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Prevalence of Physical Hazards in Public Primary Schools in South-West Nigeria

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Abstract:
Aim: Physical hazards (PHs) in the school environment compromise health of primary school children worldwide. Thus the study investigated the prevalence of physical hazards in public primary schools in South-West Nigeria.
Methods: The study was a cross-sectional survey that involved the selection of 456 teachers from 30 selected Public Primary Schools using a 4-stage random sampling technique. Data were collected through an observational checklist and a semi-structured questionnaire. The observational checklist included a 26-point scale for measuring prevalence of PHs (associated with structures, facilities and school environment) while the questionnaire elicited information on the pattern of occurrence of PHs. Data were analyzed using descriptive statistics and chi-square test at $p \leq 0.05$.
Results: Respondents' mean age was 47.3 ±6.7 years and 87.9% were females. Some (16.7%) of the schools observed were moderately hazardous and 83.3% were highly hazardous. The forms of PHs in schools included sharp objects (93.3%), leaking roof (90.0%), fields with potholes/stones (90.0%), broken windows (86.7%) and broken chairs/desk (80.0%). Injuries experienced by pupils' included falls (50.9%) and cut/laceration (46.9%), of which 70.8% of all injuries occurred during break period. Majority (80.7%) disclosed that more male than female pupils were affected by PHs.
Conclusions: The finding shows that physical hazards are prevalent in primary schools. Therefore, school health policy should aim at improving the physical environment.

Keywords: *Physical hazards, Public primary schools, School health policy, School environment, Environmental hazards, School injuries, Prevalence, Building condition, Physical environment, Teachers*

1. Introduction

WHO estimates that between 25% and 33% of the global burden of disease can be attributed to environmental risk factors. About 40% of the total burden of disease was due to environmental risks falls on children (WHO, 2002). Although everyone appreciates and supports the child friendly school's initiative, yet, the provision of such an environment particularly in public schools in Nigeria has often constituted a great challenge. Many school children in Nigeria learn under the shade of trees while many sit on the floor to learn in their classrooms. It was found that many schools had no games and recreational facilities (Akinbote, 2010; Daniel and Patricia, 2005). The Situation and Policy Analysis (SAPA) report has provided a statistical analysis of the deficiencies in the Nigeria schools as follows; 12% of pupils sit on the floor, 87% have overcrowded classrooms, 3% of the schools have no chalkboards and 38% of classrooms have no ceiling. Hence, accidents are the most common cause of death among children between the ages of 7 and 14 years (20-60%) (Okebukola, 2000).

By creating schools that are health promoting, school leaders all over the world can foster health as actively as they promote the process of learning (WHO, 2003). Therefore, to create a safe physical school environment, many factors must be considered. These hazards and associated risks must be managed to ensure the safety of staff, students and others. A comprehensive understanding of the pattern of physical hazards is essential for identification of appropriate points of intervention. This can better be achieved through teachers of primary school's pupils since the pupils are still very young and as such they have little or no proper awareness about their environment and it effect on health.

Few studies exist on the prevalence of physical hazards in the school environment in Nigeria. However, there are related studies on biological and chemical hazards in schools as well as bullying and injury related studies in Africa. It is not possible to exhaustively

cover the issue of physical hazards since hazards in the school environment consist of many elements. This study focuses on the prevalence of physical hazards and the pattern of physical hazards in public primary schools in South-West, Nigeria.

2. Methods and Procedures

The study is a descriptive cross-sectional survey which was carried out among teachers in 30 selected public primary schools out of 74 schools (68 mixed schools and 5 single schools) in Ibadan North Local Government Area of Oyo State. The Local Government consists of Multi-ethnic nationalities predominantly dominated by the Yoruba's. The study involved a four stage sampling technique; firstly, the 42 communities in Ibadan North Local Government Area were stratified into 3 groups (high, medium and low density populated area), the 74 public schools were grouped based on the population density area. In the second step, proportional sampling procedure was used to allocate the number of respondents (teachers) used in each density zones. Thirdly, schools were selected using table of random numbers taking into consideration the density of the zones. Finally, a simple random sampling was used to select consented teachers from the selected public primary schools till the sample size was met in each density zone. An observational checklist consisting of 26 items was used to observed the 30 selected public primary school while the questionnaire consists of 2 sections which sought the respondent's socio-demographic characteristic and pattern of physical hazards. Approval of the study was sought from the Oyo State Research Review ethical committee and consent was approved by the administrative head of each of the selected schools also from individual respondents. The validity and reliability of the instrument was determined by peer review, pretesting and Cronbach-Alpha correlation coefficient of SPSS 17.0 (Statistical Product and Service Solution). The prevalence of physical hazards was measured by a 26-point scale graded; moderately hazardous (<13) and highly hazardous (>13). Data generated were analyzed using SPSS version 17.0. Descriptive statistics was used to evaluate frequency distribution and chi-square was used to test the differences between variables.

3. Results

According to table 1, the age of respondents ranged from 28-62 years with a mean age of 47.3 ± 6.7 years. Most (87.9%) of the respondents were females and only (12.1%) were males. Majority (69.3%) of them had NCE/OND and few (28.5%) had Degree/HND. On considering the years of working experience, majority of the respondents (40.4%) had worked for 25 years and above, 15-24 years (30.7%) and few (27.9%) had working experience of <15 years. Also according to the stratification, most of the schools observed were in medium (43.3%) and low (36.7%) density populated area. In addition, there is a significant difference between the location of schools and prevalence of physical hazards, therefore we reject the null hypothesis as P was <0.05 and conclude that the prevalence of physical hazards is affected by the location of schools.

Demographic variable	Frequency N= 456	Percentage (%)	Mean age of respondent's	Prevalence of PHs
Age (in years)				
<40	96	21.1		
40-49	144	31.6	47.3 ± 6.7	
50+	216	47.4		
Gender				
Male	55	12.1		
Female	401	87.9		
Educational Qualification				
O' level	4	0.9		
NCE/OND	316	69.3		
Degree/HND	130	28.5		
Post Graduate	6	1.3		
Years of working experience				
<15	127	22.9		
15-24	140	30.7		
25+	180	41.4		
Location of schools				
High density zone	6	20.0		**0.00*S**
Medium density zones	13	43.3		**χ^2= 24.0**
Low density zone	11	36.7		**df = 2**
Total	**30**	**100.0**		

Table 1: Socio-demographic information

Physical hazards were prevalent in all the observed schools. Although, 16.7% were moderately hazardous while 83.3% were highly hazardous (*see fig. 1).*

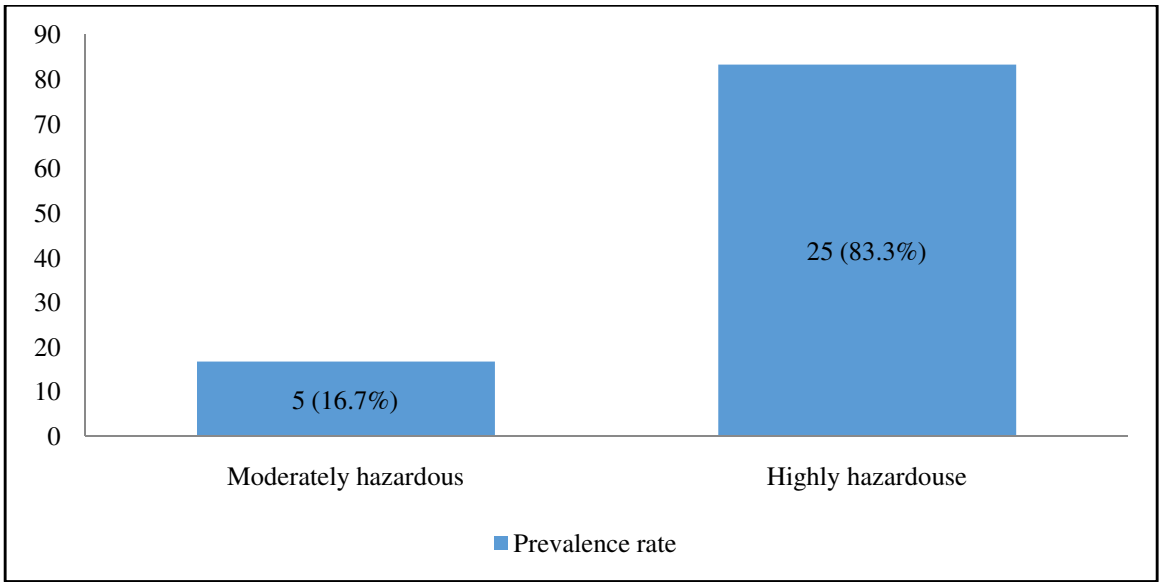
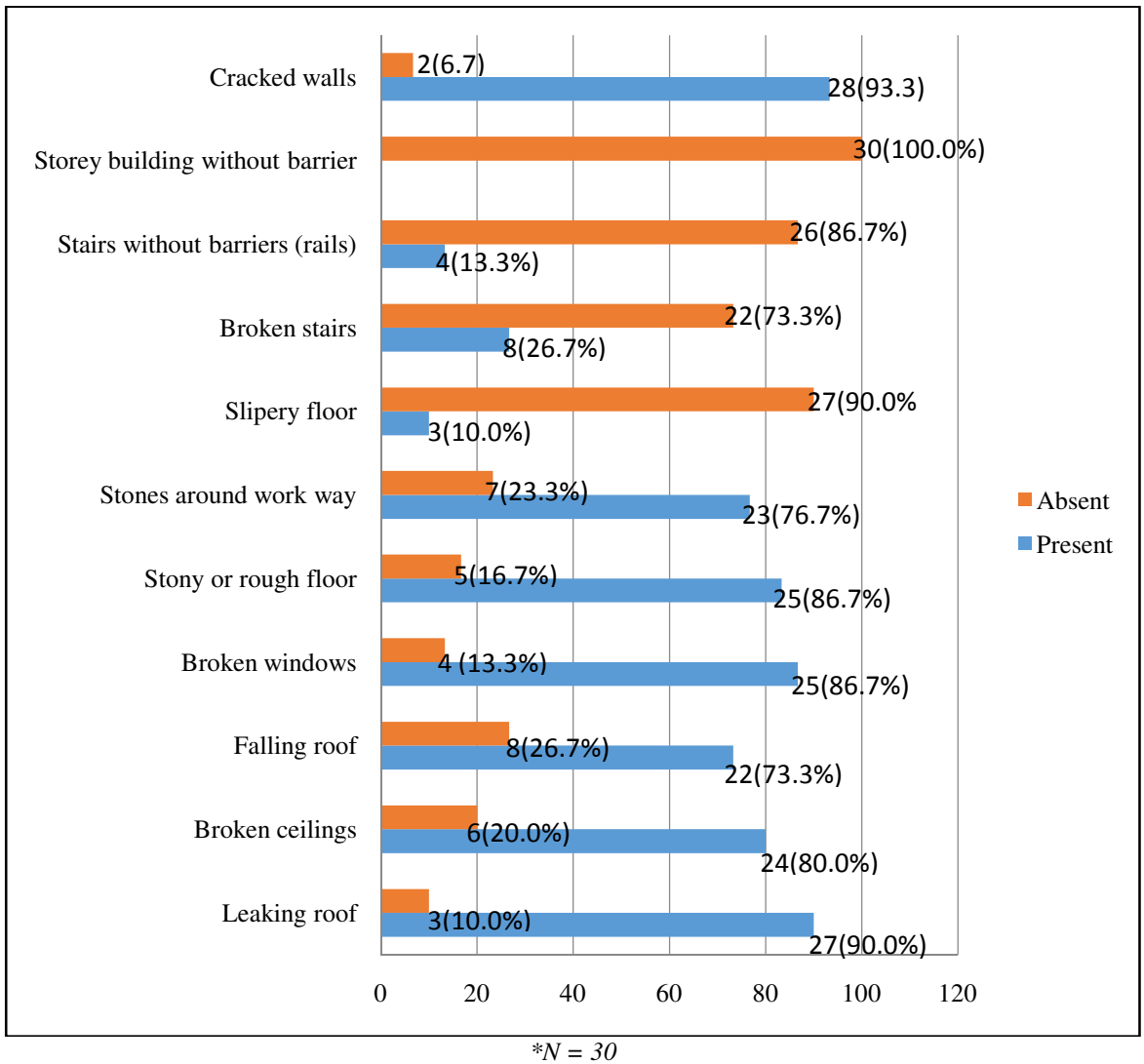


Figure 1: Prevalence of Physical Hazards in Schools

As shown in figure 2, building condition is a form physical hazards and reported building conditions include; leaking roof, broken windows, falling roof and broken stairs etc.



**N = 30*

Figure 2: Building Conditions in Schools

Table 2 shows forms of physical hazard in classroom and other areas of the school environment. Physical hazards present include; broken chairs and table (80.0%), dusty chalk board (90.0%), sharp object (83.3%), field with potholes/caves/rocks (90.0) and bushy playing ground (36.7%). See table 2 for details.

Observed variables	Present, n= 30(100%)	Absent, n= 30(100%)
Class room conditions		
Broken chairs and tables or desk	24(80.0)	6(20.0)
Protruded nails or sticks from desk or chairs	29(96.7)	1(3.3)
Dusty chalk board	27(90.0)	3(10.0)
Sharp object. E.g. razor/nails	25(83.3)	5(16.7)
Unbalanced chalk board	7(23.3)	23(76.7)
Playing ground conditions		
Broken swings (none existed)	0(0.0)	30(100.0)
Rusted swings (none existed)	0(0.0)	30(100.0)
Swings with sharp edges (none existed)	0(0.0)	30(100.0)
Faulty playing equipments (none existed)	0(0.0)	30(100.0)
Presence of sharps e.g. bottles, nails	28(93.3)	2(6.7)
Field with potholes/cave/rocks	27(36.7)	3(10.0)
Bushy playground	11(36.7)	19(63.3)
Rest room conditions		
Broken latrine	28(93.3)	2(6.7)
Slippery/patchy ground	29(96.7)	1(3.3)
Hazard registry (none existed)	0(0.0)	30(100.0)

Table 2: Classroom, Playing ground and Rest Room Conditions in School

Table 3 shows that schools in medium (43.3%) and low (36.7%) density zones are highly hazardous compare to 3.3% of schools in high density zone. Hence, there was a significant difference between prevalence of physical hazards and location of schools at $p<0.05$.

Variables	Expected first aid care			χ^2	df	P value
	Inappropriate N (%)	Appropriate N (%)	Total N (%)			
Knowledge grade				1.46	1	
Poor	155 (40.1)	232 (59.9)	387 (100.0)			
Good	33 (47.8	36 (52.2)	69 (100.0)			
Total	**188 (41.2)**	**268 (58.8)**	**456 (100.0)**			

Table 3: Significant difference between prevalence of physical hazards and location of schools in respect to their density zone($H_0$1)

As shown in Fig 3, the common physical hazards related injuries found among school children were falls (50.9%), cuts/scrape injuries (46.95) and fainting (6.6%) respectively (*see fig3 for details).*

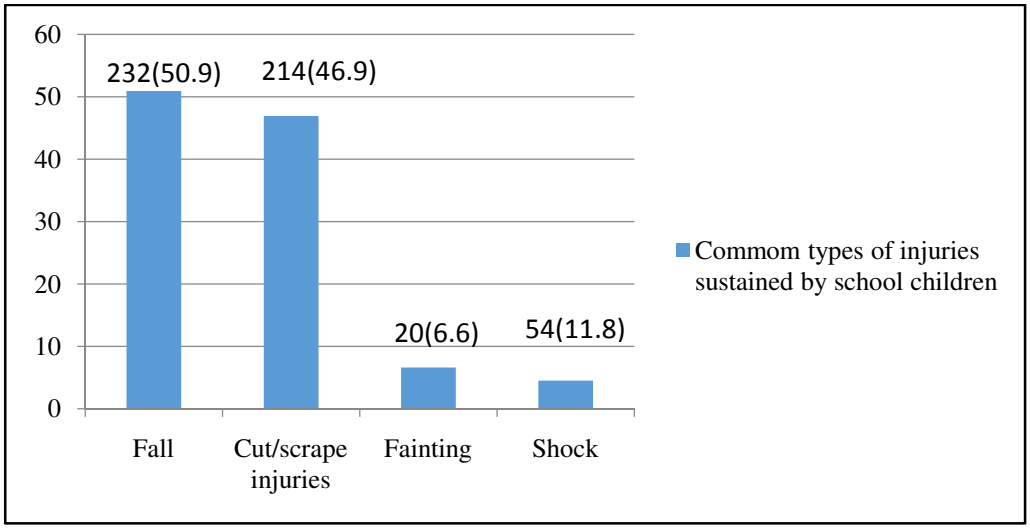


Figure 3: Physical hazards related injuries found among school children as reported by their teachers
**multiple choice*

Table 3 shows the patterns of occurrence of physical hazards among pupils as reported of their teachers in primary schools. Majority of respondents noted that injury is sustained more often among boys (80.7%) than girls (0.9%), with 88.4% of respondent accepting that boys indulge in rough play compared to girls (5.7%). The highest proportion (27.5%) of respondents said children in primary 5-6 are more prone to physical hazards followed by primary 1-2 (22.6%) and most (70.8%) reports that injury is sustained more during break hours.

Variables	Frequency	Percentage (%)
Injuries is sustained more among		
Boys	368	80.7
Girls	4	0.9
Both	84	18.4
Rough play is often found among:		
Boys	403	88.4
Girls	26	5.7
Both	27	5.9
Stones, sticks and sharps are used by students when bullying, fighting or playing rough		
True	456	100.0
False	0	0.0
Which group is more prone to physical hazards		
Pry 1-2	103	22.6
Pry3-4	77	16.9
Pry 5-6	171	37.5
Both pry 1-2 and 3-4	95	20.8
Don't know	10	2.2
*Time of the school period pupils are most likely to sustain injury		
Break hour		
Learning hour	323	70.8
Physical health day/sports hours	25	5.5
Break hour and physical health days/sports hour	40	8.8
Anytime	87	19.1
	22	4.8

Table 3: Patterns of physical hazards among pupils in primary schools
**Multiple response were included*

Frequency of occurrence of physical hazards related injuries reported by teachers in primary schools are shown in table 4. Falls (58.6%) were mostly reported as the most highly occurring physical hazards related injury, followed by being hit by blunt object (stones) (23.0%) and cuts (23.0%). Physical hazards such as piercing by sharp objects, foreign object in eyes, ear or nose, dental injury and broken limbs were the least occurring physical hazards related injury among pupils in primary schools. There has never been record of death due to physical hazards in the selected schools.

Variable	Always N (%)	Seldom N (%)	Occasionally N (%)	Total N (%)
Being hit by object (stone)	105 (23.0)	266 (58.3)	85 (18.6)	456 (100.0)
Falls	267 (58.6)	156 (34.2)	33 (7.2)	456 (100.0)
Cut	105 (23.0)	266 (58.3)	85 (18.6)	456 (100.0)
Foreign object in eye, ear or nose	23 (5.0)	142 (31.1)	291 (63.8)	456 (100.0)
Dental injury (gum or broken tooth)	13 (2.9)	58 (12.7)	385 (84.4)	456 (100.0)
Broken limbs	9 (2.0)	97 (21.3)	350 (76.8)	456 (100.0)
Piercing by sharp objects	40 (8.8)	305 (66.9)	111 (24.3)	456 (100.0)
Choking	8 (1.8)	58 (12.7)	390 (85.5)	456 (100.0)

Table 4: Frequency of occurrence of physical hazards related injury in primary schools

4. Discussion

The prevalence of physical hazard has shown to be increasing as report shows that most of the observed schools are highly hazardous which include school building, facilities in class rooms and playground conditions. In agreement to this, results from a study in American, shows that school building is about 42-year-old, and students reported need for extensive repairs or replacement of one or more building (Lyons, 2002; Bakir et al., 2014). A Nigeria study also disclosed that the school environment is dotted with dilapidated

building, and that teachers had to work under the most unsafe and unhealthy conditions (Ofoegbu, 2004; Ofovwe and Ofili, 2007; Inuwa and Yusof, 2012).

Injuries resulting from physical hazards in school environment included falls and cut/scrape which occur more in male than the female pupils and experienced mostly during break period. This is an indication that male pupils engage in more physically challenging activities than female which agrees with other studies. A study shows that falls (52.3%) and being hit by blunt objects (15.1%) were the leading causes of injury for children (Hauan et al., 2011). Accidents during break (36.6%) and physical education (29.7%) were most common (Stefania and Tomasz, 2003). A study by Marc (2000), reported death of a student after a fall from a desk. Although, no death was recorded in this study, but injuries, cut/scrapes occurs frequently and these may result to death if not properly handled.

5. Conclusion

Findings from this study shows that public primary schools still lack basic structural development and facilities required for effective and health promoting learning. This study exposes the deficiency in the school physical environment. Therefore, all public primary schools need some upgrading of facilities by way of repairs, renovation and replacement.

6. Recommendation

1. In order to promote a safe school physical environment, government and other NGO's must make it a point of duty to demolish (elimination is the most effective control measure) and replace all dilapidated building and facilities found in public primary schools.
2. There should be well planned and implemented protocols for hazards identification/mitigation in the school environment by school personnel's. This can only be done through proper training of teachers, students and other school personnel on proper identification of physical hazards and majors taken to prevent these hazards from causing harm (e.g. warning or restriction signs which is a form of administrative control) until the hazard has been fully eradicated from the environment
3. Hazard registry should be provided for all school, so that any identified hazards can be reported and taken to the ministry of education for quick consideration at least every month or in a term.

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