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ASSESSING THE TYPES, CONDITION AND FUNCTIONALITY OF WATER, SANITATION AND HYGIENE FACILITIES IN PUBLIC PRIMARY SCHOOLS IN THE ZABZUGU DISTRICT OF GHANA

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Abstract
This study assessed the types, condition and functionality of water, sanitation and hygiene facilities in public primary schools in the Zabzugu District of the Northern Region of Ghana. This cross-sectional descriptive survey was carried out in February 2015. Twenty-five schools were randomly selected for the study. The results showed that the main WASH facilities in the schools were hand-pump boreholes, covered plastic containers, Kumasi Ventilated Improved Pit latrines, flat-concrete floor urinals, and veronica buckets. The condition of water infrastructure was good in 36% of the schools, satisfactory in 48% of the schools and bad in 16% of the schools. The sanitation infrastructure was good in 28% of the schools, satisfactory in 42% of the schools and bad in 31% of the schools. Handwashing facilities which, were the only hygiene facilities the schools were good in 91% of schools and bad in 9% of schools. Additionally, the available water infrastructure was functional in 42% of the schools, partially-functional in another 42% of the schools and non-functional in 16% of the schools. Sanitation facilities were functional in 85% of the schools, partially-functional in 12.5% of the schools and non-functional in just 2.5% of schools. The study concludes that whereas the available handwashing facilities were underutilised, there was a shortfall of WASH infrastructure in most of the public primary schools in the Zabzugu, including disability-friendly toilets, urinals and menstrual hygiene management facilities. The study recommends that the Ghana Education Service and the Ministry of Education support the schools to improve their infrastructure and intensify education on WASH to ensure usage of the facilities.

Keywords: Wash, Schools, Children, Ghana, Health

Introduction

Water, sanitation and hygiene (WASH) are crucial drivers of public health. The availability, accessibility and usage of (WASH) facilities are associated with the lower levels of morbidity, mortality and expenditure on the treatment of WASH-related diseases, particularly, among children under five years of age (Joshi & Amadi, 2013).

Children have a right to basic facilities such as school toilets, safe drinking water, clean surroundings and basic information on hygiene (Osher, Kelly, Tolani-Brown, Shors, & Chen, 2009; UNICEF, 2013). Creating these conditions in schools have a stimulating effect of helping children to learn better concepts and practices on sanitation and hygiene, which they can introduce to their families (IRC, 2007).

Ensuring access to water and sanitation services in schools promotes the retention of children in school (UNICEF, 2013). It will also contribute towards achieving the sustainable development goal (SDG) 3, which aims at ensuring a healthy life and wellbeing of all; SDG 4, which seeks to achieve an inclusive and equitable quality education and lifelong learning opportunities for all; SDG 5, which concentrates on attaining gender equality and empowerment of all women and girls and SDG 6, which focuses on ensuring the availability and sustainable management of water for all. Providing schools with safe drinking water, improved sanitation facilities and hygiene education, by and large, would encourage children to develop healthy behaviour for life (UNICEF, 2012). WASH services in schools immeasurably help fulfil children's rights to health and education (UNICEF, 2012). The

fact that access to WASH could contribute to improving primary education, reducing child mortality, and promoting gender equality is not new (UNICEF, 2010a). The presence of WASH services creates an environment for effective hygiene practices which creates the right atmosphere for increased access to quality education and supports national and local interventions to establish equitable, sustainable access to safe water and basic sanitation services in schools (Temu, 2015).

As much as the benefits of WASH in schools are countless for the child, family and the nation at large, failure to provide WASH services, poor state of WASH facilities, water scarcity, inferior water quality and inappropriate hygiene behaviour contribute significantly to the current rises in child morbidity and mortality especially, those under five years (UNICEF, 2012; Brown, Cairncross, & Ensink, 2013). Children spend most of their time in schools and often become ill from there (WHO, 2009). It is, thus, necessary to take WASH in school as an option to alleviate child illness at school. It is further established that the lack of appropriate water facilities, handwashing and hygiene practices often lead to diarrhoea, worm infestations and dehydration, which are associated with growth and cognitive impairments (Joshi & Amadi, 2013). Chronic diarrhoeal reinfections could lead to environmental enteropathy, which inhibits efficient nutrient absorption, resulting in stunting (Harper, Mutasa, Prendergast, Humphrey, & Manges, 2018; Prendergast & Kelly, 2016). To reduce the incidence of WASH-related diseases among pupils, schools must be child-friendly – ensure an adequate number of WASH facilities are accessible to school children of all ages including children with disabilities. The Ministry of Education (MoE) added provision of WASH facilities to schools to its 10-year (2010-2020) strategic plan (UNICEF, 2012). The school WASH facilities include sanitation facilities (toilets and urinals); water facilities (water source and storage containers) and hygiene facilities – handwashing and menstrual hygiene management (MHM) facilities (GES, 2014a). For school WASH facilities to prevent faeco-oral route infections they must be improved facilities, low cost and easily accessible by school children (WHO, 2009). Besides availability, the conditions of WASH facilities are major determinants of their usage by pupils (UNICEF, 2013). In Ghana, reliable data on the types, conditions, and functionality of WASH facilities in schools are scarce (GES, 2014a). However, one study in Nigeria found that most primary schools had no handwashing facilities (Eseoghene & Ujiro, 2013). This study contributes to filling that information gap by establishing the types, condition and functionality of existing WASH facilities in public primary schools in the Zabzugu District of the Northern region of Ghana. It is hoped that the study findings will be used by civil society groups to improve the accountability of Government and lobby for the District's fair share of resources for WASH. In addition, policymakers such as the MOH, the GHS and child-rights and WASH advocates including UNICEF and SPRING-Ghana, could use this study's findings to improve WASH facilities and services to primary schools in Zabzugu District.

Materials and Methods

This study is a descriptive cross-sectional survey. The study population was all public primary schools in the Zabzugu District. The study unit was the public primary school, represented by the head teacher or a representative. The study area, Zabzugu district, is a rural area located in the Northern region of Ghana with a population of 63,800 and a literacy rate of 31%. Out of the district's 18,400 people in school, more than half are in primary schools (GSS, 2014). According to the Ghana Education Service (GES), the District has 50 public primary schools in five clusters or circuits – Zazugu (9 schools), Sabare (11 schools), Kukpaliga (12 schools), Gor (8 schools) and Kworli (10 schools) (GES, 2015). Primary schools were selected because the largest proportion of the student population (mainly children) are at that level. Simple random sampling technique was used to select five (5) schools from each of the five educational circuits. In all, 25 public primary schools were included in this study. Semi-structured questionnaires were administered to the selected schools' headteachers or their representatives. Direct non-participant observation checklist was also used to ascertain the types, condition and functionality of WASH facilities in each participating school. Microsoft Excel software was used for both data entry and analysis. The data were summarised into frequency tables according to the students

and teacher's population of the schools and the categories, types, status, condition and functionality of WASH facilities in the schools. The conditions and functionality of WASH facilities were determined based on the following qualitative criteria (CRS, 2012).

Good toilet: is one that is clean (not dirty, not smelly) with doors intact and lockers from the inside.

Satisfactory toilet: is one that is partly clean (somewhat smelly, some doors absent, some squat holes not in use, anal cleaning materials on floor and urine on the floor).

Bad toilet: means a toilet that is unclean and unsafe (smelly, no doors, no lockers, no roof and presence of cracks).

Good urinal: implies a clean urinal (no dirt, no offensive smell, soakaway present and no trace of urine on the floor).

Satisfactory urinal: is partly clean – slightly smelly with traces of urine on the floor.

Bad urinals: means an unclean one (smelly, no soakaway, cracked walls, urine on the floor, filthy).

Functional toilet or urinal: means the facility is in use regardless of its condition.

Partially functional toilet/urinal: means some cubicles are not in use.

Non-functional toilet/urinal: means the entire facility is not in use.

Good water source: means the facility is working and yielding enough water.

Satisfactory water source: means one that is working, but not yielding enough water.

Bad water source: refers to a broken-down facility.

Good storage container: refers to a container that is clean and always covered.

Satisfactory storage container: is either clean, but not covered or covered, but unclean.

Functional water source: means the facility is in use regularly; there is always water.

Partially functional water source: refers to a facility that is either not regularly in use, yields insufficient water or is rationed.

Non-functional water source: refers to a broken-down facility.

Functional storage container: refers to a facility that is in use regularly.

Partially functional storage container: means the facility is not in use regularly.

Non-functional storage container: refers to a broken-down or leaking container.

Good handwashing facility: is one that is clean, covered and has water outlet/taps.

Satisfactory handwashing facility: refers to a clean and not covered facility or vice versa; has no taps.

Bad handwashing facility: refers to a broken down/leaking facility.

Results

All the headteachers of the selected 25 public primary schools participated in the study. The data provided by the headteachers revealed the following. The female teacher to male teacher ratio was 1:4. The average population of children per school was 314; with an average of 142 girls and 171 boys per school. Less than half (40%) of the schools reported having pupils with disabilities; the average was 2 disabled pupils per school. The overall pupils to teacher ratio (PTR) was 54:1, however, there were wide variations between circuits. The highest PTR was 159:1 in Zabzugu circuit, while the lowest was 33:1 in Kukpaligu circuit. The overall gender parity index (GPI) was 0.8 which means that there are fewer girls enrolled in the primary schools compared to boys. A significant number of schools 18 (72%) had more boys than girls with a GPI below one implying more male enrolment than female, while the remaining seven (28%) schools had a GPI above one. Table 1 below shows that Sabare circuit has the highest GPI (0.97) while Kworli has the least GPI (0.73).

Table 1. Population of Teachers and School Children by Sex and by Circuits

Circuit	No. of Teachers		No. of Pupils		No. of Disabled Pupils		PTR	GPI
	Female	Male	Girls	Boys	Girls	Boys		
Zabzugu	13	21	996	1,184	5	6	64:1	0.84
Sabare	2	22	422	433	0	2	36:1	0.97
Kukpaligu	7	24	817	982	1	1	58:1	0.83
Gor	5	23	666	789	0	2	52:1	0.84
Kworli	0	27	657	897	0	0	58:1	0.73
Total	**27**	**117**	**3,558**	**4,285**	**6**	**11**	**54:1**	**0.83**

Source: Fieldwork

Types of WASH Facilities in the Schools

Table 2 below, show that most of the schools 19 (72%) had improved sources of drinking water irrespective of the location. The remaining seven (28%) used water from unimproved sources such as rivers and streams. All the water storage containers were the improved type. A significant number of schools 11 (44%) used covered plastic containers only. Four (16%) schools used polyethylene tanks only (commonly called poly tank) and 10 (40%) schools used a combination of storage containers including plastic containers and concrete tanks. The Kumasi Ventilated Improved Pit (KVIP) was the only type of toilet facility in the schools. The commonest type of urinals 22 (88%) were the "Flat-levelled concrete floor", which are classified as unimproved. Improved urinals (Concrete gutters at floor level and Raised concrete floor) were found in two (8%) schools. Regarding hygiene infrastructure, 18 (82%) schools had "Veronica buckets" and two (9%) had "Tippy taps" for handwashing, which are classified as improved. The remaining two (9%) schools used "small basins", which are unimproved handwashing facilities. No school had menstrual hygiene management facilities for postmenarcheal pupils.

Table 2. Categories, Types and Status of WASH Facilities in the Schools

Category	Facility	Type	No. Of Schools	Percentage (%)	Status
Water Infrastructure	Water Source	Rain	1	4	Improved
		Piped Water	2	8	Improved
		Mechanized Borehole	1	4	Improved
		River/Stream	7	28	Unimproved
		HP borehole	14	56	Improved
		Total	**25**	**100**	
	Storage Containers	Poly Tank	4	16	Improved
		Plastic	11	44	Improved
		Poly Tank & Plastic	8	32	Improved
		Concrete Tank & Plastic	1	4	Improved
		Concrete Tanks, Poly Tanks & Plastic	1	4	Improved
		Total	**25**	**100**	
	Toilet	KVIP	20	100	Improved
		Concrete gutters at floor level	1	4	Improved

Sanitation Infrastructure	Urinal	Flat-level concrete floor	22	88	Unimproved
		Gravelled floor	1	4	Unimproved
		Raised concrete floor	1	4	Improved
		Total	**25**	**100**	
	Handwashing	Veronica Bucket	18	82	Improved
		Tippy Taps	2	9	Improved
		Small Basins	2	9	Unimproved
		Total	**22**	**100**	
Hygiene Infrastructure	MHM	None	None	None	None

Source: Fieldwork

Conditions and Functionality of WASH Facilities in the Schools

As shown in Table 3 below, more than half of the primary schools, 14 (56%) had good sources of water and the rest, 11 (44%) had their water from sources in satisfactory condition. Similarly, nearly two-thirds of the schools, 16 (64%) had functional water sources while nine (36%) had partially-functional sources. The condition of the water storage containers in four (16%) schools were good, 13 (52 %) schools had satisfactory containers and eight (32%) schools had containers in bad state. About a third of the schools, eight (32%) had no functional water storage containers. Partially-functional water storage containers were found in 12 (48%) schools while functional ones were found in five (20%) schools. Of the 20 (80%) schools that had toilets, seven (35%) had toilets in good condition, 12 (60%) had toilets in satisfactory condition and one (5%) had toilets in bad condition. Additionally, majority of schools with toilets 14 (70%) had functional toilets, five (25%) had partially-functional toilets and one (5%) had no functional toilet. A little more than half of the schools, 14 (56%) had bad urinals; six (24%) had satisfactory urinals, while five (20%) had urinals in good condition. All urinals in the schools were functional regardless of their conditions. Of the 22 schools that had handwashing facilities, 20 (74%) had facilities in good condition and two (9%) schools had facilities in a bad state. A significant number of schools 14 (64%) had functional handwashing facilities and eight (36%) had non-functional facilities.

Table 3. Condition and Functionality of WASH Facilities in the Schools

Category	Facility	Condition	No. of Schools	%	Functionality	No. of Schools	%
Water Infrastructure	Water Source	Good	14	56	Functional	16	64
		Satisfactory	11	44	Partially-functional	9	36
		Bad	0	0	Not functional	0	0
		Total	**25**	**100**		**25**	**100**
	Storage Containers	Good	4	16	Functional	5	20
		Satisfactory	13	52	Partially-functional	12	48
		Bad	8	32	Not functional	8	32
		Total	**25**	**100**		**25**	**100**
Sanitation Infrastructure	Toilet	Good	7	35	Functional	14	70
		Satisfactory	12	60	Partially-functional	5	25
		Bad	1	5	Not functional	1	5
		Total	**20**	**100**		**20**	**100**
	Urinal	Good	5	20	Functional	25	100
		Satisfactory	6	24	Partially-functional	0	0
		Bad	14	56	Not functional	0	0
		Total	**25**	**100**		**25**	**100**
Hygiene Infrastructure	Handwashing	Good	20	91	Functional	14	64
		Satisfactory	0	0	Partially-functional	0	0
		Bad	2	9	Not functional	8	36
		Total	**22**	**100**		**22**	**100**
	Menstrual Hygiene Management	NA	NA	NA	NA		

Source: Fieldwork

Discussion

A total of 25 schools from the five circuits in the Zabzugu district participated in this study. Overall, there were 244 teachers and 7,860 pupils in the 25 schools, which is equivalent to a PTR of 54:1. The PTR is indicative of a shortfall of teachers, which is likely to reduce the quality of teaching in the schools. Although females form the majority of the district's population, less than a fifth of teachers were females, which seems to affirm the lower female literacy rate in the District compared to males. In Kworli circuit, there was no female teacher, which suggests that the all-male staff might have placed no premium on the needs of female pupils, particularly menstrual hygiene management. This may have contributed to the low female enrolment in that circuit; it registered the highest disparity in favour of boys (GPI 0.73). Sabare circuit, on the other hand, had the closest enrolment between males and females (GPI 0.97). Nonetheless, boys dominated the schools in Sabare circuit.

Disabled pupils formed less than one percent (0.2%) of the total student population which, is far below the national average of three percent of the total population. This could also reflect the fact that in the wider society, especially in rural areas such as Zabzugu, disabled people are not given adequate opportunity to receive an education. The findings seem to affirm Najjingo's (2009) assertion that most schools are not disability-friendly due to barriers such as the limited access to the classroom, toilets and other

WASH facilities which are all a hindrance to the disabled. This situation threatens the education of disabled children who are already marginalised in society despite some efforts being made for social inclusion of the disabled. This study also discovered that less than a third (28%) of toilet facilities were disability-friendly. Although the Ghana government has introduced the disability bill, it does not appear to be implemented in government schools in the district. This problem is notably pronounced in rural areas with high illiteracy where people hardly see the need to educate a disabled child, thus, do not demand disability-friendly facilities in schools. Zabzugu circuit recorded the highest number of disabled pupils (64%) partly because it is the district capital with a relatively higher literate and economically sound population who may have found it prudent to educate the disabled.

The study further revealed that there were five main sources of water for schools in the Zabzugu district – namely piped water, mechanized boreholes, hand-pump boreholes, rivers/streams and rainwater. Substantially, four of the five water sources were improved and used by majority (72%) of schools. This finding resonates with that of UNICEF (2010b) which, revealed that the commonest sources of water in primary schools in Malawi were improved sources such as boreholes. The most common improved source of water among the primary schools in Zabzugu was hand-pump boreholes, used by 56% of the schools. The river or stream which, is classified by the WHO/UNICEF (2012) as an unimproved water source was used by nearly a third (28%) of the schools. Water from rivers and streams has the potential of causing water-related diseases such as diarrhoea among school children. Moreover, schools that rely on small rivers, streams and rain for water would encounter difficulties in getting water during the dry season and in times of drought when there are no rains.

Regarding water storage containers, three different kinds were identified in the primary schools in the Zabzugu district. They included polyethylene tanks, concrete tanks and covered plastic containers. Substantially, 44% of the schools possessed only covered plastic containers; 16% possessed only polyethylene tanks while the rest (40%) of the schools used a combination of the different containers to meet their water storage needs. All containers were observed to provide protection to their content. Essentially, 84% of the schools had, among others, covered plastic containers making it the commonest storage container in the primary schools in the district.

In spite of the numerous types of approved improved toilets for schools in Ghana including biofil, pour-flush, biogas, convenient toilet and KVIP latrines (GES, 2014a), only the KVIP was found in schools that had a toilet facility. The KVIP was most widely used in schools perhaps because schools found that, compared to the other approved types, it is more culturally acceptable, convenient, financially less expensive to construct and maintain and does not require water which is scarce (GES, 2014b).

Moreover, the study discovered that majority (88%) of the primary schools' urinal types were flat levelled concrete floor urinals. Flat levelled concrete floor urinals are unimproved facilities that do not protect users from urine contamination of feet and body. Further, there were no platforms for feet placement while urinating and none had a roof as specified by the national standards; implying the urinal design did not meet the national standards. In addition, one (4%) school's urinal was gravelled, an indication that it was substandard and unimproved. Urinals which, are approved for schools such as the raised concrete floor and concrete gutters at floor level were found in just as few as two (8%) schools.

With regards to the types of handwashing facilities, the schools used metal veronica buckets (bucket with taps fitted), small basins and tippy taps. According to the WHO (2009), standard handwashing facilities must provide running water; in other words, no two persons should wash in the same water. The veronica buckets and tippy taps meet this standard. However, the small basins which, were used in 8% of the schools did not meet the WHO standard. The commonest handwashing facility was the veronica bucket (76%) with the small basins being the least common handwashing facility. Despite the wide availability of handwashing facilities, handwashing practices would only be effective if other supplies such as water and soap are

regularly available at the schools. Although tippy taps made using simple technology and easily available less expensive local materials, it was not the commonest handwashing facility in the schools.

More than half (56%) of the schools' water sources were in good conditions, which implies that they were working and yielding enough clean water to meet their daily demands. The satisfactory water sources were used by 11 (44%) schools which means that the water quality was compromised and needed purification before it could be consumed. The functional water sources such as hand-pump boreholes that provided enough water to meet the daily drinking and handwashing demands were found in 21 (64%) schools. On the other hand, four (16%) schools had partially-functional water sources because such sources though good and capable of producing sufficient quantities of water for schools were not working regularly. For instance, mechanized boreholes and community piped water that were available in 3 schools were only operational occasionally due to sectoral distribution of water. This suggests that the students and teachers may be unable to practice regular handwashing during times when they run out of water. Majority of schools 13 (52%) had satisfactory water storage containers which, implies that the containers lacked cleaning or were not covered to protect the water from contamination. This kind of storage needs improvement because the water could get contaminated even if the source was improved. Four schools (16%) kept their storage containers in good condition, while eight (32%) schools had storage containers in deplorable condition. Containers in deplorable or bad conditions were either leaking or broken. Although poor management may have contributed to the bad state of some storage containers in the schools, closed proximity to reliable water sources may have rendered the need for water storage (or the containers) unnecessary.

Generally, the management and maintenance of toilets in primary schools in the Zabzugu district were relatively good as 35% of the schools had toilets in good condition and 60% had toilets in satisfactory condition. One school (5%) had toilets in deplorable conditions which, is a far cry from the 57.5% discovered by Aremu (2012) among Nigerian schools. The population of the school that had a bad toilet was 400, which implies that they are unable to practice what they learn in school. The Community-led Total Sanitation programme which, empowers communities to become open defecation free, may succeed in such schools because when the community appreciates the need for a school toilet, they will mobilise resources for its construction and maintenance. It is worth noting that except those in deplorable state, the poor condition of the toilets did not obstruct their functionality. That partly explains the high fact that almost all (95%) schools had functional or partially-functional toilets. The remaining one (5%) that possessed no functional toilet seems to confirm the fact that proper sanitation cannot be practiced without the basic infrastructure. Although majority (70%) of the schools in Zabzugu district had functional toilets, that finding is lower than the 96% found by Kotingo, Ayereti and Chukwuma (2014) among schools in Nigeria. Although the findings show that most of the schools had functional toilets, it also highlights the fact that there is sufficient room for improvement vis-à-vis the provision of functional toilets and WASH facilities in the schools.

Urinals are essential for school children to urinate in privacy and in dignity, but they must be maintained and cleaned regularly. However, this study found that majority (56%) of schools had bad urinals (that is they were unclean, had pools of urine on the floor, cracked walls and floor, strong stench and lacked soak-away) although they were functional. It can only be imagined that pupils had to look for relatively better ground in the urinal to use it. It can be assumed that some children may not use them due to the bad state of the urinals. This could also have health implications on the children due to contamination of hands and feet.

Promoting handwashing among school children is key in reducing the spread of oro-fecal gastrointestinal pathogens and ensuring safer and sound growing children. This can be achieved partly by keeping facilities in good condition. The fact that 91% of the schools in Zabzugu had good handwashing facilities suggest that stakeholders

actively support and promote proper hygiene practices among young children. However, the lower proportion (64%) of functional handwashing facilities means that additional efforts such as education and/or regular supply of clean water and soap may be necessary to change student and teacher behaviour and improve usage.

Conclusion

All the participating public primary schools in Zabzugu District had functional urinals despite some of them being substandard and in bad shape. Additionally, majority of the schools had functional toilets although only half of them were in good condition. This could force some pupils to practice open defecation. Contrarily, over 90% of the schools had good handwashing facilities, yet closed to half of them were not in use. This suggests the need for behaviour change education on handwashing. Finally, there were no menstrual hygiene management facilities or disability-friendly facilities in any of the schools.

Recommendation

The study recommends that the GES, MoE and other stakeholders implement the school WASH policy by supporting public primary schools in the Zabzugu District to improve their WASH infrastructure. This includes increasing the numbers, upgrading the standards and improving the conditions of disability-friendly water sources, toilets, urinals, handwashing facilities, storage containers and menstrual hygiene management facilities. This should also be accompanied by intensified WASH education in the schools, particularly handwashing, to ensure the facilities are functional.

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