because I have been trained on the importance of hand washing			
		Disagree	Agree	Total	Percent
Do you wash your hands at critical times?	Yes	40	327	367	95.6%
	No	9	8	17	4.4%
	Total	49	335	384	100%
	p-value			0.00	
		I practice because I have been trained on the importance of using toilets			
		Disagree	Agree	Total	Percent
Do you have a habit of using the toilet?	Yes	142	237	379	98.7%
	No	1	4	5	1.3%
	Total	143	241	384	100%
	p-value			0.66	

From table 6, 327 (85.2%) pupils practicing hand washing at critical times and 237 (61.7%) using a toilet, noted that these practices are influenced by the training they had received on the importance of hand washing and toilet use while in school respectively. There was a significant relationship between hand washing at critical times and training on importance of hand washing (*p=0.00).*

To test the pupil's knowledge on hygiene, questions on general understanding of hygiene, how to maintain good hygiene, critical hand washing times, signs of poor hygiene and causes of diarrhea were posed to each of the respondent. Results indicate that 53.1% of the respondents scored more than 75%, with 29.7% of the respondents scoring between 50% and 75%, while 17.2% scored below 50%. A one-way analysis of variance test was conducted to evaluate if there was a difference between hygiene knowledge test scores of pupils (n = 384) and the hygiene promotion approaches.

Prior to conducting the ANOVA, the assumption of homogeneity of variance was tested and failed to satisfy Levene's F test, $F(5, 387) = 4.86$, $P < .05$, hence Brown-Forsythe F test was applied. The independent variable hygiene promotion approach included types of approaches: school health clubs, WASH in schools and No Strings (M = 21.14, SD = 3.91, n = 84), school health clubs and Child to Child (M = 18.23, SD = 6.87, n = 22), school health clubs and WASH in schools (M = 16.10, SD = 5.56, n = 39), CHAST (M = 17.58, SD = 2.57, n = 19) and No Strings (M = 17.05, SD

= 3.11, n = 84). There was a significant difference among the hygiene promotion approaches on hygiene knowledge, $F(5, 162) = 6.41$, $p < .05$ $\eta^2_p = 0.076$.

4.2 Discussion

There was a significant relationship between hand washing at critical times and adequacy of hand washing points however, there was no significant relationship between hand washing at critical times and functionality or accessibility to hand washing point. Though 95.6% of the respondents practice hand washing at critical times, only 39.8% indicated that handwashing facilities were adequate. The findings concur with conclusions from a study conducted in schools in Tanzania that found that although WASH facilities were available in some of the schools, they were inadequate (Antwi-Agyei *et al*., 2017).

There was no significant relationship between toilet use and adequacy of toilets with the average toilet to pupil ratio of 1:53 for boys and 1:43 for girls. MoE (2008) recommends a ratio of 1:25 for girls and 1:30 for boys. Regardless of the low toilet to pupil ratio, the study established that majority (98.7%) of the pupils use the toilet. Noting that WASH in schools which incorporates construction of toilets was implemented by a third of the schools, these findings agree with Joshua *et al* (2014), that schools with worst ratios, are most likely to benefit, in terms of increased toilet use, from the addition of even a small number of toilets.

There was also no significant relationship between toilet use and cleanliness of the toilets in school. Although toilet use was high (98.7%) among the respondents, 43% of them indicated that the school toilets were not clean. This finding agrees with Joshua *et al* (2014), that many pupils are not discriminating which facilities they used based on toilet cleanliness. However, this finding differs with a previous study conducted in India which detected both a meaningful and statistically significant associations between toilet cleanliness and toilet use (Mathew *et al*, 2009). The difference between the two studies can be attributed to the time bound software and hardware interventions (trainings and construction of toilets) that were implemented in India just before the research was undertaken.

The study observed that majority of the schools used WASH in schools approach in delivering hygiene messages to pupils, which is a comprehensive approach that integrates teachers and pupils trainings and construction of WASH facilities. The study also established that 87.2% of the respondents practiced all the three safe hygiene practices. This agrees with a study that observed that there was evidence that a comprehensive school-based WASH intervention can have a positive impact on pupil health (Trinies, 2016). School health clubs approach was also widely used in delivering hygiene messages to pupils. This observation agrees with a previous study that noted that there were more children's clubs for WASH/health in the input schools than in the other schools and they met more frequently, according to both the teachers and the children (Njuguna *et al*, 2008).

There was a significant relationship between school health clubs and hand washing at critical times. A further analysis revealed that pupils receiving hygiene messages through the school health club approach were more likely to practice hand washing at critical times. Hand washing at critical times was the most common message received by pupils and there was a significant relationship between hand washing and training on importance of hand washing. These findings agree with Stewart-Brown (2006) that programs to promote some aspects of health are more effective than

those that promote other aspects. Training on importance of hand washing is an intervention through the various hygiene promotion approaches. Ejemot *et al*. (2009) notes that the intervention group reported hand washing seven times a day compared with four times daily in the control group.

The research findings established that there was no significant relationship between toilet use and any of the hygiene promotion approaches. This observation agrees with an earlier that noted that a school-based sanitation education intervention did not have a significant impact on pupils' open defecation behaviors (Gyorkos *et al*, 2013). There was no significant relationship between safe solid waste disposal and most of the hygiene promotion approach. This result contradicts Kola-Olusanya & Ahove (2015) findings that environmental health education has positive influence on Nigerian pupils' attitude and belief towards solid waste disposal. In the Nigeria study, structured trainings on waste disposal were conducted and thereafter, pre and post training results were compared.

Further, the study findings established that there was a significant difference among the hygiene promotion approaches on hygiene knowledge. This finding agrees with George *et al* (2018) who observed that the mean score of posttest was greater than pretest amongst upper primary school children who had received personal hygiene messages through Child to Child approach.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Different hygiene promotion approaches have varying levels of success when used to improve specific hygiene practices. School health club approach is the most successful in leading pupils in public primary schools in Dagoretti North and South Sub Counties towards practicing hand washing at critical times and proper solid waste disposal.

5.2 Recommendations

Public primary schools in Dagoretti North and South Sub Counties should embrace the use of school health clubs approach since it has the potential to improve hygiene practices amongst pupils.

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