

School Sanitation-Related Psychosocial Stressors among Nigerian Students

Ojima Zechariah Wada,^{1,5*} Aminat Opeyemi Amusa,² Fiyinfoluwa Taiwo Asaolu,³ David Olatunde Akinyemi,⁴ and Elizabeth Omoladun Oloruntoba⁵

¹Division of Sustainable Development, College of Science and Engineering, Hamad Bin Khalifa University, Doha, Qatar; ²Department of Medicine and Surgery, College of Medicine, University of Ibadan, Ibadan, Nigeria; ³Department of Biomedical Science, De Montfort University, Leicester, United Kingdom; ⁴Department of Psychology, Faculty of Social Sciences, University of Ibadan, Ibadan, Nigeria; ⁵Department of Environmental Health Sciences, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria

Abstract. Psychosocial stressors are indicative of challenges associated with the social and environmental conditions an individual is subjected to. In a bid to clearly understand the present gaps in school sanitation, this cross-sectional study aimed to identify the sanitation-related psychosocial stressors experienced by students in a Nigerian peri-urban community and their associated impacts. A three-stage sampling technique was used to select 400 students from 10 schools. The students to toilet ratio were 1,521:0 and 1,510:0 for the public-school boys and girls, respectively, and 74:1 and 70:1 for the private-school boys and girls, respectively. Furthermore, public-school students had a significantly higher average stress level ($P < 0.001$, $\eta^2_p = 0.071$) and a significantly higher proportion of students experiencing school absenteeism ($P < 0.001$; odds ratio [OR] = 4.8; 95% confidence interval [CI] = 2.7–8.2), missed classes ($P < 0.001$; OR = 5.8; CI = 2.8–12.0), long urine/fecal retention time ($P < 0.001$; OR = 2.9; CI = 1.8–4.7), open defecation practice ($P < 0.001$; OR = 4.2; CI = 2.5–7.1), and open defecation-related anxiety ($P < 0.001$; OR = 3.6; CI = 2.0–6.5). Moreover, the inability to practice menstrual hygiene management was significantly associated with student-reported monthly school absence among girls ($P < 0.001$; OR = 4.5; CI = 2.2–9.4). Overall, over 50% of the respondents had reportedly been subjected to at least 14 of the 17 stressors outlined. The most prevalent stressors identified were concerns about disease contraction, toilet cleanliness, toilet phobia, privacy, and assault/injury during open defecation/urination. In conclusion, results show that the absence of functional sanitation facilities purportedly has a grievous effect on the mental, physical, social, and academic well-being of the students. This was clearly seen among public-school students. Subsequent sanitation interventions need to be targeted at ameliorating identified stressors.

INTRODUCTION

Water, sanitation, and hygiene are important for well-being. Globally, concerted efforts have been made first under the Millennium Development Goals (1990–2015) and now the sustainable development goals (2016–2030) in a bid to reduce the inadequate global WASH coverage.¹ In 2015, the sustainable development goals were adopted globally with target 6.2 aimed at achieving improved access to adequate and equitable sanitation and hygiene for all and end open defecation, while paying special attention to the needs of women and girls together with those in vulnerable situations. Five years later, about one-third of the global population still does not have access to basic sanitation services out of which 673 million people practice open defecation.² Poor sanitation has not only been linked with transmission of diseases such as cholera and hepatitis A but also a reduction in socioeconomic development because of its mental and social health outcomes such as anxiety, emotional distress, loss of school/work hours, sexual assault, harassment, and violence.^{2–5}

Narrowing down to Nigeria, the situation is quite peculiar as most of the citizens are within the educational age bracket. The country has a population of around 211,000,000, with over 70% of her population under 25 years and a median age of 18.1 years.⁶ This signifies that schools are important in the health status of this category of the population as they spend a significant amount of their time in the academic environment. Schools are also important because they are

stimulating learning environments that have the potential to significantly alter students' behavior patterns leading to improved sanitation and hygiene practices both in school, at home and in their resident community at large.⁷ With Nigeria's current position as the world's open defecation capital,⁸ prioritizing school-based assessments will certainly enhance our understanding of needed measures to be taken to achieve the SDG 6 targets in due time.

In addition, studies have linked sanitation with completion of both primary and secondary education.^{9,10} The comparatively large advantage of sanitation on school-age boys and girls can be seen from a study in India, which recorded an 8% increase among pubertal children and 12% among pre-pubertal children enrolment in schools following a national program to build school toilets.¹¹ Besides dropping out of school, other vices resultant from poor school sanitation are absenteeism, physical harm, harassment, and stigmatization among both male and female students.^{12–14} A study across schools in Badagry, Nigeria, reported sanitation-related challenges such as violent attacks and injuries had been experienced by a third of the students, whereas one-fifth of the respondents had lost learning hours because of inaccessibility of sanitation facilities.¹⁴ Comparatively, women and girls are also more susceptible to harassment and violence when using public sanitation facilities.¹⁵

Considering the dire state of sanitation in Nigeria and the significance of the student population, this study seeks to identify the sanitation-related psychosocial stressors faced by students in public and private secondary schools in a peri-urban Nigerian community. Identifying the students' sanitation-related psychosocial stressors will provide valuable data to the local education and public health ministries on the priority areas future school sanitation interventions need to address.⁵ The study also relates the stressors to the

* Address correspondence to Ojima Zechariah Wada, Division of Sustainable Development, College of Science and Engineering, Hamad Bin Khalifa University, Doha, Qatar. E-mail: ojimawada14@gmail.com

sanitation facilities available in schools and examines the direct impact of the available facilities on the students' physical and academic well-being. The study area was selected not only because it depicts the low socioeconomic status of majority of Nigerians, but also because the community was one of the local government areas (LGAs) in southwestern Nigeria reported by the Nigerian Center for Disease Control (NCDC) to have experienced a re-emergence of cholera outbreak.^{16,17}

METHODS

Study area. The survey was carried out in Akinyele LGA Ibadan, Nigeria. Akinyele LGA is one of the eleven LGAs in West Africa's largest city, Ibadan. It is located at the outskirts of the city and is relatively less developed than other LGAs within the city. Surrounded by Afijo LGA, Lagelu LGA, Ido LGA, and Ibadan North LGA to the north, east, west, and south, respectively, its land area covers about 510 km.² In 2010, the population of the residents in the LGA was extrapolated to be just under 240,000. Additionally, Akinyele LGA comprises 12 wards, consisting of both rustic and developed localities, with a significant portion of the residents depending on farming as a means of livelihood.^{18,19}

Study design and population. The study design was cross sectional. The study population consisted of senior secondary school students within the Akinleye LGA. Students in their final 3 years were chosen as respondents because of their years of experience with the sanitation facilities in the school environment. Such students are expected to identify the school sanitation-related stressors to a greater extent than fresh and younger students. A minimum sample size of 351 was determined using the Leslie Kish formula based on a 35.4% prevalence of poor school sanitation practice,¹⁴ at 95% confidence level and 0.05 margin of error. Including a 14% nonresponse rate, the sample size increased to 400 students. Eventually, a 95.5% response rate was achieved (382 respondents).

Sampling technique. A three-stage sampling technique was used to select the five wards from the 11 via simple random sampling, stratified and balloting to select one government-own school and one private school (PS) from each ward, and finally stratified, and proportional allocation and simple random sampling to select the respondents. To maintain the privacy of the schools, the PSs were renamed as PS 1, PS 2, PS 3, PS 4, and PS 5; whereas the government schools (GSs) were renamed as GS 1, GS 2, GS 3, GS 4, and GS 5.

Data collection instrument and procedure. Data were obtained by using a pre-tested semi-structured questionnaire and an observational checklist. The questionnaire consisted of three sections: 1) sociodemographic characteristics, 2) sanitation-related psychosocial stressor scale, and 3) impact of available sanitation facilities on students' well-being. The stress scale was self-developed to fit the local setting. The pre-test was conducted among secondary school students in Ibadan North LGA, a neighboring LGA. By using Cronbach's alpha, the internal consistency of the questionnaire was estimated to be 0.849. Face validation performed by expert child and adolescent academics was also used to validate the stress scale. The observational checklist assessed the schools for the availability of basic sanitation,

water, and hygiene facilities. It also accounted for their functionality and the number of sanitation facilities available to each student. Besides, the questionnaires were administered by trained research assistants who ensured that respondents filled their responses independently and completely.

Data management and analysis. Data obtained was entered into Microsoft Excel, cleaned then exported to JASP 0.14.1.0 for statistical analysis. The stress scale that consisted of 17 questions with responses "Never," "Sometimes," "Often," and "Always" was ranked as 0, 1, 2, and 3, respectively. The summation of each respondents' response was taken to give an aggregate stress level. The stress level ranged from 0 to 51. Descriptive statistics was used to obtain the mean stress levels, and the frequency and proportion of variables in the three questionnaire sections. Inferential statistics was performed at 0.05 level of statistical significance using bivariate analysis like one-way analysis of variance (ANOVA) and χ^2 test for independence, and multivariate analysis like ANCOVA and logistic regression. ANOVA was performed to assess for significant differences between the respondents' mean stress levels and their sociodemographic characteristics. In cases where variances were unequal (i.e., significant Levene's test), ANOVA with Welch was used for the analysis and Games-Howell post-hoc test was used in place of the Tukey's standard post-hoc test. The effect size of significant associations was measured using partial eta (η^2_p). χ^2 was used to derive associations between sociodemographic variables and some of the sanitation implications identified. The effect size for significant associations was measured using Cramer's V. Finally, ANCOVA was used to determine whether the student to toilet ratio was a significant covariate for measuring sanitation-related stressors, whereas logistic regression was used to identify the predictors of sanitation-related stressors. Solely to perform logistic regression, stress levels were recategorized into low-stress level (0–8) and moderate to high-stress level (9–51).

Ethical consideration. Ethical approval was obtained from Oyo State Ministry of Health, Research, and Ethics Review Committee. Approval was also obtained from Oyo State Ministry of Education, Science, and Technology. In addition, permission was requested from each principal to enrol the students, and assent was obtained from each student.

RESULTS

Sociodemographic characteristics of respondents.

The respondents had a mean age of 15.64 ± 1.64 years, with their ages ranging from 11 to 21 years. Majority were enrolled in GSs as opposed to PS. Close to 90% of the students belonged to the Yoruba ethnic group, showing the study area is quite homogenous. Also, only around 37% and 27% of the respondents' fathers and mothers, respectively, had attained tertiary education. Further details of the respondents' sociodemographic can be found in Table 1.

Participant and environmental observation. *Sanitation facilities.* None of the GSs had a functional toilet facility at the time of the survey, with each school having peculiar challenges. In schools GS 1 and GS 5, there were no sanitation facilities available for the students. In school GS 3, sanitation facilities were available but inaccessible to the students (under lock), thereby making it non-functional. The toilet facilities could not even be accessed by the research team

TABLE 1
Respondents' sociodemographic characteristics

Characteristics	Frequency (N = 382)	Percentage (%)
Gender		
Male	156	40.9
Female	226	59.1
Class		
Senior Year 1	148	38.8
Senior Year 2	164	42.9
Senior Year 3	108	28.3
Type of school		
Government-owned school	293	76.7
Private school	89	23.3
Mother's highest level of education		
Primary	47	12.4
Secondary	212	55.5
Tertiary	104	27.1
No formal education	19	5.0
Father's highest level of education		
Primary	39	10.3
Secondary	174	45.6
Tertiary	142	37.2
No formal education	27	6.9
Ethnic group		
Yoruba	332	86.9
Hausa	14	3.7
Igbo	19	5.0
Igala, Idoma, Tiv, Egun	17	4.4

because of the unavailability of the key. Furthermore, school GS 2 had unimproved toilet compartments (pit latrines without slab) with no water source. The surroundings of the toilet compartments were littered with decomposed faeces. Finally, school GS 4 had toilets that were blocked, with toilet

bowls filled with faeces. This was no surprise as an average of 669 students depended on each of the two toilets available in the school.

Considering the PSs, all had clean and functional toilets during the survey. Only PS 5 had common use toilet facility, as opposed to gender-segregated toilets available in other PSs. Furthermore, among the investigated schools, PS 4 and PS 2 had the best students to toilet ratio of 27:1 and 30:1, respectively. Detailed outline of the student to toilet ratio for each school can be found in the supplementary material (Supplemental Table 1).

Water and hygiene facilities. Of all the schools visited, only school GS 5 had a drinking water source available for the students. The water source was a borehole powered by an electric pump. Generally, students had access to potable water via kiosks selling sachet water around the school vicinity. Moreover, none of the GSs had handwash facilities present. There were no wash hand basins, soap, or water available for hand hygiene. On the other hand, all the PSs had at least a form of wash hand basin and made water provision. However, none of the handwash stations had soap.

Sanitation-related psychosocial stressors. Table 2 outlines the frequency and proportion of responses to each of the stressors assessed. Over 50% of the respondents had been subjected to at least 14 of the 17 stressors outlined. The most prevalent stressors among the students were concerns about contracting diseases traceable to the use of school toilet facilities, concerns about the cleanliness of the toilet facilities, concerns about long urine and fecal holding time because of poor state of the toilets, concerns about missing classes when a need arises to use the toilet facilities,

TABLE 2
Sanitation-related psychosocial stressors

Stressors (N = 382)	Never (%)	Sometimes (%)	Many times (%)	Often (%)
I feel stressed worrying if water would be available at the school toilet facilities when I have to use the toilet	39.6	36.8	15.8	7.8
I feel stressed worrying if soap would be available at the school toilet facilities to clean up when I need to	32.6	38.3	19.8	9.4
I feel stressed worrying if I would contract a disease if/when I use the school toilet facilities	36.7	26.1	26.9	10.3
I feel stressed worrying if the school toilets would be clean enough when/if I need to use them	26.6	37.2	22.4	13.8
I feel stressed worrying if the toilet facilities would be locked up or inaccessible when/if I want to use them	39.6	31.3	19.7	9.3
I feel stressed worrying if I have to hold myself for long because there might be people in the toilets or because the toilets might not be conducive for use	32.0	40.3	22.5	5.2
I feel stressed worrying about how to dispose sanitary materials in the school toilet facilities	43.4	33.1	16.3	7.2
I feel stressed worrying if the school toilets are private and safe enough for me to use	35.0	37.6	17.4	10.1
I feel stressed worrying if I would miss classes when/if I go to ease myself during school hours	37.1	35.6	20.5	6.8
I feel stressed worrying if my opposite sex would be in the toilet facilities when I want to use them	46.8	30.0	15.0	8.3
I feel stressed worrying if my opposite sex would come into the toilet facility when I am using it	45.5	29.7	16.5	8.3
I feel stressed worrying if I have to fetch water from a far distance to use the toilet and clean-up while at school	46.9	32.1	15.3	5.7
I feel stressed worrying if I would pee or defecate on myself, when I have to hold myself while at school	51.3	29.0	14.2	5.4
I feel stressed wondering if I would be forced to practice open defecation while at school because of the condition of the toilet facilities	51.6	29.8	11.9	6.7
I feel stressed worrying if I would be assaulted sexually if/when I defecate or urinate in the open (e.g., bush, field) while at school	50.8	24.1	16.8	8.3
I feel stressed worrying if I would be subject to embarrassment if someone sees me defecating or urinating in the open while at school	46.5	32.2	15.3	6.0
I feel stressed worrying if I would be attacked/injured by snakes, scorpions, thorns, or broken bottles if/when I defecate or urinate in the open while at school	49.0	25.6	15.0	10.4

and concerns about being attacked/injured by bandits while urinating/defecating in the outdoor environment. Also, the average stress level of the students was 15.64 ± 8.13 , ranging from 0 to 51.

Factors associated with the respondents' sanitation-related psychosocial stressors. The mean stress level for the students was 15.64 ± 8.13 , with the GS students having a significantly higher level of WASH-related psychosocial stressors (16.84 ± 11.71) than the PS students ($P < 0.001$). GS 4 had the highest mean stress level (19.67 ± 6.890), significantly higher than PS2, PS3, PS 4, and PS5, whereas students from PS 4 had the lowest stress level (8.39 ± 4.50), significantly lower than GS 1, GS 2, GS 3, GS 4, GS 5, PS3, and PS 5. None of the GSs had a lower stress level than any of the PSs. The average stress levels across the schools, along with the minimum and maximum values can be seen in the supplementary material (Supplemental Table 2).

Furthermore, when considering the gender of the respondents, the level of WASH-related stressor among male students (16.78 ± 9.00) was significantly higher than the level among the female students (14.88 ± 7.39) with $P = 0.025$. Other variables like class level, parents' level of education, and age were not significantly associated with stressor levels. However, the students' stressor level increased as the parents' level of education decreased. Students whose parents had no formal education had the highest average stressor level, whereas those whose parents had tertiary education had the least. Table 3 provides details of these associations.

PREDICTORS OF THE RESPONDENTS' SANITATION-RELATED PSYCHOSOCIAL STRESSORS

Furthermore, from the logistic regression model derived (Supplemental Table 3), the variables that significantly predicted the students' psychosocial stressors were student to toilet ratio and school type. Public school students were 11.8 times more likely to experience moderate to severe stress levels as opposed to PS students. Furthermore, the model predicted a unit decrease in the student to toilet ratio increases the likelihood of students having lower stress levels.

Impact of available WASH facilities on the students' academics and well-being. The most notable implications identified by the students were school absenteeism (47.9%),

long urine/faeces retention time (62.5%), open defecation practice (53.8%), stigmatization associated with open defecation (64.5%), and incidences of diseases like malaria (50%) and typhoid (15.3%). Moreover, over 40% of the female students reported being absent during monthly menstruation. The number of absent days each month averaged 1.82 ± 1.01 days. Details about the implications highlighted by the students can be accessed in the supplementary results (Supplemental Table 4).

Furthermore, the factors associated with each implication was accessed as seen in Table 4. GS students and male students were 4.7 times and 1.7 times more likely to be absent from school compared with their PS and female students, respectively. Female students in public schools were also 4.5 times more likely to be absent from school during menstruation. A similar trend was observed when examining other implications like missed classes, open defecation practice, stigmatization because of open defecation practice, and subjection to attack/injury during open defecation practice.

DISCUSSION

Functionality of school sanitation facilities. The absence of functional toilets in all the public schools was alarming. In the schools where toilets were available, the high pressure on limited toilet compartments rendered the facilities unclean and unfunctional. The extreme student to toilet ratios recorded exceeds the local requirement of 30 boy/girls to 1 toilet compartment.²⁰ Also, only 40% of the PSs met this quota. Similar results have also been obtained in other school-sanitation surveys conducted in Nigeria and other African countries.^{14,21–23} Proactive measures need to be taken by the local Ministries of Health and Education to enforce the school sanitation policies across board.²⁴ Furthermore, the inaccessibility of students to available toilet facilities encountered in one of the public schools and the presence of common-use toilets in one of the PSs have also been reported by another survey.¹⁴ School administrators need to be made to understand that toilets are essential facilities that need to be accessible round the clock. Locking them up to preserve their longevity only does harm to the students. Also, the presence of common use toilets in

TABLE 3
Factors associated with respondents' sanitation-related stressors

Variables		Sum of squares	df	Mean square	F	P value	η^2_p
All schools	Between groups	2,744.51	9	304.95	5.06	< 0.001*	0.109
	Within groups	22,441.36	372	60.33			
School type	Between groups	1,795.33	1	1,795.33	29.17	< 0.001*	0.071
	Within groups	23,390.54	380	61.55			
Gender	Between groups	329.50	1	329.500	5.03	0.025*	0.013
	Within groups	24,812.14	380	65.47			
Class level	Between groups	367.65	2	183.83	2.71	0.068	0.015
	Within groups	23,403.55	379	67.84			
Age	Between groups	15.91	1	15.91	0.24	0.624	0.014
	Within groups	25,169.96	380	66.24			
Fathers' LE	Between groups	18.53	3	6.17	0.094	0.964	0.011
	Within groups	24,419.89	378	66.00			
Mothers' LE	Between groups	260.66	3	86.89	1.32	0.269	7.6e ⁻⁴
	Within groups	24,367.52	378	66.04			
ANCOVA	School type	1635.84	1	1635.84	26.908	< 0.001*	0.066
	Student:toilet	349.285	1	349.29	5.745	0.017*	0.015
	Residuals	23,041.26	379	60.795			

School type: GS or PS; LE: Level of Education; ANCOVA analysis consisted of school type as nominal variable and student to toilet ratio as a covariate.

TABLE 4
Association between identified impacts and selected sociodemographic characteristics

Variables			χ^2	P value	Odds ratio and CI	Cramer's V
Absenteeism because of status of school WASH facilities						
School	Yes	No				
Public	164 (55.9%)	129 (44.1%)	32.77	< 0.001*	4.676 2.680–8.159	0.292
Private	19 (21.3%)	70 (78.7%)				
Gender	Yes	No				
Male	87 (55.6%)	69 (44.4%)	6.331	0.012*	1.689 1.121–2.544	0.129
Female	96 (42.6%)	130 (57.4%)				
Absenteeism during menstruation because of the condition of WASH facilities						
School	Yes	No				
Public	87 (52.1%)	80 (47.9%)	18.575	< 0.001*	4.548 2.204–9.385	0.288
Private	11 (19.3%)	46 (80.7%)				
Missed classes because of inaccessible sanitation facilities						
School	Yes	No				
Public	115 (39.4%)	178 (60.6%)	26.62	< 0.001*	5.775 2.789–11.960	0.294
Private	9 (10.1%)	80 (89.9%)				
Gender	Yes	No				
Male	63 (40.4%)	93 (59.6%)	7.768	0.005*	1.852 1.198–2.862	0.143
Female	61 (26.8%)	165 (73.2%)				
Long urine/faeces holding hours in while at school						
School	Yes	No				
Public	209 (71.5%)	84 (28.5%)	18.78	< 0.001*	2.871 1.765–4.672	0.223
Private	41 (46.7%)	48 (53.3%)				
Gender	Yes	No				
Male	95 (61.0%)	61 (39.0%)	2.311	0.128	0.717 0.466–1.102	–0.078
Female	155 (68.6%)	71 (31.4%)				
Inability to use toilets comfortably because of absence of privacy						
School	Yes	No				
Public	199 (67.8%)	94 (32.2%)	15.24	< 0.001*	2.579 1.590–4.184	0.199
Private	40 (44.9%)	49 (55.1%)				
Gender	Yes	No				
Male	93 (59.9%)	63 (40.1%)	0.886	0.347	0.818 0.537–1.244	–0.048
Female	146 (64.6%)	80 (35.4%)				
Subjected to open defecation practice because of poor WASH facilities						
School	Yes	No				
Public	181 (61.8%)	112 (38.2%)	30.56	< 0.001*	4.186 2.467 – 7.103	0.288
Private	25 (27.9%)	64 (72.1%)				
Gender	Yes	No				
Male	93 (59.9%)	63 (40.1%)	3.499	0.061	1.492 0.980 – 2.270	0.098
Female	113 (50.0%)	113 (50.0%)				
Attacked/injured during open defecation practice						
School	Yes	No				
Public	62 (21.3%)	231 (78.7%)	5.394	0.020*	2.369 1.124 – 4.992	0.120
Private	9 (10.2%)	80 (89.8%)				
Gender	Yes	No				
Male	36 (23.0%)	129 (77.0%)	3.126	0.077	1.598 0.948 – 2.695	0.091
Female	36 (15.8%)	190 (84.2%)				
Experienced the shame of been seen defecating in the open						
School	Yes	No				
Public	125 (42.7%)	168 (57.3%)	18.632	< 0.001*	3.578 1.957 – 6.541	0.223
Private	15 (17.2%)	74 (82.8%)				
Gender	Yes	No				
Male	70 (44.9%)	86 (55.1%)	7.830	0.005*	1.834 1.197 – 2.812	0.145
Female	69 (30.7%)	157 (69.3%)				

secondary school hampers the privacy of the students, this can potentially make students adverse to using the facilities.^{25,26}

Sanitation-related psychosocial stressors. Women and girls are usually the focus in matters relating to sanitation. However, this study uniquely provides a gender-balanced view of sanitation-related psychological stressors faced by students. We established that sanitation-related psychosocial stressors are subtle ordeal both male and female students deal with alongside academic challenges, particularly in low resource settings such as Akinyele LGA. Interestingly, this study found a significantly higher WASH-related stressor among male than female students contrary to past studies

focused on women and girls.^{12,15} This result may not be linked to chance as there were more females in this study than males. Hence, this further speaks to the critical need for a safe and sanitary environment for not only women and girls but men and boys inclusive. We also identified stressors broadly categorized into environmental (e.g., injury while practicing open defecation), physical (e.g., distant water source, long urine/fecal retention time to avoid poor toilet conditions), sexual (e.g., fear of sexual assault), and social (toilet safety and privacy concerns). Nevertheless, students most prevalently reported stressors including concerns about contracting diseases, missing classes when attending to nature's call, toilet sanitary conditions, toilet inaccessibility

(under lock), long urine/fecal retention time to escape poor toilet conditions, fear of been physically attacked while practicing open urination or defecation. This finding aligns with those of other studies in India and sub-Saharan Africa.^{15,27} Students also reported concerns about lack of soap and water similar to the findings of Amoran et al. (2017) in Ogun State, Nigeria.²⁸ This could hamper proper hygiene practices of students further predisposing them to infections and diseases (e.g., cholera and dysentery).

Besides, a significantly higher level of sanitation-related stress was observed among public schools. This is predicated upon the alarming rate of toilet inaccessibility, inadequate or lack of functional toilets, poor sanitary conditions of available toilets, and high student to toilet ratio in public schools compared with their private counterparts.^{5,28} Bisi-Onyemaechi and colleagues (2016) also reported grossly inadequate toilet facilities in certain public schools in Enugu and a standard rate of student to toilet ratio of 30:1 in a few PSs, which was also linked to affect the students' well-being.²⁹ The grossly inadequate state of sanitation facilities most probably leads to long queues at the toilet causing students to miss classes, whereas others will have to go far into the bush, field, or secluded spaces to get a semblance of privacy, which predisposes them to diverse health risks such as tears from sharps like thorns and broken bottles, attack from biting insects and animals like snakes and scorpions, and incidences rape.¹⁴ Although sanitation-related psychosocial stressors exist among male and female students in both public and PSs, they can be avoided or at least minimized. School administrators should begin to prioritize and meet the WASH needs of students in their schools. They must realize also that these stressors negatively impact the psychological well-being of their students.⁵

Adaptive behaviors and associated impacts. Poor toilet sanitary conditions, inaccessibility, and unavailability of WASH facilities contribute to alternative seeking and adaptive behaviors (such as open defecation, long urine/fecal retention) among students. For instance, 62.5% and 53.6% of the student population in this study practiced long urine/faecal retention and forced open defecation, respectively. Open defecation has been linked to lack of WASH facilities, toilet privacy and safety issues, poorly maintained toilets in different communities.³⁰⁻³² This practice may consequently expose students to stigmatization/embarrassment, risk of physical and sexual assault as well as diseases (Sahoo et al., 2015). A recent study in Badagry, Nigeria, reported that a third of the students had experienced sanitation-related challenges such as violent attacks and injuries.¹⁴ Besides, frequent, prolonged, and intentional urine retention may lead to bladder discomfort/dysfunction and impair students' mental function.³³ Moreover, this study highlighted WASH facility status-induced absenteeism among students with significantly higher frequency among public schools and female students. Lack of WASH facilities in schools has been associated with absenteeism among female students especially during their monthly menstrual cycle.^{34,35} However, more male students in this study reported higher loss of learning hours because of poor access to sanitation facilities, particularly in public schools. To reduce demand for the already overburdened toilet facilities, male students may opt for alternative sources (e.g., open defecation in a far bush), causing them to miss classes. It is however important that as the demand and efforts to prioritize access of

women and girls to sanitation facilities, boys should not be left out as well. Searching for water over a long distance (> 200 m) during school hours is distractive for students. Likewise, total absenteeism and periodic missing of class because of WASH-related issues may adversely affect the academic performance of students. Overall, effective, functional, and adequately maintained WASH facilities are important for boys and girls to relax, be comfortable, and focus better on school.³⁶⁻³⁸

Study limitations. Because of the cross-sectional nature of the study, causal inference could not be ascertained between psychosocial stressors and the availability of WASH facilities. However, results from this survey provides a strong foundation more rigorous research designs like a prospective cohort study in the study location. Local study limitations include the difficulty in accessing some schools in the peri urban LGA because of poor road infrastructure and a case of social vices among students in some of the schools during data collection, which put the research team at risk of bodily damage.

CONCLUSION

Although Nigeria among other countries has committed to SDG6 ensuring access to water and sanitation for all, loose ends still need to be tied viewing from the lens of Akinyele LGA in Ibadan. This study highlighted important sanitation-related stressors experienced by boys and girls in public and private schools, with significantly high sanitation stressors among public schools as well as boys. Although women and girls have always been disproportionately affected by abysmal sanitation infrastructure and practices, this research suggests that the boys should not be neglected in the process. Adequate provision of and access to WASH facilities in schools would reduce associated stress and promote physical and mental well-being of students. Besides the health benefits to the students, school administrators should also note that good and well-maintained toilet facilities add to the overall outlook and market value of their school, reduce absenteeism, and promote willingness to learn among students. Future research may investigate how student involvement in establishing and maintaining school WASH facilities can improve access to and usage of WASH facilities.

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Author's addresses: Ojima Zechariah Wada, Division of Sustainable Development, College of Science and Engineering, Hamad Bin Khalifa University, Doha, Qatar, and Department of Environmental Health Sciences, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria, E-mail: ojimawada14@gmail.com. Aminat Opeyemi Amusa, Department of Medicine and Surgery, College of Medicine, University of Ibadan, Ibadan, Nigeria, E-mail: amusa.aminatope@gmail.com. Fiyinfoluwa Taiwo Asaolu, Department of Biomedical Science, De Montfort University, Leicester, United Kingdom, E-mail: fiyinfoluwataiwo@gmail.com. David Olatunde Akinyemi, Department of Psychology, Faculty of Social Sciences, University of Ibadan, Ibadan, Nigeria, E-mail: akinyemidavidolatundeb@gmail.com. Elizabeth Omoladun Oloruntoba, Department of Environmental Health Sciences, Faculty of Public Health, University of Ibadan, Ibadan, Nigeria, E-mail: li_zzyy@yahoo.com.

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