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Evaluation of the awareness and experiences of the primary and secondary school teachers on asthma: A cross-sectional study in Ilorin, Nigeria

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ABSTRACT

Objectives: Children spend the daytime participating in classes and sports. Hence, as the general caregiver of children during school hours, the teacher has a role in managing those with asthma. The present study aims to identify teachers' knowledge, attitude, and experiences about childhood asthma in primary and secondary schools in Ilorin, Nigeria.

Materials and Methods: A cross-sectional study was conducted among 1532 teachers from 64 schools (24 primary and 40 secondaries) selected through multistage sampling. A 40-item Asthma Knowledge Questionnaire was used to assess teachers' knowledge about childhood asthma. A score of <22 out of 40 was considered suboptimal knowledge of childhood asthma.

Results: The response rate was 92.8%. Two-thirds of respondents were female. The overall mean age was 33.8 ± 8.1 years. The median (interquartile range [IQR]) teaching duration was 6 (3–11) years. The teachers had the highest median score (60.0%) in the triggers domain and the lowest median score (33.3%) in the symptoms domain. The overall median (IQR) knowledge score of the primary school teachers was 50.0 (30.0–65.0%), and for the secondary school teachers was 52.5 (30.0–65.0%), $P = 0.689$. Two hundred and ninety-one (55.1%) primary teachers and 479 (53.6%) secondary teachers had suboptimal knowledge. Teachers with an asthmatic relative, an asthmatic child in the class, or who previously witnessed a child with an asthmatic attack had – significantly better asthma knowledge, with each $P < 0.05$.

Conclusion: About half of the teachers surveyed had suboptimal knowledge of asthma. Strategies to improve teachers' knowledge are crucial for improved childhood asthma management in Ilorin schools.

Keywords: Asthma, School teachers, Knowledge, Attitude, Nigeria

INTRODUCTION

Asthma is a chronic inflammatory disorder of the airway.[1] Many cells, such as eosinophils and mast cells, play a role that results in symptoms often associated with widespread but variable airflow obstruction.[1] The obstruction is usually reversible, spontaneously or with treatment, and causes increased airway responsiveness to various stimuli.[1] The asthma symptoms include wheeze, chest tightness, shortness of breath, and cough. If uncontrolled, asthma symptoms could disrupt the day-to-day activities of those involved and affect developmental, emotional, and social well-being.[2]

The school is an essential setting in the management of children with asthma. During the academic session, children with asthma spend a substantial part of the daytime in school, participating in various school activities and sports. Some of these sports activities may trigger asthma symptoms, particularly in those poorly controlled.[3] Furthermore, peer pressure may prevent the child from taking the symptoms into cognizance such that they participate in activities harmful to their health despite knowing otherwise.[4] Indeed, children with asthma are targets of bullies, causing emotional distress with the resultant asthma trigger.[2,3] In addition, various asthma triggers in the school environment such as dust, viral respiratory infections, pollens, fumes, chalk dust, dust mites, and cockroaches would likely hinder control of the asthma symptoms.[5-7]

School teachers are the general caregiver of children during school hours. Therefore, to optimize the care for children with asthma during school hours, the school teachers must be knowledgeable about asthma, must be able to identify asthma triggers, take steps to prevent asthma exacerbations, and communicate with parents and medical providers to coordinate care.[8] Identifying the current understanding, comprehension, and experience of teachers in schools about asthma may serve as a valuable step toward improving the care of these children.

Many studies conducted in Asia,[9-11] Europe,[12,13] the USA,[14-16] and Africa[17-19] about teachers' knowledge of asthma symptom identification, triggers, and medications had identified a significant gap in knowledge, and the care for children with asthma. There is, however, a shortage of published studies in Nigeria on this subject matter. The available ones emanate from the country's South West region, which has a differing climate (tropical monsoon in the South and tropical savannah in the North), people perceptions, and culture compared with the country's northern part.[18,19] Moreover, these Nigerian studies recruited only secondary school teachers. The asthma symptoms are prevalent among the primary and secondary school students.[20,21] Hence, the assessment of the primary and secondary school teachers is crucial. Thus, the present study describes the primary teachers' knowledge, attitude, and experiences about childhood asthma and the secondary teachers' knowledge, attitude, and experiences about childhood asthma in Ilorin, North Central Nigeria.

MATERIALS AND METHODS

Study design and setting

A school-based descriptive cross-sectional study was conducted in Ilorin, the capital of Kwara State, located in Nigeria's North Central geographical zone. Ilorin consists of three local government areas (LGAs); Ilorin-South, Ilorin-East, and Ilorin-West LGAs. The indigenous tribes are mainly Yoruba and Fulani, although people from other tribes of Nigeria also reside in the metropolis. The predominant occupations of the residents in Ilorin include civil servants (employees in Nigerian government agencies), commercial driving, farming, trading, artisans, organized private sector, and weaving of traditional attires. According to the 2006 census, the estimated population of Kwara State was 2.37 million people, with an estimated growth rate of 2.3%.[22]

As of 2019, Ilorin had 189 public primary schools and 523 registered private primary schools, with 109,492 pupils registered in these schools. There are 55 public and 221 registered private primary schools in Ilorin-West; 55 public and 205 registered private primary schools in Ilorin-South; and 79 public and 97 registered private primary schools in Ilorin-East LGAs. There were 63 public and 82 private registered secondary schools with 42,195 students. For each LGA, Ilorin West had 26 public and 19 private secondary schools, Ilorin South had 22 public and 37 private secondary schools, while Ilorin East had 15 public and 26 private secondary schools. Qualified teachers were 10,240 and 6451 in public and private schools in Ilorin, respectively; overall, there were 16,691 qualified teachers. The distribution of qualified teachers for each LGA includes Ilorin West, with 4094 public and 2260 private teachers. Ilorin South had 3239 public and 3183 private teachers, while Ilorin East had 2907 public and 1008 private teachers.

The study was conducted between December 2019 to February 2020, and October 2020 and December 2020. The interruption was due to the COVID lockdown.

Sample size estimation

The number of teachers for enrolment was estimated by the Yamane formula; $n = N/1+Ne^2$, where n is the desired sample size, N is the size of the study population (16,691), and *e* is the precision level of 2.5%. Therefore, $n = 16691/1+ (16691 \times 0.025^2) = 1460$.

- The number of teachers recruited from each LGA was based on the proportions of the total population. The overall ratio of public to private teachers is 1.6:1; therefore, 945 public school teachers and 589 private school teachers were recruited.
- The ratio of public primary to secondary school teachers is 1:2, such that the distribution of the 945 public teachers was 316 primary teachers and 629 secondary teachers. The ratio of private primary to secondary school teachers is 1:1.5; therefore, the 589 private teachers, as 234 primary and 353 secondary teachers, were enrolled.

Inclusion criteria

Teachers from registered primary or secondary schools with day students and consenting schools were eligible for enrolment. Excluded were teachers in single-sex schools, boarding schools, mixed primary and secondary schools, schools for the handicapped, and non-consenting schools.

Sampling technique

A multistage sampling technique was used. The teachers were enrolled from 64 schools, 24 primary schools, and 40 secondary schools.

Stage 1: We obtained the lists of public schools and registered private schools from the state ministry of education. Each of the lists was arranged in alphabetical order. The number of schools to be picked from each LGA was allocated proportionately.

Stage 2: Systematic sampling was used to select the participating schools from each LGA. The first schools recruited were the first on the arranged lists, while subsequent schools were selected using sampling intervals calculated using the formula:

Sampling interval = Sampling frame/sample size

For example, the sampling interval for public primary schools in Ilorin West = $\left(\frac{55}{14}\right)$ = 4 and private primary schools is 221/23 =9.6. Hence, we selected every fourth school and every tenth school on the lists of public and private primary schools, respectively. Where a chosen school did not meet the inclusion criteria for the study, the next school on the list was recruited while still maintaining the sampling interval until the desired sample size was attained.

Stage 3: A systematic sampling technique was used to recruit the teachers in each selected school. The total teachers sampled in each school were divided by six such that at least one teacher was recruited per class. After the first six had been selected, a simple random sampling technique by balloting was used to identify the arm of classes, from which the other teachers were chosen to make the complete number required per school.

Ethical approval

The Ethical Review Committee of the University of Ilorin Teaching Hospital gave ethical approval for the study (ERC PAN/2019/07/1917). The Kwara State Ministry of Education granted permission and issued an introductory letter to conduct the study in schools. Furthermore, we received the consent of the principals and headmasters of the participating schools. We obtained consent from the teachers in the selected schools after providing relevant information on the study.

Method

The teachers completed a self-administered questionnaire that captured their ages, sex, highest educational qualifications, and the number of years in teaching service. The previous information about childhood asthma and the sources of the information were also documented.

School teachers' asthma knowledge assessment

The school teachers' level of knowledge about childhood asthma was assessed using the validated Asthma Knowledge Questionnaire (AKQ).[17] The questionnaire was pre-tested in a pilot study among teachers in a school in an LGA different from those selected. The 40-item AKQ has four parts evaluating various aspects: Part 1 with 13 questions assesses general knowledge about childhood asthma; part 2 with six questions, reviews knowledge about signs and symptoms of severe acute asthma; part 3 with ten questions checks knowledge about common triggers of childhood asthma, while part 4 with 11 questions evaluates the knowledge about asthma medications and management.

The subjects were required to pick one of three options for each question. The options were "true," "false," or "don't know." A score of "1" was allocated for every correct answer and "0" for a wrong and do not know response. The maximum obtainable score was 40, and a score <22 was considered poor or suboptimal knowledge of childhood asthma.[18]

Responses on personal and family history of asthma and history of the previous experience with students with asthma were used to assess the experience of the teachers. In addition, responses were sought on whether the teachers had been previous witnesses or assistance to a child with acute asthmatic exacerbations.

Data analysis

The data were analyzed using the IBM Statistical Package for the Social Sciences software version 20. Categorical variables such as sex, age group, and highest educational qualifications of the teachers were presented using proportions and percentages. In contrast, continuous variables such as scores of the study participants from the AKQ and length of time in teaching service were presented using mean and standard deviations for normally distributed variables and median and interquartile ranges (IQR) for non-normally distributed ones. The knowledge scores for each domain and the combined fields were expressed as percentages. The Kolmogorov–Smirnov, and Shapiro–Wilk tests were used to check for the normality of the continuous data. The Chi-

square test identified an association between categorical variables. The Mann–Whitney U-test and the student t-test were used to identifying an association between continuous variables. $P < 0.05$ was considered significant.

RESULTS

Overall, 1421 (92.8%) teachers out of 1532 teachers completed the questionnaire [Figure 1]. The response rate among the primary school teachers was 96.0%, as there were 528 well-filled questionnaires out of 550. The response rate for the secondary school teachers was 90.9% (893 filled forms out of 982). [Figure 1] illustrates the study flow chart of the teachers enrolled.

Demography of teachers

[Table 1] shows the teachers' demographic characteristics, years of teaching experience, and the number of teachers enrolled in each LGA. The majority of the teachers were female (66.9%), and the predominant age groups were 21–40 years, accounting for 73.1% and 80.5% in the secondary and primary school group, respectively. The overall mean age was 33.8 ± 8.1 years. The mean age of the primary teachers was 34.0 ± 8.5 years, while that of the secondary teachers was 33.7 ± 7.9 years, $P = 0.573$. The most common educational qualification of the primary teachers (48.1%) was the Nigerian Certificate in Education (NCE), and the university first degree for the secondary school teachers (44.9%). Overall, the median (IQR) years of teaching practice were 6 (3–11) years; 7 (3–10) years for primary teachers, while that of the secondary teachers were 6 (3–11) years, $P = 0.239$.

Responses on the four domains of the AKQ

[Table 2] shows the proportion of teachers in the primary and secondary schools with an accurate response in the asthma general knowledge, symptoms, and signs domain. More than 50% of the teachers in the two groups gave correct answers to about half the general knowledge domains questions, but less than 40% recognized the symptoms and signs of severe asthma [Table 2]. The median (IQR) score in the general knowledge domain for the primary teachers was 53.8 (38.5–61.5%), and for the secondary teachers was 53.8 (38.5–69.2%), $P = 0.073$. In the symptoms and signs domain, the median (IQR) score was 33.3 (0.0–66.7%) among the primary teachers and 33.3 (0.0–66.7%) among the secondary teachers, $P = 0.541$.

The proportion of the primary and secondary teachers with correct responses concerning asthma triggers was similar for most triggers except for cockroaches and feather/furs, with an affirmative answer among primary teachers (32.% and 39.2%) and the secondary teachers (21.8% and 35.2%) [Table 3]. The triggers domain median (IQR) percentage

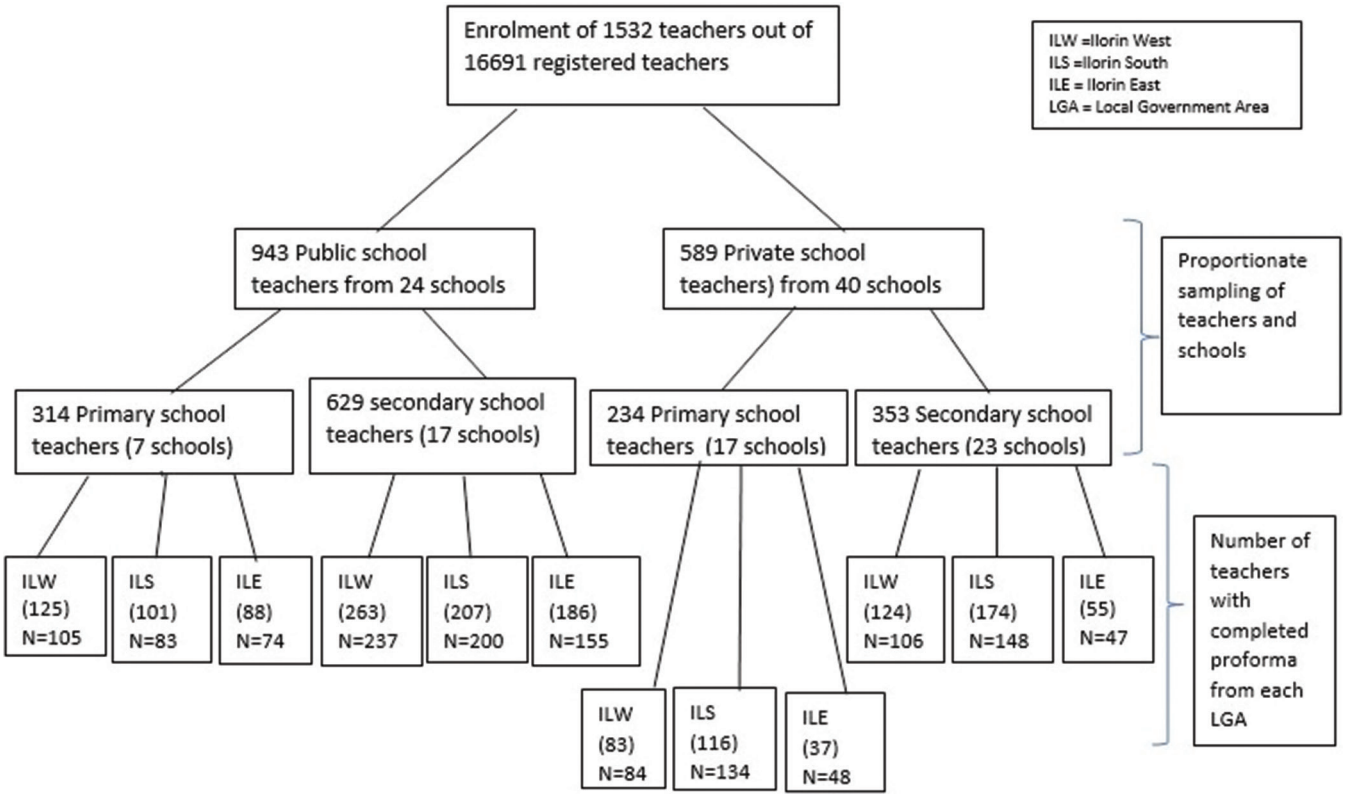

Figure 1: Study flow chart of the teachers' enrolment.

Table 1: The demographic and teaching characteristics of the teachers.

Parameter	Primary teachers		Secondary teachers		Total
	n=528 Frequency	Percentage	*n*=893 Frequency	Percentage	*n*=1421 *n* (%)
Age (years)					
<21	14	2.7	22	2.5	36 (2.5)
21–30	208	39.4	358	40.1	566 (39.8)
31–40	217	41.1	384	43.0	601 (42.3)
41–50	75	14.2	97	10.9	172 (12.1)
≥51	14	2.7	32	3.6	46 (3.3)
Gender					
Male	137	25.9	333	37.3	470 (33.1)
Female	391	74.1	560	62.7	951 (66.9)
School category					
Public	262	49.6	592	66.3	854 (60.1)
Private	266	50.4	301	33.7	567 (39.9)
Teachers' level of education					
Nigerian Certificate in Education	254	48.1	229	25.6	483 (34.0)
Ordinary National Diploma	40	7.6	89	10.0	129 (9.1)
Higher National Diploma	43	8.1	102	11.4	145 (10.2)
University first degree	167	31.6	401	44.9	568 (40.0)
Masters	14	2.7	57	6.4	71 (5.0)
Others	10	1.9	15	1.7	25 (1.7)
Years of teaching (years)					
≤5	231	43.8	415	46.5	646 (45.5)
6–10	169	32.0	250	28.0	419 (29.5)
11–15	81	15.3	144	16.1	225 (15.8)
>15	47	8.9	84	9.4	131 (9.2)

scores for the primary and secondary teachers were each 60.0 (30.0–80.0%), $P = 0.478$.

Concerning medications, about 62% of the primary teachers and 60% of the secondary school teachers correctly identified salbutamol and oxygen as necessary in asthma care. However, less than 30% of each group of respondents correctly identified self-medication in asthma care [Table 3]. Less than 50% of the teachers in either group correctly identified the questions about school attendance and sports questions. The exceptions were answers on preventive medication before exercise or sports and apprehension of further attacks among secondary (51.5 and 55.1%) and primary (55.7 and 50.0%) teachers, respectively, as shown in [Table 3]. The median (IQR) percentage scores in the medication and management domain for each teacher group were 45.5 (27.3–54.5%), $P = 0.971$.

The overall median (IQR) knowledge percentage score of the primary teachers was 50.0 (30.0–65.0%), and the corresponding score of the secondary school teachers was 52.5 (30.0–65.0%). $P = 0.689$.

Teachers' experiences and attitudes on asthma

The proportion of the secondary school teachers willing to remind asthmatic children to take their inhalers was 54.6% [Table 4]. The proportion of the primary school teachers that reminded or were willing to remind asthmatic children to take their inhalers was 24.6% [Table 4]. Less than 30% of each group of respondents had ever been in contact with an asthmatic patient. A minority (< 30%) of the primary and secondary schools had health care personnel attached to the school. [Table 4] shows the attitudes and experiences of either group of teachers.

Association between teachers' asthma knowledge level and some teacher characteristics and experience

Among the primary school teachers, 291 (55.1%) had suboptimal knowledge, while 237 (44.9%) had good knowledge. The secondary school teachers with suboptimal and good knowledge levels of asthma were 479 (53.6%) and 414 (46.4%), respectively.

A lower proportion of the secondary school teachers at public schools (51.3%) had suboptimal knowledge of asthma compared to those in private schools (60.2%), $P = 0.006$ [Table 5]. In the primary and secondary school groups, teachers with <5 years of teaching experience comprised the highest proportions with suboptimal knowledge at 58.4% and 59.5%, respectively. The proportion of teachers with suboptimal knowledge

Table 2: The proportion of teachers with correct responses in the general knowledge and symptom domains.

Variable	Correct response	Primary teachers *n*=528		Secondary teachers *n*=893	
		Number with the correct response	%	Number with the correct response	%
General knowledge					
Asthma is a common respiratory disease in children	T	218	41.3	381	42.7
Allergies are associated with asthma	T	322	61.0	548	61.4
Asthma is an infectious disease transferred from one person to the other	F	327	61.9	622	69.7
Asthma tends to run in families	T	267	50.6	446	49.9
Asthmatic children have low IQs	F	260	49.2	550	61.6
Emotional factors influence asthma	T	154	29.2	237	26.5
Asthma is not curable-it is a disease that requires treatment for a long time	T	260	49.2	416	46.6
Children can die from asthma	T	326	61.7	572	64.1
An asthma attack occurs due to the narrowing of the airway	T	299	56.6	509	57.0
Asthma is controlled by appropriate medication	T	378	71.6	619	69.3
Asthma is an emotional disorder that needs psychological counseling	F	195	36.9	368	41.2
Symptoms of asthma are cough, difficult breathing and wheezing	T	367	69.5	608	68.1
Asthma attacks occur more during the daytime than at night	F	172	32.6	318	35.6
Signs and symptoms of a severe acute asthma attack include					
Difficulty with speech	T	235	44.5	406	45.5
Agitation	T	214	40.5	357	40.0
Drowsiness	T	223	42.2	361	40.4
Skin around Chest and neck "pulled in"	T	191	36.2	340	38.1
Confusion	T	183	34.7	343	38.4
Blue discoloration of the lips	T	104	19.7	177	19.8

decreased with increasing years of teaching experience and was significant among secondary teachers, $P = 0.004$ but not primary teachers, $P = 0.382$. A significantly higher proportion of the secondary school teachers with OND and NCE educational attainment levels (62.6%) had suboptimal knowledge compared to those with university levels (48.7%) and postgraduate degrees (48.6%), $P < 0.001$ [Table 5]. The knowledge level on asthma of the primary teachers did not significantly differ based on their educational attainment (OND and NCE, university, or postgraduate) levels, $P = 0.575$.

Both the primary and secondary school teachers with a personal history of asthma, having a relative with asthma, an asthmatic child in the class, or who previously witnessed a child with an asthmatic attack were associated with a significantly good knowledge of asthma, each $P < 0.05$ [Table 5].

Sources of information

Two hundred and sixty-five (50.2%) primary teachers and 463 (51.8%) secondary teachers proffered their sources of information on asthma. Accounting for about 60% of the source of asthma information, for each of the primary teachers and secondary school teachers, was mass media, family, and friends [Figures 2 and 3]. In each group, the least common sources of information were the health care worker and personal experience, as shown in [Figures 2 and 3].

DISCUSSION

It is crucial that teachers have knowledge of asthma for the optimal management of the child with asthma.[23] However, the present study shows suboptimal knowledge about childhood asthma among the primary and secondary school teachers in

Table 3: The proportion of teachers with correct responses concerning the knowledge of asthma triggers, medications, and sports domains.

Variable	Correct response	Primary teachers *n*=528		Secondary teachers *n*=893	
		Number with the correct response	%	Number with the correct response	%
Common triggers of asthma					
Chalk dust	T	311	58.9	550	61.6
Strenuous exercise	T	290	54.9	528	59.1
Smoking	T	357	67.6	598	67.0
Common cold/catarrh	T	347	65.7	585	65.5
Perfumes/Strong odors	T	367	69.5	590	66.1
House dust mite	T	347	65.7	578	64.7
Pollens	T	251	47.5	425	47.6
Certain drugs and food	T	257	48.7	422	47.3
Feathers or fur of animals	T	206	39.0	321	35.9
Cockroaches	T	170	32.2	195	21.8
Medications					
Does the use of antibiotics relieve an asthma attack?	F	161	30.5	324	36.3
Does the use of aspirin relieve an asthma attack?	F	176	33.3	316	35.4
Ventolin or salbutamol (inhaler) relieves an asthma attack by opening the airway	T	314	59.5	534	59.8
Oxygen therapy is required in very severe asthma attacks	T	338	64.0	542	60.7
Ventolin can cause a rapid pulse rate, palpitations and hand tremors	T	235	44.5	337	37.7
Should self-medication be discouraged in the management of asthma in children?	F	125	23.7	260	29.1
School attendance and sports					
Having attacks in school makes a child apprehensive or afraid of further attacks	T	264	50.0	492	55.1
Asthmatic children should avoid exercise and sports	F	153	29.0	309	34.6
The asthmatic child can take preventative medication before exercise and sports	T	294	55.7	460	51.5
Playing games in the rain increases the likelihood of an asthma attack	T	225	42.6	343	38.4
Swimming is the best sport for asthmatics	T	122	23.1	192	21.5

Ilorin, Nigeria, similar to reports from South-West Nigeria[18,19] and some other countries.[15,17,24-26] Hence, the results of the index study suggest that both primary and secondary school teachers require additional health education regarding childhood asthma to improve their knowledge base. Indeed, some authors have reported improvement in the teachers' knowledge after an educational intervention, and guidelines to train teachers in appropriate asthma care are available.[27-29] Improvement in the teachers' knowledge should reinforce good management and enhance asthma outcomes at school. Most of the teachers had limited knowledge of recognizing the symptoms and signs of an asthmatic attack in the index study, a finding earlier reported.[23] Indeed, the present study recorded the lowest scores attained in this domain. Teachers must recognize symptoms of an asthmatic attack to enable them to take the necessary steps for early intervention.

The present study revealed a better knowledge of triggers of childhood asthma among the school teachers than knowledge about clinical manifestations and management of the disease. This finding is in keeping with the previous studies.[9,14,18,19,30] The triggers, especially the common ones such as smoke, strong odor, and dust, are easier to understand by teachers compared to the aspect related to etiology, pathogenesis or management. Good knowledge of the various triggers of asthma, especially those poorly known, such as cockroaches, feathers, and fur, is crucial, so the teacher is proactive in preventing asthma attacks by identifying likely triggers in the school environment.

More than 60% of the teachers responded that asthmatic children should not engage in exercise and sporting activities in the present study. Similarly, workers from Nigeria and other countries reported this finding.[11,14,18,19,24] This misconception may be related to the high preponderance of exercise-induced bronchospasm (EIB) among children with asthma and the tendency to limit activities in such children leading to an inactive lifestyle and resultant poor asthma management.[31,32] Indeed, the risk of EIB attacks is reportedly

Table 4: Teachers' experiences and attitudes toward asthmatic students or pupils.

Experiences and attitude on asthma	Primary teachers *n*=528		Secondary teachers *n*=893	
	Yes (*n*)	Percentage	Yes	Percentage
Do you think you know enough about asthma?	109	20.6	208	23.3
Have you ever had any training on asthma?	86	16.3	178	19.9
Would you allow asthmatic children to keep their drugs in school?	258	48.9	447	50.1
Would you or do you remind an asthmatic child to take their inhaler?	130	24.6	488	54.6
Would you or do you supervise asthmatic children using the inhaler?	274	51.9	417	46.7
Are you a parent of an asthmatic child?	68	12.9	124	13.9
Do you have a relative with asthma?	107	20.3	209	23.4
Do you have asthma?	60	11.4	101	11.3
Have you ever had a child with asthma in your class?	89	16.9	177	19.8
Have you witnessed a child having an asthma attack?	157	29.7	317	35.5
Have you ever contacted a parent of a child with asthma about the child's symptoms?	126	23.9	277	31.0
Is there a school nurse permanently or partially attached to your school?	158	29.9	217	24.3
Is there a school doctor permanently or partially attached to your school?	84	15.9	119	13.3

Table 5: Association between some demographic characteristics and experiences of the teachers with asthma knowledge.

Variable	Asthma knowledge of primary teachers		*P*-value	Asthma knowledge of secondary teachers		*P*-value
	Suboptimal *n*=291 *n* (%)	Good *n*=237 *n* (%)		Suboptimal *n*=479 *n* (%)	Good *n*=414 *n* (%)	
Gender						
Male	77 (56.2)	60 (43.8)	0.765	171 (51.4)	162	0.290
Female	214 (54.7)	177 (45.3)		308 (55.0)	252	
Age group (years)						
≤25	45 (50.6)	43 (49.4)	0.738	73 (57.9)	53 (42.1)	0.674
26–35	135 (55.1)	110 (44.9)		236 (52.3)	215 (47.7)	
36–45	91 (58.0)	66 (42.0)		138 (54.5)	115 (45.5)	
>45	21 (53.8)	18 (46.2)		32 (50.1)	31 (49.9)	
Type of school						
Public	153 (58.4)	109 (41.6)	0.132	298 (51.3)	294 (48.7)	0.006
Private	138 (51.9)	128 (48.1)		181 (60.2)	120 (39.8)	
Level of education						
NCE/OND	161 (54.8)	133 (45.2)	0.347	199 (62.6)	119 (37.4)	<0.001
HND/University	120 (57.1)	90 (42.9)		245 (48.7)	258 (51.3)	
Postgraduate	10 (41.7)	14 (58.3)		35 (48.6)	37 (51.4)	
Years of teaching experience						
≤5	135 (58.4)	96 (41.6)	0.382	247 (59.5)	168 (40.5)	0.004
6–10	90 (53.3)	79 (46.7)		123 (49.2)	127 (50.8)	
≥11	66 (51.6.)	62 (48.4)		109 (47.8)	119 (52.2)	
Personal history of asthma						
Yes	25 (41.7)	35 (58.3)	<0.001	39 (38.6)	62 (61.4)	0.001
No	266 (57.2)	199 (42.8)		440 (55.6)	351 (44.4)	
Relative with asthma						
Yes	25 (28.1)	64 (71.9)	<0.001	61 (29.2)	148 (70.8)	<0.001
No	266 (60.1)	173 (39.9)		418 (61.1)	266 (38.9)	
Have/had a child with asthma in class						
Yes	25 (28.1)	64 (71.9)	<0.001	54 (30.5)	123 (69.5)	<0.001
No	266 (60.1)	173 (39.9)		425 (59.4)	291 (40.6)	
Ever witnessed a child with an asthmatic attack						
Yes	51 (32.5)	106 (67.5)	<0.001	88 (27.8)	229 (72.2)	<0.001
No	240 (64.7)	131 (35.3)		391 (67.9)	185 (32.1)	

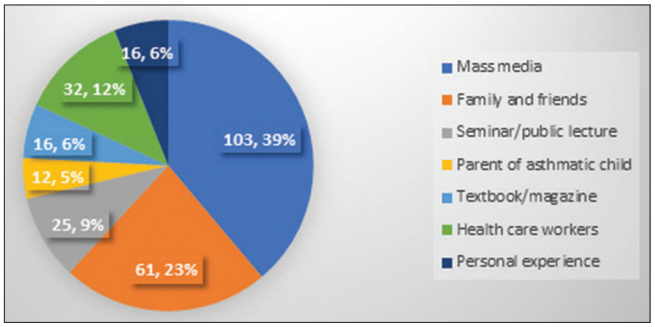

Figure 2: Pie chart showing the sources of information on asthma among the primary school teachers.

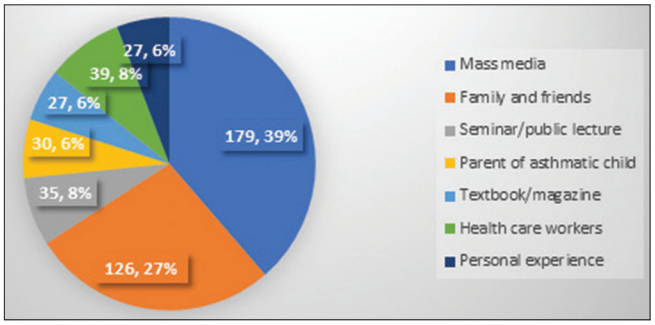

Figure 3: Pie chart showing the sources of information on asthma among secondary school teachers.

low among children who remain physically active and prepare for physical exertion.[31] Physical activity reportedly enhances endurance capacity and increases airway clearance and lung tissue elastic recoil.[32] Hence, the EIB should not restrict guided physical activities as it can be reduced or treated using a short-acting bronchodilator (pre-exercise and post-exercise) and pre-exercise warm-up exercises.[33] Therefore, educating teachers, parents, and asthmatic children about how and when such children can participate in physical activities and how to utilize medication before and during periods of physical activity remains crucial in disease control.[31] In addition, distinguishing between the limitations during asthma exacerbation and overall limitations is essential.[31]

The majority of the school teachers had misconceptions about some drugs used in asthma management. Many teachers erroneously responded that aspirin relieves an asthmatic attack, similarly reported in South Africa,[17] Turkey,[13] and Nigeria.[18] Furthermore, most school teachers did not know that antibiotics do not help alleviate asthma attacks in the index study. Other studies reported this misconception concerning antibiotics.[14,19,24,25] Aspirin is a trigger rather than a reliever of asthma symptoms, and erroneously administering it to a child with asthma may aggravate the child's symptoms with dire consequences. Hence, avoidance of aspirin in children with asthma, even for those with a fever, is important. Furthermore, the erroneous belief of antibiotics as asthma relieving drug may cause delay seeking the appropriate management for the child. Moreover, it will result in antibiotics misuse, with the attendant risk of antibiotics resistance Hence, these misconceptions in the knowledge are worrisome and the correction of these misconceptions, probably by strategies such as strengthening the school health services and asthma heath education, is crucial.

Few teachers (less than one-fifth) were aware of an asthmatic child in their class, lower than the proportion reported of 51% in Chile[34] and 84% in Spain.[35] In a nationwide Nigerian survey, the overall prevalence of physician-diagnosed asthma and clinical asthma was 1.4% (1.25–1.55) and 3.1% (2.88–3.32) among children aged 6–17 years, respectively.[36] The reported Nigerian prevalence is much lower than the prevalence of childhood asthma in Chile (12–18%)[37] and Spain at 7.1–15.3%.[38] The differences in country asthma prevalence may account for the disparities in the teacher awareness reported. The low Nigerian prevalence suggests that the low proportion of teachers aware of an asthmatic child in class may be due to not having one in the class. Moreover, the proportion of teachers in the index study who had witnessed an asthmatic attack was higher than those who had ever contacted the child's parent, which may signify a gap in communication between the parents, school, and teacher. The teachers need to know if a child with asthma is in their class to keep track of the children's medications or be of assistance when needed. There is a need for communication among parents of children with asthma, students, and teachers to achieve control of asthma. Hence, a study looking at the two-way initiated communication for children with asthma between teacher-parent and parent-school clinics, as reported in USA,[14] would be helpful in identifying if and where any lapse in communication lies.

The present study identified that the teachers' level of knowledge was related to the length of years in teaching services for the secondary school teachers, which was similarly reported in Lagos, Nigeria.[19] This finding contrasts with the reports of earlier workers that found no relationship between knowledge and teaching experience.[9,11,18,35] Perhaps, this finding related to years of service may be due to a likelihood of the teachers having had exposure or encounter with an asthmatic child with some form of asthma education or training received. However, the present study did not ascertain the status of teachers on training about asthma.

Only half the respondents proffered a source of information on asthma which was majorly the mass media, family, and friends. The other half that proffered no information may corroborate the suboptimal asthma knowledge observed among teachers in the present study. Health-care providers are an uncommon source of information to teachers, accounting for < 10% in the index study and previous studies.[35,39] Indeed, the fact that the teachers with a personal history or

relative with asthma and experience with a child with asthma in the class had better knowledge was not surprising. These teachers were likely to have been exposed to health education as part of their asthma management. It probably accounts for the small number of teachers who got their information from health-care providers. About 10% of the teachers in the index study had gained information from seminars or public lectures on asthma. A teacher who has witnessed the asthmatic attack and could not intervene appropriately would likely take steps to improve their knowledge base in anticipation of a repeat episode. Other authors had identified these findings of better asthma knowledge among teachers with personal or family experiences.[14,19,23,26,34]

CONCLUSION

Both the primary and secondary school teachers in Ilorin, Nigeria, have a suboptimal perception of childhood asthma. However, the least knowledge scores were reported for asthma symptomatology, management, and sporting activities domains. Strategies to improve teachers' knowledge of asthma and intermittent training and retraining on steps required for acute asthmatic attack management as part of the school health program are crucial.

The study's major strengths were the multistage sampling used for the teachers' selection and the selection of teachers from three different LGAs, and the large sample size from many schools. These strengths reduce the risk of bias. Limitations of the study include the failure to get feedback from the teachers on their willingness to accept an asthma education program that would have proven beneficial based on the current findings. Furthermore, there may be some information bias as the study was interrupted due to the lockdown; the teachers interviewed after the lockdown may have gotten more information during the interval.

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Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. International consensus report on diagnosis and treatment of asthma. National Heart, Lung, and Blood Institute, National Institutes of Health. Bethesda, Maryland 20892. Eur Respir J 1992;5:601-41.
2. Blackman JA, Gurka MJ. Developmental and behavioral comorbidities of asthma in children. J Dev Behav Pediatr 2007;28:92-9.
3. Wildhaber J, Carroll WD, Brand PL. Global impact of asthma on children and adolescents' daily lives: The room to breathe survey. Pediatr Pulmonol 2012;47:346-57.
4. Cohen R, Franco K, Motlow F, Reznik M, Ozuah PO. Perceptions and attitudes of adolescents with asthma. J Asthma 2003;40:207-11.
5. Hauptman M, Phipatanakul W. The school environment and asthma in childhood. Asthma Res Pract 2015;1:12.
6. Tranter DC. Indoor allergens in settled school dust: A review of findings and significant factors. Clin Exp Allergy 2005;35:126-36.
7. Esty B, Phipatanakul W. School exposure and asthma. Ann Allergy Asthma Immunol 2018;120:482-7.
8. Bruzzese JM, Evans D, Kattan M. School-based asthma programs. J Allergy Clin Immunol 2009;124:195-200.
9. Bahari MB, Nur NM, Rahman AF. A knowledge of asthma in school children: A survey among primary school teachers. Singapore Med J 2003;44:131-5.
10. Tse K, Yum T. Knowledge of asthma and its management: A study in primary schoolteachers in Hong Kong. Hong Kong Pract 2002;24:4-14.
11. Jiwane N, Wadhva S. Assessment of knowledge, attitude and practices of teachers regarding childhood asthma in rural school of Maharashtra, India. Indian J Appl Res. 2014;4:1-3.
12. Hussey J, Cahill A, Henry D, King AM, Gormley J. National school teachers' knowledge of asthma and its management. Ir J Med Sci 1999;168:174-9.
13. Ones U, Akcay A, Tamay Z, Guler N, Dogru M. Asthma knowledge level of primary schoolteachers in Istanbul, Turkey. Asian Pac J Allergy Immunol 2006;24:9-15.
14. Bruzzese JM, Unikel LH, Evans D, Bornstein L, Surrence K, Mellins RB. Asthma knowledge and asthma management behavior in urban elementary school teachers. J Asthma 2010;47:185-91.
15. Getch YQ, Neuharth-Pritchett S. Teacher characteristics and knowledge of asthma. Public Health Nurs 2009;26:124-33.
16. Lucas T, Anderson MA, Hill PD. What level of knowledge do elementary school teachers possess concerning the care of children with asthma? A pilot study. J Pediatr Nurs 2012;27:523-7.
17. Govender D, Gray A. Knowledge of primary school teachers about asthma: A cross-sectional survey in the Umdoni sub-district, KwaZulu-Natal. South Afr Fam Pract 2012;54:347-51.
18. Kuti B, Kuti D, Omole K, Oso B, Mohammed L, Minna Y. How much do school teachers know about childhood asthma in Ilesa, Nigeria? Niger J Paediatr 2017;44:68-75.
19. Adeyeye OO, Kuyinu YA, Ozoh OB. Assessment of the knowledge of teachers about asthma and the availability of facilities for asthma care in public secondary schools in Lagos, Nigeria. Afr J Thorac Crit Care Med 2018;24:192.
20. Falade AG, Olawuyi JF, Osinusi K, Onadeko BO. Prevalence and

severity of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema in 6- to 7-year-old Nigerian primary school children: The international study of asthma and allergies in childhood. Med Princ Pract 2004;13:20-5.
21. Falade AG, Olawuyi F, Osinusi K, Onadeko BO. Prevalence and severity of symptoms of asthma, allergic rhino-conjunctivitis and atopic eczema in secondary school children in Ibadan, Nigeria. East Afr Med J 1998;75:695-8.
22. National Population Commission. Provisional Census Figures by States and LGA. National Population Commission; 2006.
23. Canitez Y, Cekic S, Celik U, Kocak A, Sapan N. Health-care conditions in elementary schools and teachers' knowledge of childhood asthma. Paediatr Int Child Health 2016;36:64-71.
24. Alkhamis ZN, Hashim SA. Awareness of asthma and its management in primary school teachers in Eastern Province. J Family Med Prim Care 2019;8:1908-13.
25. Abdel Gawwad ES, El-Herishi S. Asthma education for school staff in Riyadh city: Effectiveness of pamphlets as an educational tool. J Egypt Public Health Assoc 2007;82:147-71.
26. Varela AL, Esteban SR, Díaz SP, Murúa JK, Fernández-Oliva CR, Jiménez JS, *et al.* Knowledge of asthma in school teachers in nine Spanish cities. Pediatr Pulmonol 2016;51:678-87.
27. Sapien RE, Fullerton-Gleason L, Allen N. Teaching school teachers to recognize respiratory distress in asthmatic children. J Asthma 2004;41:739-43.
28. Henry RL, Gibson PG, Vimpani GV, Francis JL, Hazell J. Randomized controlled trial of a teacher-led asthma education program. Pediatr Pulmonol 2004;38:434-42.
29. Coffman JM, Cabana MD, Yelin EH. Do school-based asthma education programs improve self-management and health outcomes? Pediatrics 2009;124:729-42.
30. Caruana M, West LM, Cordina M. Current asthma management practices by primary school teaching staff: A systematic review. J Sch Health 2021;91:227-38.
31. Williams B, Powell A, Hoskins G, Neville R. Exploring and explaining low participation in physical activity among children and young people with asthma: A review. BMC Fam Pract 2008;9:40.
32. Stickland MK, Rowe BH, Spooner CH, Vandermeer B, Dryden DM. Effect of warm-up exercise on exercise-induced bronchoconstriction. Med Sci Sports Exerc 2012;44:383-91.
33. Parsons JP, Hallstrand TS, Mastronarde JG, Kaminsky DA, Rundell KW, Hull JH, *et al.* An official American thoracic society clinical practice guideline: Exercise-induced bronchoconstriction. Am J Respir Crit Care Med 2013;187:1016-27.
34. Pitstick C. Asthma knowledge among primary and secondary school teachers in rural northern Costa Rica. Cuad Investig UNED 2015;7:25-32.
35. Rodríguez Fernández-Oliva CR, Torres Alvarez de Arcaya ML, Aguirre-Jaime A. Knowledge and attitudes of teachers on children with asthma. An Pediatr (Barc) 2010;72:413-9.
36. Ozoh OB, Aderibigbe SA, Ayuk AC, Desalu OO, Oridota OE, Olufemi O, *et al.* The prevalence of asthma and allergic rhinitis in Nigeria: A nationwide survey among children, adolescents and adults. PLoS One 2019;14:e0222281.
37. Mallol J, Solé D, Baeza-Bacab M, Aguirre-Camposano V, Soto-Quiros M, Baena-Cagnani C, *et al.* Regional variation in asthma symptom prevalence in Latin American children. J Asthma 2010;47:644-50.
38. Carvajal-Urueña I, García-Marcos L, Busquets-Monge R, Suárez-Varela MM, de Andoin NG, Batlles-Garrido J, *et al.* Geographic variation in the prevalence of asthma symptoms in Spanish children and adolescents. International study of asthma and allergies in childhood (ISAAC) phase 3, Spain. Arch Bronconeumol 2005;41:659-66.
39. Al-Muhsen S, Horanieh N, Dulgom S, Aseri ZA, Vazquez-Tello A, Halwani R, *et al.* Poor asthma education and medication compliance are associated with increased emergency department visits by asthmatic children. Ann Thorac Med 2015;10:123-31.

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