Asian Journal of Medicine and Health

19(11): 22-31, 2021; Article no.AJMAH.76889
ISSN: 2456-8414

Status of Public Primary Schools: Safety, Health Service Provision and Environmental Health Facilities in Sokoto Metropolis, Northwestern Nigeria

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Authors' contributions

The authors listed in this manuscript contributed significantly in one way or another. Author AUA, created the concept, conducted literature search, collected and reviewed the data, analyzed and drafted the manuscript. Author IAR critically reviewed the concept, drafting and edited the manuscript. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2021/v19i1130395
Editor(s):
(1) Dr. Engbang Ndamba Jean Paul, University of Douala, Cameroon.
Reviewers:
(1) Riccardo Beltrami, University Of Pavia, Italy.
(2) John O. Ogedengbe, University of Abuja, Nigeria.
Complete Peer review History, details of the editor(s), Reviewers and additional Reviewers are available here: https://www.sdiarticle5.com/review-history/76889

Original Research Article

Received 13 September 2021
Accepted 26 November 2021
Published 01 December 2021

ABSTRACT

Background: Provision of security, health services and environmental health facilities in schools is crucial in achieving the overall goals of the School Health Programme (SHP) because of their implications in all the areas of school health and plays an important role in the safety of school community and in retention and learning outcomes of students. We aimed to determine the status of public primary schools with respect to safety, health service provision and environmental health facilities in Sokoto metropolis, Northwestern Nigeria.
Methods: We conducted a cross sectional descriptive study among 40 public primary schools by multistage sampling technique. We collected data with an observation checklist using an electronic Open Data Kit (ODK) and analysed for descriptive statistics using SPSS version 23.
Results: The majority of schools had no security fence 21 (52.5%). Security/ safety teams were present in about a third 15 (37.5%) of the schools. None of the schools had a fire alarm. However,

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fire extinguisher was available in only 3 (7.5%) of the schools. Health room or sick bay 16 (40.0%) and health register 14 (35.0%) were available in less than half of the schools. Health personnel 3 (7.5%) and school ambulance or school bus 3 (7.5%) were available in only a few schools. First aid box was available in most, 38 (95.0%) of the schools. However, less than half, 17 (40.0%) of the schools had Iodine in their first aid boxes. Presence of handwashing facilities with soap was observed in only 3 (7.5%) of schools. All the schools use open dumping as means of refuse disposal; however, dustbin for refuse collection in classes was observed only in about a third, 15 (37.5%) of the schools. Traditional pit latrine was the most predominant toilet type 27 (67.5%) in schools.

Conclusion: Resources concerning safety, health service provision and environmental health facilities were found to be grossly inadequate in most of the schools observed. Government agencies involved in school administration should collaborate with other stakeholder's in ensuring the provision of adequate resources for school health program.

Keywords: Status; public primary schools; Sokoto; Nigeria.

1. INTRODUCTION

A healthful school environment is very crucial in contributing to healthy academic exercise as it forms the fulcrum on which other activities revolve [1]. However, little attention is paid to the quality of the school environment even though the location, design and structure forms the physical appearance of the school, which has an effect on the perception and choice for learning experience desired by parents and students as its attract them in their initial judgments about the quality of what goes on in the school [1]. The school physical environment includes the school location, buildings, classrooms, furniture, equipment, instructional materials, libraries, playgrounds, water supply, refuse disposal and toilet facilities [1-3]. A healthful school environment is that which ensures the health and safety of learners and other members of the school community. It is an essential factor in achieving the overall goals of the School Health Programme (SHP) because it has implications for all areas of school health and plays a decisive role in the retention and learning outcomes of students [2, 4].

In an ideal condition, the school should be located in a safe area with perimeter fencing and a gate for security purposes, away from potential hazards, noise and other forms of pollution such as factories, markets, airports, major highways and public motor parks. In addition, there should be in place adequate and informative regulatory or warning signs and markings on the roads leading to the schools [2]. The materials used for the construction of the school must meet the approved architectural standard. The doors and windows combined should have an area of not less than 25% of floor space and should be placed on different walls for cross ventilation [2, 3].

Health services provision in school refers to as health care delivery system that is operational within a school. These services could be in the form of preventive, promotive and curative aimed at maintaining the health of the school population, particularly the pupils, so as to give them a good start in life and enable them to benefit optimally from their school learning experience [5]. They include: appraisal of the health status of pupils and school personnel; counselling of pupils, parents and others concerning appraisal findings; follow-up services; provision of emergency care for injuries and sudden illness; help prevention and control of communicable diseases and early detection and encouraged correction of remedial defects; record-keeping and supervision of the health of school children and personnel [5-7].

The current economic instability in Nigeria manifesting as food and financial crises have highlighted the importance of school feeding programmes both as a social safety net for poor pupils, food insecurity and as part of the national education plan. Once the children are in school, the programme, through the provision of one meal per day, can contribute to their learning, enhancing cognitive abilities if hunger is eliminated. Through the concept of Home-Grown School Feeding (SGSF), the programme provides an opportunity to benefit farmers and producers by generating a structured and predictable demand for their products, thereby building the market and enabling system around it [8].

Reports from previous studies in Nigeria show many schools with no toilets, hand washing facilities, unsanitary means of refuse disposal and poor water supply for basic sanitation [9-14]. This lack of water supply hinders the proper hygiene practice and puts the school children at risk of infectious diseases [15]. In 2012, Ibhafidon and Ejifuga in southwestern Nigeria reported a neglect of health appraisal, follow up services, emergency care and first aid services in schools [7]. In Sokoto, a study on visual acuity and academic performance of primary school children revealed the prevalence of low vision was 2.9%, 10.1% had difficulty with near vision, while 1.4% had a problem with distant vision and were not able to see the board clearly from their seat [16]. This indicates that when health promotion is neglected, children are placed at a greater risk for academic failure, which can trigger a ripple effect on the performance and effectiveness of the whole school [17].

Despite political commitment to reverse years of neglect in the education sector by relevant authorities and the provision of national school health policy and implementation guidelines in 2006, with the vision of promoting the health of pupils in Nigeria, there is little or no improvement with regards to funding, provision of adequate facilities and resources in public primary schools [18]. Therefore, this study was carried out to assess the status of public primary schools with respect to safety, health service provision and environmental health facilities in Sokoto metropolis, Northwestern Nigeria.

2. METHODOLOGY

Sokoto state is the seat of the caliphate, one of the oldest states in Northwestern Nigeria, with its capital Sokoto, near the confluence of the Rima and Sokoto rivers. The state came into existence in 1976 with Sokoto as the capital city. It is bordered in the North by Niger Republic, Zamfara State to the East and Kebbi State to the South and West. Sokoto metropolis occupies the Sudan Savannah between latitudes 13°01′48″ – 13°06′06″ north of the equator and longitude 05°14′55″ – 05°16′00″east of Greenwich [19] and covers an area of 60.33 square km.The metropolis comprises Sokoto North, Sokoto South and some parts of Dange-Shuni and Wamakko local government areas, and has a total population of about 937,471using a population growth of 3.01 in 2018 [20].

The metropolitan LGAs has 209 government primary schools in the state based on the list obtained from the State Universal Primary Education Board. Most of the schools are co-educational and day schools, few are boarding schools. The majority of the schools operate during the morning hours between 7:30 am to 12:30 pm, while a few, mostly Arabic primary schools, operate during the evening hours between 2 pm to 6 pm. The coordination of the entire school's system rests on the State Ministry of Education and the State Universal Primary Education Board.

2.1 Study Design and Study Population

A descriptive cross-sectional study was carried out in April 2018. The study population comprised of public primary schools in Sokoto metropolis, Nigeria. Public primary schools registered by the government and were in the list obtained from the SUBEB were considered eligible. We excluded schools that were not operational for at least six months prior to this study.

2.2 Sample Size and Sampling Technique

A total of 40 public primary schools were selected using a two-stage sampling technique. In the first stage, two of four metropolitan LGAs; Dange-Shuni and Wamakko were selected by balloting. In the second stage, a list of all the schools within the two selected metropolitan LGAs was obtained from Sokoto state Universal Primary Education Board, Nigeria. Twenty-one out of 82 schools and 19 out of 74 schools were selected by simple random sampling in Dange-Shuni and Wamakko LGAs, respectively, and proportionate allocation was done in selecting schools from the two LGAs.

2.3 Data Collection and Analysis

An observation checklist was used by the principal researcher in all the selected schools to assess the status with respect to safety in schools, health service provision and environmental health facilities using a structured quantitative scoring adapted from previous studies [6, 10, 21]. The instrument was pretested on eight public primary schools in Shagari LGA, Sokoto State, Nigeria, about 45km away from the study area. Appropriate corrections were made based on the deficiencies detected in the instrument during the pretesting. The checklist was built in an electronic Open Data Kit (ODK) application which was used to collect data on the field. Data collected from the field were sent to

the researchers' server via the internet for aggregation. Data were retrieved from the researchers' server to Microsoft excel 2016 and from which it was exported to the IBM SPSS® version 23 software for the analysis. The period of data collection lasted for three weeks. The variables assessed with respect to safety, health service provision and environmental health facilities were scored one (1) for available or present and Zero (0) for not available or absent. The result was reported in frequencies and proportions.

3. RESULTS

The majority, 21 (52.5%) of schools observed had no security fence. Security/ safety teams were present in about a third 15 (37.5%) of the

Table 1. Safety and Hazard prevention status in schools

Variables	Frequency n = 40	Percent
School in close proximity with a major road		
Yes	23	57.5
No	17	42.5
Presence of security fence		
Yes	19	47.5
No	21	52.5
Presence of Regulatory or warning sign		
Yes	3	7.5
No	37	92.5
Presence of security/ safety team		
Yes	15	37.5
No	25	62.5
No source of noise pollution around the school		
Yes	28	70.0
No	12	30.0
Presence of fire alarm		
Yes	0	0.0
No	40	100.0
Presence of fire extinguisher		
Yes	3	7.5
No	37	92.5

Table 2. Health Service Provision in schools

Variables	Frequency n = 40	Percent
Presence of health room/ sickbay		
Yes	16	40.0
No	24	60.0
Availability of health register		
Yes	14	35.0
No	26	65.0
Availability of standard consultation card		
Yes	0	0.0
No	40	100.0
Availability of two-way referral form		
Yes	0	0.0
No	40	100.0
Presence of ambulance/ school bus		
Yes	3	7.5
No	37	92.5
Presence of health personnel		
Yes	3	7.5
No	32	80.0

Table 3. Availability of functioning diagnostic materials, First aid box and contents of the first aid box in schools

Variables	Frequency n = 40	Percent
Availability of functioning diagnostic materials		
Thermometer	7	17.5
Stadiometer	8	20.0
Weighing scale	7	17.5
Snellen's chart	10	25.0
Availability of first aid box		
Yes	38	95.0
No	2	5.0
Contents of first aid box		
Analgesic	27	67.5
Antibiotics	11	27.5
Antimalarial	14	35.0
Glucose	2	5.0
Iodine	17	42.5
Dressing Materials	25	62.5

Table 4. Schools compliance with building code and classroom environment

Variables	Frequency n = 40	Percent
Building walls		
Strong walls, no cracks	8	20.0
Strong walls with minor cracks	30	75.0
Old walls, not plastered with a major crack	2	5.0
Roof		
Intact not leaking	22	55.0
Leaking	18	45.0
No roof	0	0.0
Floor finishing		
Plastered and damp free	17	42.5
Worn off, broken and dusty	23	57.5
Sandy	0	0.0
Heat control in the classroom		
Classroom properly ceiled	27	67.5
Classroom partially ceiled	12	30.0
No ceiling	1	2.5
Door and window open on different wall	40	100
Controllable ventilation with intact door and window	23	57.5
Presence of artificial ventilation (fan etc.)	8	20.0
Number of pupils not more than 40/class	11	27.5
All pupils seated on desks	18	45.0
Furniture design to match individual pupil	7	17.5
Furniture has facilities for backrest and desk work	20	50.0
Adequate natural light in class	40	100
Availability of artificial (electricity) in class	12	30.0

schools observed. None of the schools had fire alarms. However, fire extinguisher was available in only 3 (7.5%) of the schools as shown in Table 1.

The presence of health room or sick bay 16 (40.0%) and health register 14 (35.0%) were seen in less than half of the schools. Health personnel were present in only a few, 3 (7.5%) of the schools observed. School ambulance or a school bus was available in only few 3 (7.5%) schools. None of the schools had standard consultation cards or two-way referral forms (Table 2).

Table 5. Water supply and waste disposal status of schools

Variables	Frequency n = 40	Percent
Availability of water in school	23	57.5
Drinking water source in the school		
Student bring from home	37	92.5
Tap water/ borehole within school	14	35.0
Sachet water for sale	25	62.5
Well within school	12	30.0
Availability of hand washing facility with soap	3	7.5
Availability of solid waste disposal site in schools	40	100
Method of solid waste disposal in schools		
Open dumping	40	100
Open dumping and burning	27	67.5
Burying	0	0.0
Use of private collectors	0	0.0
Composting	18	45.0
Availability of dustbin for refuse collection in classes	15	37.5
Availability of toilets facility in school	40	100
Toilets designated for different sexes	37	92.5
Type of toilets in schools		
Water closet	4	10.0
VIP latrine	22	55.0
Traditional pit latrine	27	67.5
Availability of water in toilets	7	17.5
Presence of good sanitary condition in toilets	11	27.5

Table 6. Source of school meal and food hygiene status of schools

Variables	Frequency n= 16	Percent
Source of school meal		
School meal	2	5.0
Home meal	40	100
Mobile vendor	39	97.5
Permanent vendor	3	7.5
Clean appearance of food vendors/ handlers	10	25.0
Use of apron and hairnet by food vendor/ handlers	0	0.0
Availability of vending site/ dining hall	4	10.0
Food vendor /handlers have an up-to-date certificate	0	100

Functioning Thermometer was available in only a few, 7 (17.5%) of the schools. First aid box was available in most, 38 (95.0%) of the schools observed. The majority of schools had analgesic 27 (67.5%) and dressing materials 25 (62.5%) in their first aid boxes. However, less than half, 17 (40.0%) of the schools observed had Iodine in their first aid boxes, as shown in Table 3.

The majority of the schools had strong walls with minor cracks 30 (75.0%), and their roof was intact, not leaking 22 (55.0%). The presence of controllable ventilation with intact doors and windows was observed in the majority, 23 (57.5%) of the schools. Artificial light (electricity) 12 (30.0%) and artificial ventilation (fan) 8 (20.0%) were available in only a few of the schools observed. More schools were overcrowded as slightly above a quarter 11 (27.5%) of the school had pupils not more than 40/class.

Majority, 23 (57.5%) of the schools had water supply located within the school premises. Handwashing facilities with soap were observed in only a few, 3 (7.5%) of schools. All the schools use open dumping as means of refuse disposal. However, none of the schools employs the use of private collectors or burying. Availability of dustbin for refuse collection in classes was

observed only in about a third, 15 (37.5%) of the schools. Traditional pit latrine was the most predominant toilet type 27 (67.5%) in schools. However, water availability in toilets was observed in only a few, 7 (17.5%) of the schools as shown in Table 5.

School meal is provided for only two (5.0%) of schools. The food vendors appeared clean in only about a quarter, 10 (25.0%) of the schools observed (Table 6).

4. DISCUSSION

This study assessed the status of public primary school's safety. Health service provision and environmental health facilities in Sokoto metropolis, Nigeria.

The presence of a security fence was observed in about half of the schools, and more than a third of the schools had a security or safety team. The increased provision of security safety teams in Nigerian public schools is not surprising due to the upsurge in the incidence of kidnapping and killing of school children, especially in the northern part of this country. None of the schools had fire alarms, but about a fifth, had a fire extinguisher. The low proportion of schools with fire extinguishers and the fact that no school had a fire alarm translates to the failure of social services and hazard prevention in schools in the study area.

With respect to health service provision, health rooms or sickbay were available in more than a third of the schools observed. This finding is consistent with what was reported in Ifo and Sagamu Ogun state, Nigeria [15, 22]. However, findings are at variance with the findings in studies in Osun and in Edo states where only 18.8%and 3.4% public schools had availability of health room or sickbay respectively [9, 10, 13]. Presence of health personnel was observed in few of the schools. This result is similar though slightly higher than what was reported by Ademokun, where only about 5% of schools had availability of health personnel in their school [10]. However, it is at variance with what was reported by Kuponiyi *et al* in their study on school health services and its practice among public and private primary schools in Western Nigeria, where about half of the schools had the presence of health personnel [5]. School ambulance or bus to convey a sick pupil to the nearest health post in case of emergency was available in only a few of the schools observed. This is similar to what was reported by Kuponiyi *et al* in their study in Western Nigeria [5]. Absence of school ambulances or buses reflected the poor state of school health services in most of the Nigerian public primary schools. Health registers were available only in about a third of schools. This is at variance with what was reported by Odeyemi in Ogun state, where a majority (64.3% and 64.5%) of schools in Ifo and Ekenne LGAs of the state maintained a health record [15].

The presence of a first aid box was observed in all the schools observed. This finding is consistent with the findings in studies conducted in Ifo and Sagamu Ogun state and in Osun state, South-western Nigeria, where most, (95.6% and 96.5%) of schools maintain first aid box respectively [9, 10, 15, 22]. Regarding contents of the first aid box, analgesics were available in 67.5% of schools. This is in concordance with (even though less than) what was reported in Osun (87.8%) South-west Nigeria [9]. Antibiotics were available in only about a third of the first aid boxes in schools. This finding is similar but slightly lower to what was reported by Abodunrin *et, al*; in their study on scope and determinants of school health services in Osun state, Nigeria [9]. Antimalarials were available in 35.0% of schools. This finding is at variance with what was reported in Osun, where only a few (7.7%) of the schools had antimalarial in their first aid box [9]. Presence of Iodine solution was observed in less than half of the school's first aid boxes. This is not the case in Osun, where most (84.6%) of the schools had Iodine in their first aid box [9]. Dressing materials were available in most(62.5%)schools. These findings are similar, though much lower than what was reported by Abodunrin *et, al*. where all (100%) of the school had presence of dressing materials in their first aid box [9]. This finding is not surprising due to high demand as children are more prone to injuries requiring dressing in schools.

Regarding the schools' compliance with building code, even though most of the schools had strong walls with minor cracks, many buildings had their roofs leaking and were partially ceiled. This could reflect schools not receiving considerable attention and lack of maintenance from government agencies involved in school administration. Presence artificial light (electricity) and artificial ventilation (fan) were available in only a few of the schools, and more classes were overcrowded as slightly above a quarter of the school had number of pupils not more than 40/class. This could be associated

with discomfort, learning difficulties among pupils and may negatively affect their physical health, mental health and academic performance.

About a third of the schools had pipe-borne water, while 30.0% had wells located within the school premises as the source of drinking water. The findings in this study are at variance with a number of similar studies in Nigeria. Ademokun *et al*., in 2014, reported that only a few (5%) of the schools had pipe-borne water located within the school, while most (62.0%) of the schools had well as source of drinking water [10]. Similarly, in a study carried out in Ogun South-west and Edo South-south Nigeria, it was reported that pipe-borne water was present in only 14.0% and 17.3% of the schools respectively [13, 15]. The higher proportion of schools with pipe-borne water in this study compared to studies carried out elsewhere could be because the study centres were located within the metropolitan local government areas.

Concerning the means of refuse disposal, all the schools use open dumping/burning as a means of refuse disposal, of which 45% of schools co-practice composting as another means of refuse disposal. The finding in this study is in concordance with (even though lower than) what was reported in Ibadan and Ogun, South-west Nigeria, which reported that 86.0% and 92.9% of schools disposed of their refuse by burning [10, 15] Similarly, in a study conducted in Osun State, south-west Nigeria, Abodunrin et al in 2013 reported that the commonest method of waste disposal in schools was open dumping (39.1%) followed by burning (21.7%) [9]. The similarities of the findings in this study with other Nigerian study could be due to the fact that open dumping/burning is the cheapest and commonest method of unsanitary disposal of refuse in Nigeria.

This study also observed the means of sewage disposal by way of checking the availability of toilet facilities in all the schools. A higher proportion of the schools had traditional pit latrines. However, a water closet system was available in only 10% of the schools. The high proportion of schools with water closet systems in this study as compared to other studies could be due to the high proportion of schools with a direct supply of water from state water board. The finding in this study agrees with studies conducted in Osun South-west Nigeria and Edo South-south Nigeria that reported majority of toilets being pit latrine and the remaining being VIP latrine and water closet system [9, 13]. The finding in this study is at variance with what was reported by Ademokun in South-western Nigeria where pit latrine and water closet toilets occupy same proportion (43.0%) of toilets in the schools [10].

School meal is provided in only (5.0%) of the schools. Even though school nutrition program is the only component of SHP which considerable emphasis has been placed on in recent times in Nigeria, both State and Federal governments have come out to lend support for the provision of school meals for pupils under UBE; however, the findings in this study could be due to the fact that provision of school meal to pupils was not fully operational in Sokoto state at the time of this study as compared to other states in the country. In order to meet the UBE requirements for school nutrition, schools employ the use of home, temporary and permanent vendors to provide meals for pupils in the schools. The food vendors appeared clean in only about a quarter of the schools. None of the food vendors were seen using apron or hair net while serving food or have up-to-date certificate in catering. These findings could be due to poor monitoring and lack of quality control regarding food vendor's services in Sokoto as compared to what was reported by Ademokun in South- western Nigeria where all (100%) of food vendors used apron and hair net while serving food [10].

5. CONCLUSION

Resource for School Health Program (SHP)concerning safety, health service provision and environmental health facilities were grossly inadequate in most schools observed. Therefore, government agencies involved in school administration (particularly Sokoto State Universal Basic Education Board, Ministry of Basic and Secondary Education) should collaborate with other stakeholder's, parent teachers' association (PTA), non-governmental organization (NGOs) etc., in ensuring the provision of adequate resources for school health program.

ETHICAL APPROVAL

Ethical approval and permission were obtained from the Research Ethics Committee of Sokoto State Ministry of Health and Sokoto state Ministry of Education, respectively.

CONSENT

A wiling written informed consent was obtained from head teachers whose schools participated in this study. Head teachers were assured of strict confidentiality of the data obtained in their respective schools. They were also informed that their participation is voluntary and would acquire no cost if they refuse to participate in the study.

ACKNOWLEDGEMENTS

We acknowledged theMinistry of Basic and Secondary Education, Sokoto State Nigeria; Ministry of Health, Sokoto State, Nigeria; Sokoto state Universal Basic Education Board (SUBEB); and the headteachers of the respective schools for the cooperation given to us.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/76889