

Original Research Article

Adequacy of sanitation and handwashing facilities in public primary schools: case of Tharaka Nithi County, Kenya

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ABSTRACT

Background: Hygiene as practices and conditions contribute to the upholding of population health or prevention of disease outbreak. The implication of sanitation needs to the population tends to weigh heavily on the children population due to their vulnerability to pathogens.

Methods: Analytical cross-sectional study design was used and 219 participants in the selected public primary schools participated in the study. Data was collected using administered structured questionnaire, observation and Key Informant Interview. Quantitative data analysis was conducted using SPSS version 26.0 and involved univariate and bivariate analysis. Bivariate analysis was done through logistic regression was used to test the significance of the association between the dependent and independent variables ($p < 0.05$). Qualitative data was analyzed by thematic content analysis.

Results: More than three quarter 171 (78.1%) were day school with 40 (18.3%) and 54 (24.7%) of school having between 150-179 boys and 180-209 girls respectively. Slightly less than half 104 (47.5%) of schools had less than 5 toilets for boys and 90 (41.1%) of schools had between 5-10 toilets for girls, 112 (51.1%) of schools had water available for hand washing outside the latrines/toilets. Schools with 120-149 boys and 210-239 girls were more likely to avail water for handwashing outside the toilets.

Conclusions: Schools lack sanitary facilities, water, soap and protective clothing, leading to poor sanitation levels, further, schools with scarcity of water and soap for hand washing are at risk of contamination, leading to the spread of diseases like cholera.

Keywords: Disease outbreak, Handwashing facilities, Public primary school, Sanitation facilities

INTRODUCTION

Sanitation is the establishment of facilities, structures and habits that promote a safe management of human waste. It depends on the development of the area and the availability of clean water. Hygiene is practices and conditions that contribute to population health or prevent disease outbreak, household and public facilities are primary targets.¹ The WHO has adopted measures to promote sanitation, such as washing hands, using hand sanitisation agents, and correct disposal of waste.²

Children are particularly vulnerable to pathogens, and there is a need for adults to monitor them to ensure adherence to safety practices. This would depend on their expertise in installing safety features and counter measures. UNICEF identifies the burden of inadequate sanitation to rest on the abilities of the involved societies, with low-income areas facing a higher challenge than upper- and middle-income regions.³ World Health Organization estimates that 2.6 billion lack access to sanitation instruments, with slum areas leading to limited sanitation capacity and natural and generic calamities causing damage to sanitation infrastructure.⁴ UNICEF

estimates that half a billion children in Sub Saharan Africa lack adequate sanitation facilities.⁵ The African Centre for Disease Control (ACDC) plays a pivotal role in the promotion of disease mitigation practices across the continent. The East African Community aligns its health agenda to the capacity of the health ministries of member countries, but also shares defined policies aiming at improving hygiene practices.⁶

The impact of sanitation further manifests in the plight of adolescent girls necessitating facilities and utilities to assist manage their menstrual flow. Lack of adequate facilities exposes them to stigmatisation leading to possible discontinuation of their learning process. Stigma only defines a single aspect of their challenges with the potential contracting of infections and psychological disturbance defining the schooling experience.⁵ Only 25% of the adolescent girls in marginalized areas manage to remain school following challenges annexed to lack of adequate sanitation facilities and utilities. The implication of inadequacies in sanitation facilities further manifests in the experiences of the infant population.⁷ The WHO places infant mortality attributed to poor sanitation at about 8% in Sub-Saharan Africa.⁴ A further exploration of the subject from a child health perspective paints the need to engage in defined measures that would offer both reliable and preferable solutions.

The sanitation agenda in Kenya rests on the capacity of the Ministry of Health in partnership with county government authorities and external outfits such as the UNICEF and WHO.^{4,5} Githaka et al found that handwashing facilities are not near latrines, and 62.5% of water points are accessible to individuals with physical disabilities.⁸ 56% of schools have functional water sources, 40% have a functional pit latrine, and 92% provide menstrual hygiene education to students. The toilet to student ratio at the national level is estimated to be 1:109.

Approximately 87.4% of secondary schools have latrine coverage, with 62.1% having undergone renovation. Hand-washing facilities are accessible in 40% of secondary educational institutions, but only 17.5% are equipped with soap or a suitable alternative. Oronje findings revealed an average ratio of one student dropout for every 68 students.⁹ The lack of proper sanitation facilities, unpleasant odors, and individualized latrines may contribute to open defecation practices. In 48 public elementary schools in North Shewa, Kimbibit Woreda, 6.3% of schools had handwashing stations in close proximity to restrooms, and none had access to water supply or soap for handwashing.

Their relationship focuses on promoting ideal hygiene measures in adherence to the established sanitation standards among other interests. County governments presume the obligation of managing health facilities through ensuring the existence of a health department in their cabinet structure. Tharaka Nithi County falls under

the Arid and Semi-Arid Land (ASAL) of Kenya; hence faces challenges in accessing adequate water and ideal sewer infrastructure. Most households across Tharaka Nithi County opt to explore pit latrines as sanitation essential since their management does not hinge on the availability of constant water supply.

METHODS

This was an analytical cross-sectional design using both quantitative methods (issuing self-administered questionnaires to the Principals, Deputy Principals or Senior Teachers) and qualitative methods (use of key informant interviews from directors of education, health/hygiene teacher or environment teacher or WASH club teacher/patron, community health workers and public health officers working from selected wards) of data collection that was carried out between January 2023 to February 2023. Systematic random sampling method was used among 219 primary schools from three constituencies in Tharaka Nithi County, i.e., Maara, Chuka/Igambang'ombe and Tharaka.

The study included respondents working in public primary schools funded and administered by the Ministry of Education, who were available during data collection period, and respondents who were willing to participate and consented for the study. Further, it excluded respondents from private ownership and exclusively privately funded was not part of the study.

Self-administered structured questionnaires were used to collect quantitative data while Key Informant Guide was used to collect qualitative. Quantitative data was analyzed using statistical package for social science (SPSS) version 26.0. Descriptive data was presented using frequencies, percentages, means and standard deviation while inferential statistics used chi-square test to measure association between independent and dependent variables. P values less than 0.05 were considered statistically significant.

RESULTS

Socio-demographic characteristics of study respondents

The study involved 219 respondents, as shown in the Table 1, 148 (67.6%) were male respondents, with half 110 (50.2%) being the school head teacher and 109 (49.8%) were the deputy head teacher/senior teacher. Additionally, 62 (28.3%) had a working experience in current school between 3-5 years and 26 (11.9%) for more than 11 years (Table 1).

Status of the school

More than three quarter 171 (78.1%) were day school with 40 (18.3%) and 54 (24.7%) of school had between 150-179 boys and 180-209 girls respectively (Table 2).

Table 1: Socio-demographic characteristics of study respondents.

Characteristics	Frequency	Percent
Gender	Male	148
	Female	71
Designation	School head teacher	110
	Deputy head teacher/ senior teacher	109
Years in current school	Less than 3 years	35
	3-5 years	62
	6-8 years	47
	9-11 years	49
	More than 11 years	26

Status of the school

More than three quarter 171 (78.1%) were day school with 40 (18.3%) and 54 (24.7%) of school had between 150-179 boys and 180-209 girls respectively (Table 2).

Table 2: Status of the school.

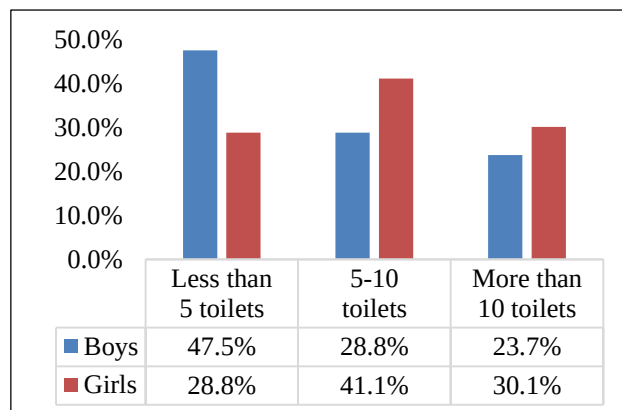
Characteristics	Frequency	Percent
School status	Boarding	30
	Day	171
	Mixed day and boarding	18
Total number of boys	90-119 boys	32
	120-149 boys	35
	150-179 boys	40
	180-209 boys	33
	210-239 boys	30
	240-279 boys	25
	280 boys and above	24
Total number of girls	110-139 girls	46
	140-179 girls	42
	180-209 girls	54
	210-239 girls	36
	240-279 girls	41

Adequacy of toilets

The percentage of the number of toilets per gender was determined in each school and presented an overall toilet. Slightly less than half 104 (47.5%) of schools had less than 5 toilets for boys and 90 (41.1%) of schools had between 5-10 toilets for girls. Additionally, 52 (23.7%) and 66 (30.1%) had more than 10 toilets for boys and girls respectively (Figure 1).

The KII respondents mentioned that in their respective schools, toilets are not adequate for the school population.

‘The toilets in this school are inadequate.....we have like five filled toilets...there is need to add not less than ten toilets, six for girls and four for boys’ (KII 3).

**Figure 1: Adequacy of toilets.****Pupils to toilet ratio**

Through physical counting, the researcher established that most of the schools had between 3 and 7 toilets for boys, between 5 and 9 toilets for girls, every school had a separate for boys and girls. For boys the ratio of toilets ranged from 30 pupils per toilet to 52 pupils per toilet. For girls the ratio of toilets ranged from 32 girls per toilet to 44 girls per toilet. For most of the schools the ratio was far way above the recommendations by the Ministry of Education (2015), which states that sanitation facilities in primary schools should be in the following ratio: - 1:30 for boys; 1 :25 for girls (Table 3).

Table 1: Pupils toilet ratio.

Characteristics	Pupil-per toilet ratio
School status	Boarding
	Day
	Mixed day and boarding
Total number of boys	90-119 boys
	120-149 boys
	150-179 boys
	180-209 boys
	210-239 boys
	240-279 boys
	280 boys and above
Total number of girls	110-139 girls
	140-179 girls
	180-209 girls
	210-239 girls
	240-279 girls

On probing, the head teachers stated that one sanitation facilities holding so many pupils' limits access to proper use of the sanitation facilities. In addition, they revealed

that the facilities present in the schools are not adequate to serve the school population and do not meet the school health policy guidelines on toilet ratios for boys and girls.

“Schools in this area are required to provide adequate sanitation facilities that are child-friendly to encourage use. However, this is not the case due to funding limitations” (KII 6).

Relationship between toilets adequacy and school status

The findings indicated that while there is no statistically significant association between adequacy of toilets with

total number of boys ($r = 0.143$, $p = 0.089$), total number of girls ($r = 0.216$, $p = 0.058$), and status of school ($r = 0.179$, $p = 0.078$).

Additionally, there was no significant association between total number of boys with total number of girls ($r = 0.017$, $p = 0.800$), and status of school ($r = 0.077$, $p = 0.255$). However, there was a statistically significant and stronger positive relationship between status of school and total number of girls ($r = 0.490$, $p = 0.005$) (Table 4).

Table 4: Relationship between toilets adequacy and school status.

		Adequacy of toilets	Total number of boys	Total number of girls	School status
Adequacy of toilets	Pearson correlation	1			
	Sig. (2-tailed)				
Total number of boys	Pearson correlation	0.143	1		
	Sig. (2-tailed)	0.089			
Total number of girls	Pearson correlation	0.216	0.017	1	
	Sig. (2-tailed)	0.058	0.800		
School status	Pearson correlation	0.179	0.077	0.490**	1
	Sig. (2-tailed)	0.078	0.255	0.005	

** . Correlation is significant at the 0.01 level (2-tailed).

Availability of water for washing hands outside the toilets

Slightly more than half 112 (51.1%) of schools had water available for hand washing outside the latrines/toilets (Figure 2).

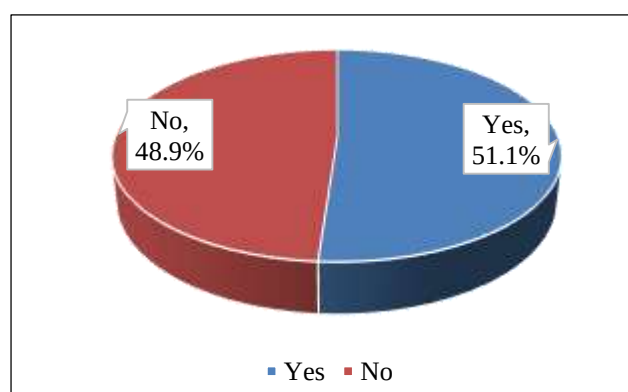


Figure 1: Availability of water for washing hands outside the toilets.

On access to water, the respondents mentioned that the majority of the schools do not have their own water sources. They rely on water supplied to the public section of the schools.

“We are required to fetch water and fill in the drinking water containers and the handwashing containers, this is

cumbersome...some of handwashing facilities still lack water till today” (KII 7).

“ It is important to have a drinking water source in the schools. Rain water harvesting tanks can be installed to support these institutions.....the department is experiencing funding challenges, however, WASH is one of the top priority especially for rural schools” (KII 8).

Influence of availability of water for washing hands outside the toilets

Most of day school in the study area had water available for handwashing outside the toilets 94 (55.0%) and 12 (40.0%) of boarding schools had water for washing hands outside the toilets. Further analysis showed that boarding and day schools were 0.8 and 0.4 times less likely to avail water for handwashing outside the toilets respectively. The majority of the schools 23 (65.7%) with boys between 120-149 had water for handwashing outside the toilets followed by schools with 240-279 boys at 16 (64.0%) and at least 7 (29.2%) of schools with 280 boys and above had water for handwashing outside the toilets. Further bivariate analysis using logistic regression showed that the likelihood of availing water for handwashing outside the toilets reduced with increase in number of boys in school, with schools having between 90-119 boys were 1.4 times more likely to avail water for handwashing outside the toilets. Likewise, schools with 110-139 girls and between 140-179 girls were 1.3 and 1.2 times more likely to avail water for handwashing outside the toilets respectively. Among the number of boys and

girls, there was a statistically significant association between schools with 120-149 boys (OR=1.215; 95% CI=0.070- 0.661; p= 0.007) and 210-239 girls

(OR=0.657; 95% CI=0.657- 4000; p= 0.025) and availing water for handwashing outside the toilets (Table 5).

Table 2: Influence of availability of water for washing hands outside the toilets.

		Yes	No	OR	95% CI	p-value
		N (%)	N (%)			
School status	Boarding	12 (40.0)	12 (60.0)	0.750	0.221- 2.546	0.645
	Day	94 (55.0)	94 (45.0)	0.410	0.147- 1.142	0.088
	Mixed day and boarding	6 (33.3)	6 (66.7)	Ref		
Total number of boys	90-119 boys	16 (50.0)	16 (50.0)	1.412	0.134- 1.262	0.121
	120-149 boys	23 (65.7)	23 (34.3)	1.215	0.070- 0.661	0.007
	150-179 boys	21 (52.5)	21 (47.5)	0.973	0.127- 1.094	0.072
	180-209 boys	15 (45.5)	15 (54.6)	0.494	0.162- 1.508	0.215
	210-239 boys	14 (46.7)	14 (53.3)	0.471	0.151- 1.465	0.193
	240-279 boys	16 (64.0)	16 (36.0)	0.232	0.070- 0.770	0.017
	≥280 boys	7 (29.2)	7 (70.8)	Ref		
Total number of girls	110-139 girls	22 (47.8)	22 (52.2)	1.263	0.543- 2.936	0.057
	140-179 girls	21 (50.0)	21 (50.0)	1.158	0.489- 2.741	0.079
	180-209 girls	32 (59.3)	32 (40.7)	0.796	0.351- 1.806	0.585
	210-239 girls	15 (41.7)	15 (58.3)	0.621	0.657- 4000	0.025
	240-279 girls	22 (53.7)	22 (46.3)	Ref		
Availability of urinals	Yes	108 (50.9)	108 (49.1)	1.284	0.281- 5.876	0.747
	No	4 (57.1)	4 (42.9)	Ref		
Types of latrine/ toilets	Pit latrines	51 (53.7)	51 (46.3)	0.897	0.454- 1.773	0.755
	VIP latrines	35 (47.9)	35 (52.1)	1.129	0.552- 2.310	0.739
	Water closet	26 (51.0)	26 (49.0)	Ref		
Toilet cleaning	Pupil	59 (50.4)	59 (49.6)	1.063	0.625- 1.809	0.821
	School workers	53 (52.0)	53 (48.0)	Ref		
Latrine/ toilets structure	Stone	36 (52.2)	36 (47.8)	0.701	0.296- 1.661	0.420
	Timber	26 (40.6)	26 (59.4)	1.118	0.465- 2.688	0.804
	Iron sheet	37 (66.1)	37 (33.9)	0.393	0.158- 0.975	0.044
	Mud	13 (43.3)	13 (56.7)	Ref		

DISCUSSION

The study revealed that most of the schools had between 3 and 7 toilets for boys, between 5 and 9 toilets for girls, every school had a separate latrine/toilet for boys and girls. For boys the ratio of toilets ranged from 30 pupils per toilet to 52 pupils per toilet. For girls the ratio of toilets ranged from 32 girls per toilet to 44 girls per toilet. In accordance with Kenya's ministry of education sanitary requirements, a single toilet may accommodate 30 boys.¹⁰ The schools required to implement plans to construct more sanitary facilities because none of the schools had met the international criteria for sanitation. According to international sanitary requirements, there should be 25 girls for every one toilet.¹¹ The study also concurs with Njue & Muthaa, the results of the study showed that the ratio in public schools was 41:1, the ratio in private schools was 31:1, and the ratio in informal schools was the highest at 58:1.¹² There are 38 females for every toilet in the district's schools as a whole. This suggests that there weren't enough facilities in all the schools to accommodate female students. For most of the

schools the ratio was far below the recommendations by the Ministry of Education, which states that sanitation facilities in primary schools should be in the following ratio: - 1:30 for boys; 1:25 for girls. The study findings agree with those in Child Health and Development Centre, Makerere University by Alam and Mukarrom who found that almost all schools surveyed did not meet the minimum sanitation and hygiene school standards.¹³ One in five people defecate in the open and this applies in the case of children.¹

The study found that slightly less than half 104 (47.5%) of schools had less than 5 toilets for boys and 90 (41.1%) of schools had between 5-10 toilets for girls. Additionally, 52 (23.7%) and 66 (30.1%) had more than 10 toilets for boys and girls respectively. This meant that the problem of inadequate latrines could persist for a longer time. The pressure on the few available sanitation facilities was evidenced by the cleanliness of latrines and their wear and tear. A similar study in Nakuru, Kenya, by Wambugu and Kyalo revealed that the major problem in school sanitation was the high pupil/toilet ratio.¹⁰ Kijungu also found that the availability of adequate sanitation

facilities had implications on good hygiene practices in schools indicated by proper use of toilets.⁷ The study found that slightly more than half 112 (51.1%) of schools had water available for hand washing outside the latrines/toilets. Further, the respondents agreed that school hand washing facilities are in usable conditions (Mean=3.9), however, 65 (29.7%) strongly disagreed that the school has constant supply of hand washing soaps and other detergents (Mean=3.0). Studies have suggested that hand washing can prevent 47% of diarrhoeal infections and 30% of acute respiratory infections.¹⁴ Abosi established that lack of resources, such as soap and water, contribute to the low practice of hand washing in schooling children.¹⁵ Some pupils may also forget to wash hands when the location of hand washing facilities away from latrines.¹⁶ A similar study in Nakuru Municipality by Wambugu and Kyalo also found that hand washing facilities in primary schools were inadequate.¹⁰ The location of the hand washing facility were located near the latrine facilities in 71 (83.5%) schools. This result was better than study done by Adukia in South Wollo school facilities near latrine were not available.¹⁷ The same study done by Abosi in North Shewa Kimbibi worda schools showed that, 6.3% of school had hand washing facilities near latrine which is less than Addis Ababa.¹⁵

The study was conducted in only public primary school in Tharaka Nithi County. The privately owned and the faith-based primary schools were excluded thus limiting the generalizability of the study findings. The vast nature of Tharaka Nithi County offered ideal challenges to the access of the respective schools. Also, the dynamics of the school calendar impaired the access to the respective schools.

CONCLUSION

It can be concluded from this study that majority of the schools had scarce existence of sanitary facilities this is revealed by the ratio of pupils to available sanitary facilities. However, this existence has not led to any changes in the improvement of sanitation level because all schools were not sufficiently equipped with the sanitary facilities, water, soap and protective clothing for the workers taking care of the sanitary facilities. It was possible to conclude that there was scarcity of water and soap for hand washing in the schools. The main water source in schools was less than 15m away from sanitary facilities, this led to a conclusion that contamination of water sources can occur easily and cause the spread of disease. This was common in schools that occupied small pieces of land and in schools with poor structural plans that have poorly maintained buildings, inadequate toilets and few hand washing areas. The school management should encourage the involvement of stakeholders in education including NGOs, and community members (PTAs) in the provision of sanitation and hygiene facilities for schools to meet the hygiene needs of pupils in schools. Schools should encourage children to carry

soap from home, as noted in some of the schools, which is deposited with the teacher, and provided every time the child visits the toilet. This will also enable teachers to ensure that children are washing their hands. The schools without hand washing facilities should develop simple modified facilities that were noted in some schools such as water Jeri cans fitted with a tap, which could be fitted outside the toilets and in the classrooms, to ensure children can wash their hands at any time or place.

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