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Full Length Research Article

KNOWLEDGE, PERCEPTION, AND LEVEL OF SCHOOL DISASTER PREPAREDNESS AMONG TEACHERS IN SECONDARY SCHOOLS IN KADUNA NORTH LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA

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ABSTRACT
Schools have been regarded as safe environments, but the emergence of natural and man-made disasters means that there is a need for schools to be prepared against hazards. This study assessed teachers' knowledge and perception of school disaster preparedness as well as the level of disaster preparedness in secondary schools in Kaduna North Local Government Area of Kaduna State. A cross-sectional, descriptive study was conducted between November and December 2021 using pre-tested, self-administered questionnaires and observational checklists. A total of 150 teachers were selected using a multi-stage sampling technique. Data was analyzed using SPSS version 23, and results were presented using tables and charts. Chi-square test (x^2) was used to test for association ($p \leq 0.05$). The mean age of the participants was 40.7 ± 9.0 years, only 12.7% of them had good knowledge and 95% had positive perception towards school disaster preparedness. The majority (80%) of the schools had entrance gates and security personnel; however, only 60% of them had school clinics, and 40% had first aid boxes. Only 20% of the teachers had training on school disaster preparedness. None of the schools had fire alarms and muster points. There was no statistically significant association between the respondents' socio-demographic characteristics and level of knowledge; but there was a statistically significant association between their perception and marital status (p=0.0016) and religion (p=0.0285). Knowledge of school disaster preparedness was poor, but perception was positive. Half of the schools showed some level of disaster preparedness. In order to improve school disaster preparedness, most respondents recommended training of school staff and students and provision of fire alarms as early warning signs for fire as well as fire extinguishers.

Keywords: Disaster preparedness, Knowledge, Perception, Secondary School Teachers

INTRODUCTION

Education is a fundamental human right and many countries have systems of formal education which are sometimes compulsory (Roser and Ortiz-Ospina, 2019). A school is an educational institution with a major objective of providing a conducive learning environment for teaching students. It contributes to the physical, mental and psychosocial well-being of children, which in turn provides a foundation for them to become useful members of society (Uro and Arokoyu, 2016). Schools also promote students' general development and social skills as well as enhance positive effects on friendships, accomplishments and progress in life (Diab and Mabrouk, 2015). School children spend approximately 35- 40 % of their time at school.

Schools are significant agents of secondary socialization after the family. They are supposed to be a safe environment for effective learning for millions of children. School pupils, teachers and other staff are common victims of disasters globally due to their high exposure to diverse types of risk. The occurrences of school violence, terrorism and the possibility of widespread communicable diseases call for urgent attention for schools to be prepared for the possibilities of all-hazard emergencies. Government at all levels also have roles to play.

In order to ensure the safety of students, teachers and other staff, every school should have a good level of disaster preparedness; encompassing preparedness, response, recovery, mitigation and prevention (Makama et al., 2018). There is a fundamental link between day-to-day emergency readiness and disaster preparedness. Schools that are well prepared for an individual emergency involving a student or staff member are more likely to be prepared against disasters at different levels (American Academy of Paediatrics, 2008).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) opined that children are particularly vulnerable to disasters and schools are often not able to keep them safe (Idowu, 2019). More than half of all people affected by disasters worldwide are children (Ogunleye and Olusola, 2019) and approximately 100 million children worldwide are affected by disasters each year (Below *et al*, 2011). Disasters generally are one of the key factors preventing school attendance by children. In northern Pakistan, the collapse of a school building resulted in 75,000 deaths (Magreta, 2012). Similar disasters have also been reported in secondary schools in Africa.

Nigeria has been observed as one of the disaster-prone nations in the world (Wand *et al*, 2015). The United Nations Office for the Coordination of Humanitarian Affairs estimated that 600,000 Nigerian children have difficulty accessing education due to disasters (Wahab and Folarin, 2014). Across the twelve states

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affected by floods in 2012, a total of 4,199 schools (comprising 3,205 primary and 994 secondary schools) were either partially or severely damaged. The flood disaster resulted in the disruption of schooling activities and in the displacement of students to neighbouring schools (Wahab and Folarin, 2014).

In the north-eastern part of Nigeria, *Boko Haram* has launched devastating attacks on schools which includes the kidnapping of secondary school girls in Chibok, Borno State in 2014 (Wahab and Folarin, 2014). There have been reports of 18 disasters affecting schools in Zaria, Kaduna State, north-western Nigeria (Ibrahim and Musa, 2011). A similar study conducted in Osun State, south-western Nigeria reported cases of flood, fire and windstorms affecting schools, with most of the schools not having safety measures in place (Olatunya *et al*, 2014). There have been relatively few studies of this type done in this part of the country. Data resulting from this study can be used to develop policies and programs by governments at all levels in order to prevent or mitigate disasters in school settings.

MATERIALS AND METHODS

Study area

Kaduna North Local Government Area (LGA) is one of the 23 LGAs in Kaduna State, with an area of 70.2km^2 and headquarters at Doka. It has 12 electoral wards, and its 2020 projected population was 492,100 (Kaduna State Ministry of Education, 2020). There are a total of 812 secondary schools in Kaduna State: 340 public and 472 private schools. Out of these, 169 are in Kaduna North LGA, 28 of which are public and 141 are private (Jaykaran and Tamoghna, 2013).

Study design and population

This is a descriptive, cross-sectional study conducted among secondary school teachers in Kaduna North LGA from November to December, 2021. The inclusion criterion was teachers working in the schools for at least 6 months. However, those on study leave or sick leave were excluded from the study.

Sample size

The minimum sample size for the study was determined using the formula for descriptive studies, ($n=Z\alpha^2pq/d^2$) (Sarmah *et al*., 2013) where Z is the normal standard deviate set at 1.96, with a confidence level specified at 95% and a tolerable margin of error (d) at 5%, considering non-response rate and prevalence of school disaster preparedness 0.317 (Makama *et al*, 2018). The complementary probability (q) is 1-p. The calculated sample size with 10% non-response rate for the study was 150.

Sampling technique

Multi-stage sampling technique was employed for sample selection as follows:

Stage 1: Selection of wards

A total of 5 wards were selected from the list of the twelve wards in the LGA using simple random sampling technique through balloting.

Stage 2: Selection of secondary schools

One secondary school was selected from the list of all secondary schools in each of the five selected wards using simple random sampling technique through balloting.

The calculated sample size was proportionately allocated to the 5 selected schools according to the number of teachers in the schools as shown below:

Name of School	Number of Teachers	Proportionate allocation
*GSS Badarawa	45	30
Rimi College	63	41
GSS Unguwan Sarki	46	30
GSS Unguwan Shanu	25	16
**GGSS Kawo	50	33
Total	**229**	**150**

*GSS- Government Secondary School, **GGSS- Government Girls' Secondary School

Stage 3: Selection of respondents

The selection of teachers who met the inclusion criteria from the selected schools was done by systematic sampling technique after generating the sampling frame from the list of teachers in each of the selected schools to obtain the required sample size for each of the schools. The calculated sampling interval was between 1.5 and 1.6.

Data collection

The data was collected using a pre-tested, structured, self-administered questionnaire with questions organized in sections and an observational checklist. Data were collected by trained research assistants under the supervision of the principal investigator. The research assistants were trained for two days on interviewing techniques, the purpose of the study and the confidentiality of the respondents. The collected data were cross-checked on each day of data collection for consistency and completeness. Ten percent of the questionnaires (15) were pre-tested in Government Secondary School, Chikun LGA of Kaduna State.

Ten questions were used to assess knowledge of teachers on school disaster preparedness. One mark was awarded for each correct answer while incorrect or 'I don't know' responses were scored zero. The respondents' scores were added up and the percentage scores were obtained. The overall knowledge score was graded as follows > 75% (good), 60 -75% (fair) and < 60% (poor) (Diab and Mabrouk, 2015). Five questions were used to assess the respondents' perception with the maximum obtainable scores of 25. Each response for perception was scored 1 to 5. The overall perception scores were added up and the percentage scores were obtained, then graded as follows ≥ 75% (positive) and < 75% (negative) (Diab and Mabrouk, 2015).

Statistical analysis

The data collected were cleaned and entered into Statistical Package for Social Sciences (SPSS, version 23, Chicago, IL, USA) and Microsoft Excel 2016. Descriptive statistics were used to examine the sample characteristics. The results were summarized and presented in tables and charts, and the p-value was set at < 0.05 for statistical significance.

Ethical Considerations

Ethical approval was sought and obtained from the Health Research Ethics Committee of Barau Dikko Teaching Hospital, Kaduna State (HREC /MAC/GEN/45/Vol/1). Permission was also obtained from the Kaduna State Ministry of Education and principals of the sampled schools. Informed verbal consent was

obtained from each respondent before the conduct of the study with the assurance of confidentiality. Respondents also had the right to opt out of the study at any point during the research without any negative implication.

RESULTS

The mean age of the respondents was 40.7 ± 9.7 years. There are more female respondents (57.3%). The Hausa tribe was the most predominant ethnic group (59.3%) followed by Yoruba (10%) and Igbo (4%); other tribes like Jabba, Bajju, Kagoma, Ebira, Igala, Baja, Nupe were also present. Majority of the respondents were Muslims (66.7%) and married (77.3%). The bachelor's degree was the predominant highest educational qualification (71.3%) [Table 1].

Majority (88.7%) and almost two-thirds (62%) of them were aware of school safety and school disaster preparedness, respectively. However, the knowledge of muster points (37.3%) and the importance of fire alarm system (9%) and conduct of simulation drills (8.7%) were low. The availability of school clinics, training teachers on school disaster preparedness and the presence security personnel in the schools were 64.0%, 16.0% and 86.0% respectively [Table 2].

Majority (67.3%) of the teachers got their information on school disaster preparedness from the mass media [Figure 1]. About half of the respondents agreed that lack of school safety is a problem in Kaduna North LGA (44.0%) and in Nigeria (47.3%). And 57.3% of them strongly agreed that the school disaster preparedness program is a necessity [Table 3]. About half of the respondents (44.0%) had fair knowledge score with only 12.7% of them having good knowledge. However, the majority (95.3%) had a positive attitude towards school disaster preparedness [Table 4].

On the level of school disaster preparedness, 80.0% of the schools had complete fences, and secured school entrance gates manned by security personnel. Forty percent had first aid boxes and emergency exit gates; but none of the schools had their students trained on school disaster preparedness and early warning systems such as fire alarm systems [Figure 2]. The majority of the first aid boxes contained analgesics, tincture iodine, needles and syringes, a thermometer, antimalarials, antibiotics, cotton wool, gauze, crepe bandage, electronic blood pressure measuring machine, suture materials, needle holder, scissors and artery forceps. There was no statistically significant association between the respondents' socio-demographic characteristics and their knowledge and disaster preparedness [Tables 5] but there was statistically significant association between perception and marital status and religion of the respondents [Table 6].

Suggestions by the respondents on ways to improve school disaster preparedness include training of staff and students (43.1%), provision of fire alarms and extinguishers (25.8%) as well as awareness creation (19.8%), among others [Figure 3].

Table 1: Socio-demographic Characteristics of the Respondents (n=150)

Variable	Frequency (%)
Age (in years)- mean age = 40.7 ± 9.7 years	
20-24	2 (1.3)
25-29	18 (12.0)
30-34	24 (16.0)
35-39	24 (16.0)
40-44	28 (18.7)
45-49	15 (10.0)
50-54	24 (16.0)
55-59	14 (9.3)
60-64	1 (0.7)
Sex	
Male	64 (42.7)
Female	86 (57.3)
Tribe	
Hausa	89 (59.3)
Igbo	6 (4.0)
Yoruba	15 (10.0)
Others (e.g., Jaba, Bajju, Kagoma, Ebira, Igala, Baja, Nupe)	40 (26.6)
Religion	
Islam	100 (66.7)
Christianity	50 (33.3)
Marital Status	
Married	116 (77.3)
Unmarried	34 (22.7)
Highest educational qualification	
NCE	12 (8.0)
HND	6 (4.0)
Bachelor degree	107 (71.3)
Master degree	18 (12.0)
PhD	1 (0.7)
Postgraduate diploma	6 (4.0)

Table 2: Knowledge of School Disaster Preparedness among the Respondents (n=150)

Variable	Frequency (%)
Awareness of school safety	
Yes	133 (88.7)
No	17 (11.3)
Awareness of school disaster preparedness	93 (62.0)
Yes	57 (38.0)
No	
Knowledge of muster points	
Yes	56 (37.3)
No	94 (62.7)
Knowledge of the importance of fire alarm systems	9 (9.0)
Yes	141 (91.0)
No	
Conduct of simulation drills	
Yes	13 (8.7)
No	137 (91.3)
Importance of functional fire extinguishers	61 (40.7)
Yes	89 (59.3)
No	
Availability of school health clinic	
Yes	96 (64.0)
No	54 (36.0)
Training of teachers on school disaster preparedness	24 (16.0)
Yes	126 (84.0)
No	
Training of students on school disaster preparedness	34 (22.7)

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Yes	116 (77.3)
No	
Presence of armed security personnel	
Yes	129 (86.0)
No	21 (14.0)

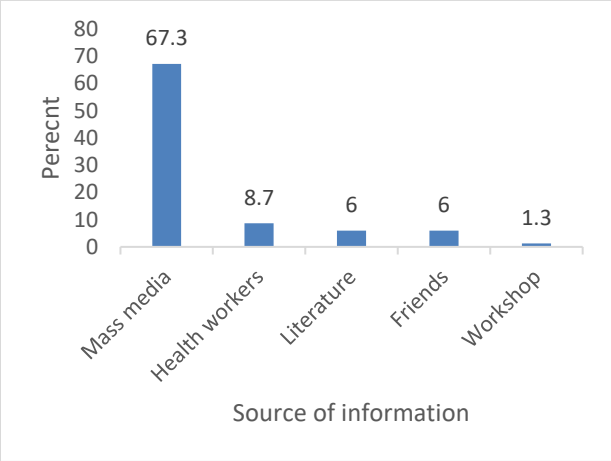

Figure 1: Source of information on school disaster preparedness among the respondents (n = 150)

Table 3: Perception of the Respondents on school disaster preparedness (n=150)

Variable	Frequency (%)
Lack of school safety as a problem in Kaduna North LGA	33 (22.0)
SA	66 (44.0)
A	14 (9.3)
N	27 (18.0)
D	10 (6.7)
SD	
Lack of school safety as a problem in Nigeria	42 (28.0)
SA	71 (47.3)
A	7 (4.7)
N	14 (9.3)
D	16 (10.7)
SD	
The school environment is at risk of disasters	17 (11.3)
SA	53 (35.3)
A	33 (22.0)
N	43 (28.7)
D	4 (2.7)
SD	
The school management is proactive with regards to disaster preparedness	
SA	17 (11.3)
A	59 (39.3)
N	47 (31.3)
D	18 (12.0)
SD	9 (6.0)
School disaster preparedness program is a necessity	86 (57.3)
SA	54 (36.0)
A	5 (3.3)
N	3 (2.0)
D	2 (1.3)
SD	

Key: SA: Strongly Agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly disagree

Table 4: Grading of Respondents' Knowledge and Perception scores on School Disaster Preparedness (n=150)

Variable	Frequency (%)
Knowledge	
Good	19 (12.7)
Fair	66 (44.0)
Poor	65 (43.3)
Perception	
Positive	143 (95.3)
Negative	7 (4.7)

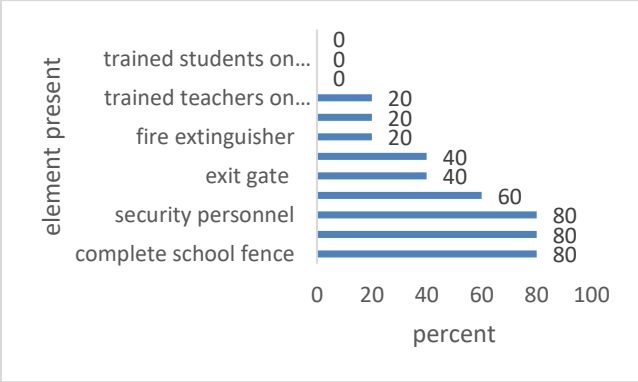

Figure 2: Disaster preparedness in the secondary schools (n = 150)

Table 5: Relationship between respondents' socio-demographic characteristics and their knowledge of school disaster preparedness (n=150)

Variables	Good knowledge (%)	Fair knowledge (%)	Poor knowledge (%)	Test statistics
Age (in years)	0(0.0)	0(0.0)	2(100.0)	χ^2 =
20-24	2(11.1)	6(33.3)	10(55.6)	15.511
25-29	4(16.7)	13(54.2)	7(29.2)	p > 0.05
30-34		99(37.5)	15(62.5)	
35-39	0(0.0)	12(42.9)	14(50.0)	
40-44	2(7.1)	6(40.0)	8(53.3)	
45-49	1(6.7)	13(54.2)	6(25.0)	
50-54	5(20.8)	79(50.0)	2(14.3)	
55-59	5(35.7)	0(0.0)	1(100.0)	
60-64	0(0.0)			
Sex				
Male (64)	5 (7.8)	30 (46.9)	29 (45.3)	χ^2=2.426
Female (86)	14 (16.3)	38 (44.2)	34 (39.5)	7 p= 0.2972
Marital status	16 (13.8)	56 (48.3)	44 (37.9)	χ^2=0.600

Married (116) Unmarried (34)	3 (8.8)	17 (50.0)	14 (41.2)	3 p= 0.7407
Religion				
Islam (100) Christianity (50)	12 (12.0) 7 (14.0)	45 (45.0) 23 (46.0)	43 (43.0) 20 (40.0)	χ^2=0.184 p= 0.9121
Tribe				
Hausa (89) Ibo (6) Yoruba (15) Others (40)	10 (11.2) 1 (16.6) 2 (13.3) 7 (17.5)	45 (50.6) 3 (50.0) 8 (53.3) 17 (42.5)	34 (38.2) 2 (33.3) 5 (33.3) 16 (40.0)	χ^2=1.475 4 p= 0.9611
Highest educational qualification Bachelor degree Master degree NCE others PhD	16(15.0) 1(5.6) 1(8.3) 1(8.3) 0(0.0)	49(45.8) 7(38.9) 5(41.7) 4(33.3) 1(100)	42(39.3) 10(55.6) 6(50.0) 7(58.7) 0(0.0)	Fischer's exact=4.937 p >0.05
Course studied by respondent Education Sciences Social science Engineering Art	1(33.3) 10(13.0) 1(5.6) 2(25.0) 5(11.4)	1(33.3) 34(44.2) 10(55.6) 2(25.0) 19(43.2)	1(33.3) 33(42.9) 7(38.9) 4(50.0) 20(45.5)	χ^2=4.875 p >0.05
Course taught Sciences Art Mathematics English Language	4(6.3) 10(16.7) 2(20.0) 3(18.8)	32(50) 22(36.7) 5(50.0) 7(43.5)	28(43.8) 28(46.7) 3(30.0) 6(37.5)	χ^2=6.492 p >0.05
30-34	24(100.0)	0(0.0)	p >0.05
35-39	23(95.8)	1(4.6)	
40-44	25(89.3)	3(10.7)	
45-49	14(93.3)	1(6.7)	
50-54	23(95.8)	1(4.2)	
55-59	14(100.0)	0 (0.0)	
60-64	1(100.0)	0 (0.0)	
Sex			
Male (64)	60 (93.7)	4 (6.3)	χ^2=0.629
Female **(86)**	83 (96.5)	3 (3.5)	p= 0.4277
Marital status			
Married (116)	114 (98.3)	2 (1.7)	χ^2=9.960
Unmarried (34)	29 (85.2)	5 (14.8)	p=0.0016*
Religion			
Islam (100)	98 (98.0)	2 (2.0)	χ^2= 4.7952
Christianity **(50)**	45 (90.0)	5 (19.0)	p =0.0285*
Tribe			
Hausa (89)	85 (95.5)	4 (4.5)	χ^2= 2.5049
Ibo (6)	5 (83.3)	1 (16.7)	p =0.4744
Yoruba (15)	14 (93.3)	1 (6.7)	
Others (40)	39 (97.5)	1 (2.5)	
Highest Educational qualification Bachelor degree Master degree NCE Others PhD	104(97.2) 17(94.4) 11(91.7) 10(83.3) 1(100.0)	3(2.8) 1(5.6) 1(8.3) 2(16.7) 0(0.0)	Fischer's exact=6.864 p >0.05
Course studied Education Sciences Social science Engineering Art	3(100.0) 73(94.8) 17(94.4) 8(100.0) 42(95.5)	0(0.00) 4(5.2) 1(5.6) 0(0.00) 2(4.5)	Fishers exact=1.006 p >0.05
Course taught Sciences Art Mathematics English Language	60(93.8) 57(94.4) 10(100.0) 16(100.0)	4(6.3) 3(5.6) 0(0.0) 0(0.0)	Fischer's exact= 0.716 p >0.05

Table 6: Relationship between respondents' socio-demographic characteristics and their perception of school disaster preparedness (n=150)

Variables	Positive perception (%)	Negative Perception (%)	Test statistics
Age (in years)			
20-24	2(100)	0(0.0)	Fisher's exact=6.127
25-29	17(94.4)	1(5.6)	

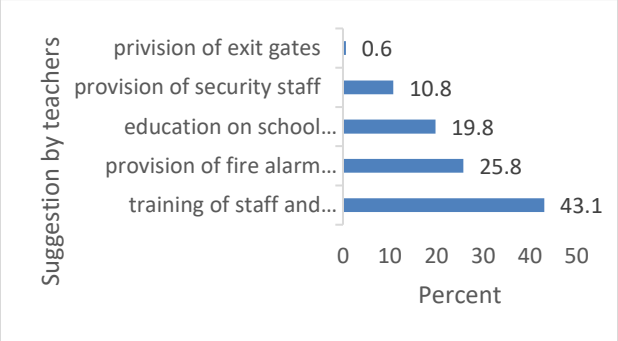

Figure 3: Respondents' suggestions on ways to improve school disaster preparedness (n = 150)

DISCUSSION

Majority (76.7%) of the respondents were within the productive age group of 30 – 54 years, which are the most productive years in every society. More than half are female, Hausas and Muslim. These could be because of the study location being Kaduna North, where the population is predominantly Hausas and Muslim. Teaching is observed by the researchers as mainly a female profession especially in the northern parts of the country. A study conducted in Ekiti State, south-western Nigeria showed majority of the respondents to be female (52%) similar to this study; but a study in Ghana showed males to be the majority (Ogunleye and Olusola, 2019; Below *et al*, 2011). Expectedly the majority (77.3%) of the respondents in this study are married due to cultural and religious beliefs.

A high proportion of the respondents were aware of school safety, school disaster preparedness, the importance of school clinics and the presence of armed security personnel in school disaster preparedness. However, only a small proportion had knowledge of the importance of muster points, fire alarm systems, simulation exercise/drills, fire extinguishers and the roles of teachers and students in school disaster preparedness. These could be because of the increasing cases of school attacks by kidnappers and armed bandits in recent times in Kaduna State. A similar study conducted in Saudi Arabia among teachers revealed that about half of respondents had good understanding of disaster preparedness (Alkalash *et al*, 2023). The implication of our findings is that a good knowledge of school disaster preparedness may be a good step in disaster prevention and mitigation in schools. And the teachers can also share the information with their students, other staff in their schools and their communities.

The major source of information on school disaster preparedness in this study was the mass media. This contrasts with studies carried out in Ekiti State (Ogunleye and Olusola, 2019) and Saudi Arabia (Alkalash *et al*, 2023) where school and the social media (78.8%), respectively were reported as the main sources of information. Radio and television remain a significant means of information transmission, especially in northern Nigeria and could be targeted in the passage of information by government and other relevant stakeholders to the public.

Majority of the respondents agreed that lack of school safety is a problem in Kaduna north LGA and the state. They had a good perception that their school management is proactive regarding school disaster preparedness and viewed school disaster preparedness as a necessity. These could translate into a positive attitude and ultimately, a positive practice by the teachers in terms of school disaster preparedness in their schools.

A small proportion (12.7%) of the respondents had good knowledge of school disaster preparedness. This finding agrees with that of a study conducted in Saudi Arabia where majority of their respondents had poor knowledge of school disaster preparedness (Alrazeeni, 2021). Our finding is at variance with that of a study in Ekiti State, Nigeria where 64.3% of the respondents had good knowledge of disaster preparedness (Idowu, 2019). This contrast could be explained by the low level of attendance at any form of school disaster preparedness training among the respondents in our study. A study conducted in India (Ganpatrao, 2014) showed unsatisfactory knowledge of school disaster preparedness with a mean score of 53% among participants. Another study in the Philippines reported a higher knowledge score of 62.5% among teachers (Hipolito, 2012).

Majority (95.3%) of the schoolteachers in this study had positive perception on school disaster preparedness similar to a study in Ekiti State, Nigeria where 72.9% had positive perception. It also agrees with a study carried out in Louisiana, USA where 85% have positive perception (Idowu, 2019; Pate *et al*, 2016). The similarities could be explained by the findings in these referenced studies where all the schools have experienced some form of disasters and this implies that these populations will be willing to learn and implement disaster preparedness measures in their schools; hence in turn, reducing the impact of disasters and their effects on the health of the school population and by extension, the community at large.

Less than half of the schools had emergency exits similar to a study conducted in Zaria, Kaduna State where only 12% of participating schools had emergency exits (Makama *et al*, 2018). This contrasts with a study conducted in Ghana where 68% of schools had emergency exits (Ahenkorah-Marfo and Borteye, 2010). This could be due to increased awareness of the importance of school safety measures among the study population over the years as observed by the researchers. This finding could imply that majority of the respondents in our study will not know where to exit from in the case of disasters which could lead to many casualties resulting from possible stampedes.

Also, less than 50% of the schools had first aid boxes unlike the findings of the study in Zaria with a figure of 65.1% (Below *et al*, 2011). However, 60% of them had school clinics. This implies that in case of any injuries, most patients can get first aid care before they are referred to secondary or tertiary healthcare facilities, as the case may be.

None of the schools had a fire alarm system and this is similar to a study in Ekiti, Nigeria where 16.6% indicated having fire alarms (Idowu, 2019). All these are similar to studies carried out in Osun State (south-western Nigeria) and Kenya where even though majority indicated they had fire extinguishers in case of fire outbreaks, a significant majority also did not have fire alarms (Olatunya *et al*, 2014; Ahenkorah-Marfo and Borteye, 2010). A fire alarm system could serve as an early warning in case of fire disaster, thereby reducing the negative impacts resulting from such hazards.

A good proportion (80%) of the schools having the presence of security personnel, secured entrance gates and completed school fences is a good sign of disaster preparedness by the schools. On the contrary, similar studies conducted in Japan and India (47%) showed insufficient school disaster preparedness (Ganpatrao, 2014; Kawasaki *et al*, 2022). The better overall level of school disaster preparedness reported in our study could be because of the recent high prevalence of school attacks in the state. The presence of these personnel could serve as a deterrent to such attacks on these schools.

Only one fifth of the schools had fire extinguishers and they were not expired. This contrasts with a study conducted in Zaria, Nigeria and Ghana where 76.2% and 91.5% had fire extinguishers; however, 68% and 55.3% of the fire extinguishers, respectively were expired (Makama *et al*, 2018; Leppold *et al*, 2022). The differences could be due to the categories of schools in which these studies were carried out as the index study was carried out in public (government-owned) secondary schools and those in Zaria and Ghana were conducted in privately owned secondary schools. Private schools may be relatively better funded and therefore have more funds to provide fire extinguishers than public schools.

None of the schools conduct any form of simulation exercises or drills implying that majority of them will not be able to handle

disasters if they ever occur, therefore the resulting morbidity and mortality are likely to be high. Disaster management often requires proper co-ordination of response and rescue activities and a unified direction of command.

There was no statistically significant relationship between the socio-demographic characteristics of the respondents with their knowledge and perception. These could be as the result of the sample size of the respondents used.

About four out of ten of the respondents suggested training for both students and staff as a measure to improve school disaster preparedness, 25.8% suggested the provision of fire alarms and extinguishers, 19.8% suggested creating awareness and 10.8% suggested the presence of security personnel. This is in contrast to a study conducted in Kenya where majority (83.3%) suggested organization of workshops and seminars, 66.6% suggested (regular) inspection by quality assurance officers and 65% suggested the provision of funds by the government (Wand *et al*, 2015).

Limitations of the study

There are very few existing literature on the topic and the (then recent) covid 19 pandemic also affected the calendar of the schools in the state. Measures taken to reduce the limitation include administering questionnaires before the schools closed and making optimum use of available literature. Security challenge in the state was also an issue and Kaduna North LGA was not an exception.

Conclusion

The overall knowledge of school disaster preparedness was assessed as poor, but the perception was positive among the respondents. In the areas of presence of school clinics, security personnel, secured entrance gate and fencing of the school, the school disaster preparedness was good. Most respondents suggested the training of school staff and students as well as the provision of fire alarms and extinguishers to improve school disaster preparedness, among others. There is a need for Kaduna State Ministry of Health to conduct regular training through workshops and seminars among secondary school teachers and students on school disaster preparedness as well as regular simulation exercises.

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REFERENCES

Ahenkorah-Marfo M, Borteye EM (2010). Disaster preparedness in academic libraries: the case of the Kwame Nkrumah university of science and technology library, Kumasi, Ghana. Library & Archival Security, 30;23(2):117-36. DOI:10.1080/01960075.2010.501417

Alkalash S H, Alhashmi Alamer E H, Allihyani A M (2023). Knowledge of and Attitude toward Disaster Preparedness Among Secondary School Students in the Western Region of Saudi Arabia. Cureus; 15(1): e33926. DOI:10.7759/cureus.33926.

Alrazeeni D (2015). Saudi EMS Students' Perception of and Attitudes toward Their Preparedness for Disaster Management. Journal of Education and Practice;6 (35):110-116. https://files.eric.ed.gov/fulltext/EJ1086390.pdf

American Academy of pediatrics, Council on school Health, Medical emergencies occurring at school. Pediatrics 2008; 112(4): 887-894. DOI: 10.1542/peds.2008-2171

Below R, Guha-Sapir D, Vos F, Ponserre S. Annual disaster statistical review 2010. Centre for Research on the Epidemiology of Disasters. 2011. https://pessoas.feb.unesp.br/anna/files/2009/08/ADSR_2010.pdf

Diab GM, Mabrouk SM (2015). The effect of guidance booklet on knowledge and attitudes of nurses regarding disaster preparedness at hospitals. Journal of Nursing Education and Practice; 5(9):17-31.https://sid.ir/paper/700779/en

Ganpatrao JS (2014). Knowledge and Practices of School Teachers regarding disaster management. 98 International Journal of Health System and Disaster Management; 2 (2):98-102. DOI:10.4103/2347-9019.139055

Hipolito ER (2012). Knowledge, Attitude and Practice of Students and Science Teachers in Disaster Preparedness. Universe International Journal of Interdisciplinary Research; 2 (3): 71-81. **DOI NO.: 08.2020-25662434 DOI Link:** https://www.doi-ds.org/doilink/09.2021-84485817/UIJIR

Ibrahim AA & Musa IJ (2011). A study of common episodic disaster events in Zaria urban area, Nigeria. Research Journal of Environmental and Earth Sciences; 3 (2):90-94.

Idowu, IO (2019). Disaster Preparedness and Awareness Among School Educators and Administrators-A study of selected secondary schools in Ekiti Sate, Nigeria. Journal of education and Practice; 10 (25):87-92. DOI: 10.7176/JEP

Jaykaran C, Tamoghna B (2013). Calculation of sample size for different study designs in medical research. Indian Journal of Psychology Medicine;35 (2):121-126. https://doi.org/10.4103/0253-7176.116232

Kawasaki H, Yamasaki S, Kurokawa M, Tamura H, Sonai K (2022). Relationship between Teachers' Awareness of Disaster Prevention and Concerns about Disaster Preparedness. Sustainability, 14, 8211. https://doi.org/10.3390/su14138211

Leppold C, Gibbs L, Block K, Reifels L, Quinn P (2022). Public health implications of multiple disaster exposures. The Lancet Public Health; 7 (3): e274-e286. DOI: 10.1016/S2468-2667(21)00255-3

Magreta W. Assessing school safety from disasters A global baseline report. ISDR Thematic platform for knowledge and education 2012.

Makama JG, Joshua IA, E.J Yusuf, N (2018). Disaster preparedness of private schools in Zaria Nigeria. Clinics of Surgery; 1:1-6.

Ministry of education Kaduna state Federal Republic of Nigeria annual school census report 2018/2019 February,

2020. https://education.kdsg.gov.ng/wp-content/uploads/2020/06/2018-2019-KADUNA-ASC.pdf

Ogunleye OI, Olusola JA (2019). Evaluating Disaster preparedness among university learners: A study of Ekiti State University, Ado-Ekiti, Nigeria. World Journal of innovative Research; 6 (2):85-88. https://www.wjir.org/download_data/WJIR0602011.pdf

Olatunya OS, Oseni SB, Ogundele O and Oyelami OA (2014). A study of primary school environment in a local government area, Southwest Nigeria. Journal of Community Medicine and Health Education; 4: 321. DOI:10.4172/2161-0711.1000321

Pate A, Bratberg JP, Robertson C, Smith G (2016). Evaluation of a tabletop emergency preparedness exercise for pharmacy students. American Journal of Pharmaceutical Education; 25;80 (3):50-55. http://dx.doi.org/10.5688/ajpe80350

Roser M, Ortiz-Ospina E. Primary and Secondary Education. Our world in data retrieved October 2019.

Sarmah HK, Hazarika BB, Choudhury G (2013). An Investigation on Effect of Bias on Determination of Sample Size on The Basis of Data Related to The Students of Schools of Guwahati. International Journal of Applied Mathematics & Statistical Sciences; 2 (1): 33-48.

Uro E, Arokoyu S.B (2016). Hazard Perception by teachers of public secondary schools in Rivers State, Nigeria. international Journal of scientific Research and Innovative Technology, 8; 2-6.

Wahab B, Folarin S (2014). The Spatial Pattern of Disasters in Public Schools in Ibadan, Nigeria. Journal of Emergency and Environmental studies; 5 (2): 87-101. file:///C:/Users/user/Downloads/Wahab.Folarin_TheSpatialPatternofDisastersinPublicSchoolsinIbadanNigeria.pdf

Wand MZ, Ayuba IGU, Asika BG (2015). Needs for Disaster Risk Reduction in Nigeria. Journal of Environmental Science, Toxicology and Food Technology; 9 (1):43-47. DOI:10.9790/2402-09134347