



Healthful School Environment in Primary Schools: A Cross-Sectional Study of Gwagwalada Area Council, Federal Capital Territory, Nigeria

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Summary

BACKGROUND

Children spend long hours of the daytime in schools where they are exposed to the various components of the school environment which may affect their health status. There is, therefore, a need to constantly evaluate the status of the school environment. This study sought to assess the school environment in primary schools in Gwagwalada Area Council in the Nigerian Federal Capital.

MATERIALS AND METHODS

A descriptive cross-sectional study was carried out among 146 public and private primary schools using the school environment component of the school health programme evaluation scale. The key variables in the evaluation scale included the methods of sewage and refuse disposals, infrastructural features of the classrooms, sitting comfort for pupils and teachers, health hazards and safety measures in the schools, healthful living in the schools as well as evidence of maintenance of the school environment.

RESULTS

A borehole was the source of water supply in 76(52.1%) schools. Of the 118(80.8%) schools with water closet toilets, 103(97.3%) were private while 15(37.5%) were public schools. In 127(87%) schools, the refuse disposal method was open dumping/ burning. Ventilation was adequate in 38(95%) public and 55(51.9%) private schools ($p < 0.001$). School fence was present in 102 (69.9%) schools.

Overall, only 6 (5.7%) out of the 106 private schools scored up to the acceptable minimum score of 57; no public school attained such a score (Fischer's exact 2.361, p -value = 0.124).

CONCLUSION

The environments of primary schools in Gwagwalada Area Council, lack the basic requirement to make them healthful. A mechanism should be put in place to ensure compliance with a standard environment.

Keywords: Healthful school environment, primary school, Gwagwalada, Nigeria

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Introduction

Children spend long hours of the daytime in schools where they get exposed to the diverse components of the school environment which may affect their health status.[1] A good environment is an important factor for good health.[2] World Health Organization estimated that between 25 – 33% of the burden of disease globally is attributable to environmental risk factors, with 40% on children younger than 5 years. Furthermore, a meta-analysis has shown the minimum environmental component of any disease category to be 5% [3]

Children are more vulnerable to the adverse health effects of environmental hazards than adults. This may be due to their relative reduction in immunity, immaturity of organs and functions, and rapid growth and development compared to adults. Also, children's behavioural patterns, such as putting objects in their mouths indiscriminately are distinctly different from adults and this places them at a greater risk of exposure to environmental infectious agents than adults.[4] A high proportion of school lost days in both developing and developed nations are considered to be due to diseases contracted within the school environment.[4] Also, significant physical injuries were reported to be sustained by children within the schools even in the developed world.[5,6] Therefore, there is a need for the school environment to be healthy and safe for children.

A healthful School Environment (HSE) is an integral component of a school health programme. According to the American Academy of Paediatrics, a healthful school environment protects students and staff against immediate injury or disease and promotes preventive activities and attitudes against known risk factors that might lead to future disease or disability.[7]

Various authors have reported poor/unhealthy school environments in Nigeria.[5,8-10] Studies have shown that these prevailing conditions could have a profound negative impact on the health of school children.[9,11] There is therefore a need to constantly evaluate the status of the school environment. No study was carried out before now to evaluate the primary school environment at the current study location, hence, the need for the present study.

This study sought to assess the status of school environments in primary schools in Gwagwalada Area Council (GAC), Federal Capital Territory (FCT).

Materials and Methods

Study design

This study was a descriptive cross-sectional study. The study location was Gwagwalada Area Council. It is one of the six area councils of the Nigerian Federal Capital Territory located in the Northcentral region. It falls within latitude 7 degrees 25 min and 9 degrees 20min North of the equator and longitude 5 degrees 45 min and 7 degrees 39 min East of Greenwich meridian.[12] Its projected population as of 2016 was 402 000 people.[13]

The study was carried out over a period of seven months (April to October 2017) in Public and private primary schools.

There were 291 registered primary schools, consisting of 80 public and 211 private schools in the Area Council. The authority of the schools lies with the Universal Basic Education (UBE) Board and Zonal Education Office (ZEO), Gwagwalada.

Sample size determination

A sampling ratio of 50% of all registered schools was surveyed, giving the largest size for the chosen error margin of 0.05.[14] Therefore, with a sampling ratio of 50%, 146 schools were selected from 291 for the study.



Sampling technique for the schools

The primary schools were stratified into public and private schools. There were 80 public and 211 private primary schools in Gwagwalada Area Council. With a sampling ratio of 50% applied to each category, 146 schools were selected including 40 schools from public and 106 private schools. The 146 schools were randomly selected from the list of schools using balloting.

Inclusion criteria

We included registered primary schools, established not less than 2 years before this study. The minimum school age of 2 years was because the FCT's education secretariat expects that at the end of the second year of a school establishment, the school was expected to have had facilities for SHP implementation along with a minimum single stream of 6 classrooms, after which, final approval was given for any established school.

Exclusion criteria

Registered primary schools whose headteachers declined consent to the study and schools with mixed primary and secondary education (13 private schools excluded).

Ethical Consideration

University of Abuja Teaching Hospital's Research and Ethics Committee gave the ethical approval for the study. Approvals were also obtained from FCT Universal Basic Education Board and Zonal Education Office, GAC. Informed consent was further obtained from the participants in the selected schools.

Confidentiality was assured by the use of codes on the assessment forms.

Data collection

The study instrument used was adapted from "School Health Practice" by Anderson and Creswell along with the incorporation of key elements of the Nigerian National Policy Guidelines on School Sanitation and School Health Programme. [15, 16, 17] It was

completed for each school by direct interview and inspection by the researchers. The checklist was weighted which allowed for objectivity and quantification of school performances. It contains sections on the school administration data as well as various components of the school environment including water supply, toilet facilities, ventilation, building quality, infrastructural facilities, sporting facilities, safety measures and evidence of maintenance. According to the checklist, the maximum attainable and minimum acceptable scores were 66 and 57, respectively. [17]

The headteachers provided information on school health administration and other information about HSE that could not be checked by observation at each school.

Measurements for the floors, windows, and doors were applied to each classroom in each school after which the average scores were determined to arrive at the score for the whole school. The sizes of the floors, windows and doors of classrooms were measured using a non-elastic measuring tape and the areas were calculated by multiplying their lengths by widths. A classroom floor was considered standard if it was not less than 19.4 metres square.[16] Ventilation was adjudged controllable where doors and windows had hinges that allowed for easy opening and closing. Also, ventilation was classified as adequate if the doors and windows allowed for cross ventilation and their combined areas accounted for at least a quarter (25%) of the floor space.[18] The toilet-pupil ratio in each school was obtained by dividing the total number of toilets by the number of pupils.

A pilot study was carried out in two (one public and one private) schools in Kwali Area Council (a neighbouring Area Council) to identify problems that could be encountered in the administration of the questionnaire and were addressed before the study. The findings from



the pilot study were not included in the data collected.

Statistical analysis

The data collected were sorted based on school ownership (private/ public). The data were analysed using Statistical Programme for Social Science (SPSS) version 20. Categorical data were reported as proportions and continuous data as means and standard deviations.

Group means were compared with the Student t-test while the Pearson chi-square test or Fischer's exact test (where appropriate) was used for comparison of frequencies in the contingent tables as well as differences between proportions. In all statistical tests of significance, only P-values of less than 0.05 was regarded as significant.

Results

This study was undertaken in one hundred and forty-six (146) primary schools in Gwagwalada Area Council (GAC). Of these, 40 (27%) were public while 106 (73%) were private schools. There were a total of 52 756 pupils (26 774 females and 25 982 males) and 2 154 teachers in the schools surveyed. Public schools had more pupils, 38 685 (73%) compared to 14071 (27%) in private schools.

Methods of sewage disposal and toilet to pupil ratio

Of the 118(80.8%) schools with water closet toilets, 103(97.3%) were private while 15(37.5%) were public schools ($p<0.001$). There were no toilets in 18(12.3%) schools.

Toilet to pupil ratio of $1: \leq 30$ existed in 51(48.1%) private and 1(2.5%) public schools ($p<0.001$). This information is shown in Table 1

Refuse disposal

In 127(87%) schools, the refuse disposal method was open dumping/ burning. Nineteen (13%) schools (all private) used the municipal waste management system of refuse collection.

Sources and location of water supply

The source of water supply in 28(70%) public and 48(45.3%) private schools was boreholes ($p<0.001$). While 57(39%) schools depended on pipe-borne water as a water source; a well was the water source in 11(7.5%) schools.

More public {29(72.5%)} than private {51(48.1%)} schools had their water sources within the schools ($p=0.008$).

Infrastructural features of the classrooms

Some infrastructural features of the classrooms in the schools shown in Table 2 include:

Classroom building

As shown in Table 2, 29(19.9%) schools had old walls with leaking roofs while the buildings in 3(2.1%) {2(5.0%) public and 1(0.9%) private} schools were dilapidated.

Fire protection

In 89 (83.9%) of the 106 private schools and 39(97.5%) of the 40 public schools, buildings were constructed completely with fire-resistant materials, $p=0.026$. The buildings in 2(1.4%) schools, exclusively private, were entirely constructed with prefabricated materials.

Floor size and finishing

In all the public and 35(33%) private schools, the floor size was standard (Area $\geq 19.4m^2$). The difference was significant, $p<0.001$. Out of the 101(69.2%) schools with flat and non-glossy floor finishing, 21(52.5%) were public and 80(75.5%) private ($p=0.007$).



Table 1:
Sewage disposal method, toilet: pupil ratio and water supply in the schools

| Variable | Schools | | | χ^2 | p-value |
|---------------------------------|------------------------|--------------------------|------------------------|----------|---------|
| | Public N=40 n(%) | Private N=106 n(%) | Total N=146 n(%) | | |
| Sewage disposal method | | | | | |
| Water closet | 15(37.5) | 103(97.2) | 118(80.8) | 66.710 | <0.001* |
| Pit latrine | 9(22.5) | 1(0.9) | 10(6.8) | 21.151# | <0.001* |
| Surface/ No toilet | 16(40.0) | 2(1.9) | 18(12.3) | 39.029# | <0.001* |
| Toilet: Pupil ratio | | | | | |
| 1: ≤ 30 | 1(2.5) | 51(48.1) | 52(35.6) | 26.349# | <0.001* |
| 1: 31-45 | 0(0.0) | 22(20.8) | 22(15.0) | 9.775# | 0.002* |
| 1: 46-60 | 1(2.5) | 9(8.5) | 10(6.8) | 1.633# | 0.201 |
| 1: 61- 90 | 6(15.0) | 12(11.3) | 18(12.3) | 0.364 | 0.546 |
| 1: > 90 | 16(40.0) | 10(9.4) | 26(17.8) | 21.066 | <0.001* |
| Source of water supply | | | | | |
| Borehole | 28(70.0) | 48(45.3) | 76(52.1) | 7.109 | 0.008* |
| Pipe borne | 8(20.0) | 49(46.2) | 57(39.0) | 8.393 | 0.004* |
| Well | 1(2.5) | 10(9.4) | 11(7.5) | 2.004 | 0.517 |
| Surface water | 3(7.5) | 1(0.9) | 4(2.7) | 4.685* | 0.030* |
| Location of water source | | | | | |
| Within the school | 29(72.5) | 51(48.1) | 80(54.8) | 6.973 | 0.008* |
| Outside the school | 11(27.5) | 55(51.9) | 66(45.2) | 6.973 | 0.008* |

Key * p value < 0.05(i.e. statistically significant) #=Fischer's exact test χ^2 : Chi square

Ventilation

In 38(95.0%) public and 55(51.9%) private schools ventilation was adequate (doors and windows allow for cross ventilation and their combined areas accounted for at least a quarter (25%) of the floor space). In 130 (89.0%) of the schools, ventilation was controllable (doors and windows had hinges that allow for easy opening and closing).

Lighting

The majority (97.9%) of the schools had good lighting which was further supplemented with artificial light (electric bulb) in 8(7.5%) private and 1(2.5%) public schools.

Insulation from heat

While all the public schools had a ceiling, 13(12.3%) of the 106 private schools

studied had no ceiling. More public than private schools (52.8% as against 42.5%) were completely ceiled.

Sitting comfort for pupils and teachers

All teachers and pupils were comfortably seated in all the private schools. In contrast, only 29 (72.5%) and 31(77.5%) public schools had comfortable seating arrangements for teachers and pupils respectively.

Health hazards

As shown in Table 3, the presence of pests/vectors was reported in 34 (85%) public and 26 (24.5%) private schools. More private (46.2%) than public (5.0%) schools had no health hazards (p<0.001).



Table 2:
Infrastructural features of the classrooms

| Features | Schools | | | χ^2 | p-value |
|--|------------------------|--------------------------|------------------------|----------|---------|
| | Public N=40 n(%) | Private N=106 n(%) | Total N=146 n(%) | | |
| Building | | | | | |
| Dilapidated | 2(5.0) | 1(0.9) | 3(2.1) | 2.375# | 0.123 |
| Old wall & leaking roof | 19(47.5) | 10(9.4) | 29(19.9) | 26.437 | <0.001* |
| Strong wall & minor cracks | 14(35.0) | 40(37.7) | 54(36.9) | 0.093 | 0.760 |
| Strong wall & good roof | 5(12.5) | 55(51.9) | 60(41.1) | 18.611 | <0.001* |
| Fire protection | | | | | |
| All buildings with fire-resistant material | 39(97.5) | 89(83.9) | 128(87.7) | 4.924 | 0.026* |
| Some prefabricated buildings | 1(2.5) | 15(14.2) | 16(10.9) | 4.040# | 0.044* |
| All prefabricated buildings | 0(0.0) | 2(1.9) | 2(1.4) | 0.765# | 0.382 |
| Floor | | | | | |
| Standard spacing ¥ | 40(100.0) | 35(33.0) | 75(51.4) | 52.156 | <0.001* |
| Finishing | | | | | |
| Flat non-glossy | 21(52.5) | 80(75.5) | 101(69.2) | 7.187 | 0.007* |
| Flat glossy | 0(0.0) | 0(0.0) | 0(0.0) | - | - |
| Worn off/ broken/ dusty | 19(47.5) | 26(24.5) | 45(30.8) | 7.187 | 0.007* |
| Ventilation ψ | | | | | |
| Adequate μ | 38(95.0) | 55(51.9) | 93(63.7) | 23.344 | <0.001* |
| Controllable ρ | 37(92.5) | 93(87.7) | 130(89.0) | 0.676 | 0.411 |
| Lighting ψ | | | | | |
| Good | 40(100.0) | 103(97.2) | 143(97.9) | 1.156 | 0.282 |
| Supplementary artificial light(bulb) | 1(2.5) | 8(7.5) | 9(6.2) | 1.279# | 0.445 |
| Insulation from heat | | | | | |
| No ceiling | 0(0.0) | 13(12.3) | 13(8.9) | 5.385# | 0.020* |
| Partially ceiled | 23(57.5) | 37(34.9) | 60(41.1) | 6.124 | 0.013* |
| Completely ceiled | 17(42.5) | 56(52.8) | 73(50.0) | 1.240 | 0.266 |
| Sitting comfort Θ | | | | | |
| All pupils comfortably seated | 9(22.5) | 106(100.) | 115(78.8) | 104.925 | <0.001* |
| All teachers comfortably seated | 11(27.5) | 106(100.0) | 117(80.1) | 95.898 | <0.001* |

Key: *- p-value < 0.05 #: Fischer's Exact test χ^2 : Chi-square ¥: Floor area $\geq 19.4 \text{ m}^2$ ψ : multiple responses possible μ : Combined areas of the doors and windows $\geq 25\%$ of the floor area ρ : Doors and windows have hinges for easy opening and closing Θ : 2 pupils per bench and table

Safety measures

Table 3 shows the erection of school fences was a safety measure in 12 (30%) public and 90 (84.9%) private schools ($\chi^2=41.581$ $p<0.001$). In addition, 2 (1.4%) schools, both privately owned, had a fire alarm. The majority (118 {81.5%}) of the schools surveyed had a gateman.

Evidence of maintenance of school environment

One hundred and twenty-five (85.6%) schools {36(90.0%) public and 89(84.0%) private} had an environment that was well maintained (evidenced by well-groomed lawns, swept classes and surroundings and clean toilets). Environmental maintenance was comparable in both groups of schools ($p = 0.354$).



Healthful living

Healthful living in the surveyed schools are as shown in Table 3. More private than public schools made provision for toilet paper, soap for washing hands, wash hand basins and dust bins. These were statistically significant with $p < 0.001$ for each of the items. A total of 39(36.8%) private schools, relative to 33(82.5%) public ones, had sports fields. This was significant statistically ($p < 0.001$). Only 4 (2.7%) schools made up of 1 public and 3 private schools had a drinking fountain in classes.

Overall, 6 private schools, scored up to the acceptable minimum score of 57; none of the

public schools attained the acceptable minimum score. There was no significant difference, however, in the number of public and private schools with a satisfactory healthful school environment (Fischer's exact 2.361, p -value = 0.124).

The mean scores attained by the schools on the various components of a healthful school environment were 32.93 ± 5.65 SD for public and 45.66 ± 7.00 SD for private schools out of the maximum score of 66. The difference in their means was statistically significant ($t=11.344$, $p < 0.001$).

Table 3:
Health hazards, safety measures and healthful living in the schools

| Variables | School | | | χ^2 | p-value |
|---|------------------------|--------------------------|------------------------|----------|---------|
| | Public N=40 n(%) | Private N=106 n(%) | Total N=146 n(%) | | |
| Health hazards ψ | | | | | |
| Vectors / pests | 34(85.0) | 26(24.5) | 60(41.1) | 43.871 | <0.001* |
| Industrial population including major roads, market | 10(25.0) | 44(41.5) | 54(36.9) | 3.396 | 0.065 |
| Dangerous/ grazing animals | 34(85.0) | 17(16.0) | 51(33.5) | 60.764 | <0.001* |
| Animal droppings in classroom | 30(75.0) | 10(9.4) | 40(27.4) | 62.782 | <0.001* |
| Floods/ open drainage | 11(27.5) | 12(11.3) | 23(15.8) | 5.728 | 0.017* |
| Nil | 2(5.0) | 49(46.2) | 51(33.5) | 21.716# | <0.001* |
| Safety measures ψ | | | | | |
| School fence | 12(30.0) | 90(84.9) | 102(69.9) | 41.581 | <0.001* |
| Safety patrol team | 30(75.0) | 59(55.7) | 89(60.9) | 4.564 | 0.033* |
| Fire extinguisher/ bucket of sand | 3(7.5) | 21(19.8) | 24(16.4) | 3.204# | 0.073 |
| Fire alarm | 0(0.0) | 2(1.9) | 2(1.4) | 0.765# | 0.382 |
| Nil | 7(17.5) | 11(10.4) | 18(12.3) | 1.363 | 0.243 |
| Healthful living ψ | | | | | |
| Shoes wearing compulsorily | 36(90.0) | 105(99.1) | 141(96.6) | 7.202 | 0.007* |
| Regular cleaning of toilets & classrooms | 21(52.5) | 101(95.3) | 121(83.6) | 38.698 | <0.001* |
| Dustbin/ waste paper basket available | 22(55.0) | 93(87.7) | 115(78.8) | 18.608 | <0.001* |
| Availability of soap for handwashing | 6(15.0) | 102(96.2) | 108(73.9) | 99.519 | <0.001* |
| Toilet rolls available | 5(12.5) | 98(92.5) | 103(70.6) | 89.347 | <0.001* |
| Wash hand basin available | 2(5.0) | 76(71.7) | 78(53.4) | 51.921# | <0.001* |
| Sports facilities available | 23(57.5) | 71(67.0) | 94(64.4) | 1.138 | 0.286 |
| Sports field available | 33(82.5) | 39(36.8) | 72(49.3) | 24.273 | <0.001* |
| Adequate psychosocial environment | 28(70.0) | 41(38.7) | 69(47.3) | 11.430 | 0.001* |

Key: * p value < 0.05(i.e. statistically significant) #: Fischer's exact test χ^2 : Chi square ψ : multiple responses possible



Discussion

The environment of most of the primary schools in Gwagwalada Area Council was in a deplorable state and thus, not healthy. Only a few schools attained the acceptable minimum score on a healthful school environment. This agreed with poor school environments similarly found in other studies in Nigeria, [5, 8-10] Ghana, [19] and Bangladesh, [20]; demonstrating widespread poor school environments in the developing countries.

Water is an important item for good sanitation and health and a high proportion of schools surveyed had functional sources of water. Similar to the finding in Ogun state,[21] the commonest water source in GAC primary schools was borehole which has a reduced chance of contamination as compared to well water which was the commonest water source in schools recorded by Bisi-Onyemaechi *et al* [9] in Enugu and Ademokun *et al*[22] in Ibadan. The proportion of schools with a water source in this current study was higher than that reported in Bonny, Nigeria and Chittagong, Bangladesh.[2, 23] The location of the current study in the nation's capital (with more social amenities) may be a reason for the observed differences.

Water was easily accessible in more than half of the schools surveyed as the water sources were within the school premises. This was more so in the public schools. This might have been due to the provision of water sources to public schools under the previous Millennium Development Goals (MDG) project by the government and other development partners. The high cost of providing water sources within the private schools may be a factor to most of them relying on outside sources, mostly through water vendors. In public schools with water sources outside the school, pupils were responsible for fetching water for the schools. These pupils could be exposed to the risk of road

traffic accidents in addition to spending more precious school hours in search of water. Furthermore, an adequate supply may not be assured exposing such school populations to an increased risk of diseases associated with water shortage.

In the present study, three out of every four schools, mostly private schools, had a toilet. However, close to half of public schools (where most pupils schooled) had no toilet. This was a far cry from the findings in studies in other tropical countries where every school had a toilet, such as in Vhembe District, Limpopo (South Africa), Chittagong (Bangladesh) and rural Vietnam. [2,24,25] This may be due to better oversight function by authorities or better budgetary allocation to schools by the government in the aforementioned locations. The recommended ratio of 1 toilet to not more than 30 pupils,[1] was fulfilled in 35.6% of primary schools in GAC; mainly private schools. This was higher than the national average of 1% recorded in 2006 and 14.2% recorded in Ogun state primary schools.[1,21] Also, the finding of up to 80% of public schools in the present study with a ratio of toilet: pupil of 1: > 90 pupils or no toilet at all is a departure from the 10.8% such ratio reported by Mbarie *et al*[8] in Oredo LGA. In schools with no toilet facilities or those with a low toilet to pupil ratio, pupils could indiscriminately defecate in bushes and open places. This could result in faecal contamination and a possible outbreak of diseases such as cholera, typhoid fever or acute diarrhoeal disease in the school community. Defecating in bushes could also expose the children to bites by snakes and other reptiles.

In addition, items for healthful living were considered. These items are an essential addition to sanitary measures employed. The finding of inadequate provision of toilet rolls, wash hand basins, soap for washing hands, as well as drinking fountains mostly in the public



schools in the present survey, was in keeping with those in other Nigerian studies.[5,23,26] The inadequacy will result in low hygiene and sanitation. With this finding, hand washing which is considered among the most cost-effective means of preventing disease transmission, particularly in the developing nations,²⁷ would be jeopardized in the public schools in the study location

Regarding the infrastructural features in the schools, more than half of the schools had classrooms with standard floor sizes. However, the dimension of floors in the majority of the classrooms in private schools did not conform to the approved standard. Even though the classroom sizes in public schools were built to a standard, overcrowding was found in the majority of them; a situation that might lead to easy transmission of communicable diseases particularly respiratory and skin diseases. The inadequate number of classrooms in the public schools could be a factor in this observation. The finding in the present study was similar to that of Olatunya *et al* [5] in Ilesa primary schools, perhaps for the same reason.

Furthermore, even though ventilation was controllable in most of the schools surveyed, it was adequate in less than two-thirds. Inadequate ventilation was commoner in private than in public schools. The inadequate ventilation and substandard classroom floor dimensions in private schools were, possibly, because a number of the private schools were housed in residential buildings not designed to be a school. The finding of inadequate ventilation in more than a third of the schools in the present study was at variance with that in schools in Mymensingh municipality, Bangladesh.[20] The pupils of schools with uncontrollable ventilation would be negatively affected by harsh weather conditions ranging from extreme cold, and windstorms to scorching

sunlight, while those in schools with inadequate ventilation are at risk of respiratory infections.

Only a few of the public schools could provide a seat for each of their pupils and teachers despite the Universal Basic Education (UBE) and child-friendly school initiatives, resulting in about four to five pupils sharing a bench meant for only two and others sitting on the floor. Meanwhile, all the private schools could provide such for all their pupils and teachers. This could be a reflection of poor funding and investment in public school education in the study location. The crowded sitting arrangements or sitting on the floor as revealed in the current study could make pupils less comfortable and jeopardize effective learning. It could also lead to the easy spread of communicable diseases among school children. Teachers could experience both physical and emotional exhaustion hampering their ability to give their best. This finding in the present study was in tandem with figures from similar Nigerian studies,[22,23] possibly for similar factors.

The majority of the schools in the present survey had one form of health hazard or the other. The commonest nuisance recorded in the schools was pest and disease vectors such as rodents, cockroaches and mosquitoes. The school population could be at risk of the spread of vector-transmitted diseases such as malaria. The practice of open dumping and burning of refuse as means of disposal, which was the practice in the majority of the schools, could contribute significantly to this. In addition to the breeding of rodents and mosquitoes, the non-combustible materials like empty bottles and broken bottles left behind may be a source of injury and accidents for children. Open refuse dumping was also a practice in studies from other parts of the country.[5,23,26] This was a non-compliance with policy guidelines of Nigerian national school sanitation.[16] This



could be a result of the low cost and the ease of maintenance of this method, compared to healthier, safer and more hygienic methods like incineration.

Another source of external hazard in the schools was the proximity to major roads, markets and recording studios. The 36.7% of schools in this situation in the present study were comparable to 20% reported in Mymensingh Municipality, Bangladesh.[20] Noise pollution generated would not only distract the pupils but chronic exposure could also lead to hearing disturbances. Locating schools in such areas could be due to inadequate supervision before approval by appropriate authorities, especially for private schools. It could also be due to ignorance of the health implication of noise or other disturbances such could bring to the school population. The national policy guideline on school sanitation [16] enforcement as well as public education is the necessary measure to check this.

Furthermore, animals grazing within the school premises could have a direct relationship with the absence of school fences in up to 69.9% of the schools. Hence, the animals could freely gain entrance to the school premises. This contrasted with 18% reported in Enugu.[9] The difference may be location dependent. Whereas the current study location is in the Northern part of Nigeria where animal rearing is common, such activity is not as common in Southern Nigerian cities like Enugu. Also, Gwagwalada Area Council, Federal Capital Territory is located within the Guinea Savanna of Northern Nigeria. Hence, this may further explain the lower (15.8%) proportion of schools with a flood as compared to 60% in the rainforest of Bonny LGA, Rivers State.[23]

Safety in schools is a rising concern and the need to keep children safe while in school is both a public health and global concern. The safety measure adopted by most (69.9%) schools

was the erection of perimeter fences. This finding was comparable to 77% reported in Abakaliki,[28] but higher than the respective 10% and 0% schools with fences in Rivers[23] and Imo states.[26] The higher proportions of schools with fences noted in the present study and that of Abakaliki may be related to the recent security challenges, particularly, the increasing spate of kidnapping and abduction of school children in the country.[29] The fewer schools reported to have fenced in Imo and Rivers States might be because those studies were done when the recent precarious security situation was not very common.

The other safety measure reported in the present study was the provision of fire extinguishers. Only a few schools had a fire extinguisher /bucket of sand. This was a shade better than finding from similar Nigerian studies.[5,9] Perhaps, the rare incidence of fire outbreaks in schools in Nigeria might have accounted for the lack of acquisition of fire extinguishers by most of the schools as noted by Asodike and Abraham in their survey of safety practices in some schools in Port Harcourt.[6]

Conclusion

The environment of primary schools in Gwagwalada Area Council, especially the public schools, is a far cry from meeting the desired standards; hence, is not healthful. We, therefore, recommended that a mechanism should be put in place to ensure compliance with the standard environmental requirement before schools in the Gwagwalada Area Council are registered by the appropriate government authorities. Appropriate authorities should also compel existing schools with the substandard environment to upgrade their facilities

Conflict of Interest

The authors have no conflict of interest to disclose



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