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Teachers assessment of asthma-friendliness of primary schools in Abuja

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Abstract: *Introduction:* Children should be protected and safe in school. An important disease like asthma, the leading chronic respiratory disease among children globally, should occupy a place of priority in a school's health programme. Therefore, the aim of the study was to determine how asthma-friendly schools are in Abuja, Nigeria from a teacher's perspective.

Materials and Methods: This was a cross sectional, questionnaire-based survey carried out among randomly selected teachers in public primary schools. Asthma-friendliness of schools was assessed using the "How asthma-friendly is your school" questionnaire.

Results: Of the 403 teachers who participated in the study, majority were females 249(61.8%), mean age was 35 years SD ±8 years, school settings were mainly urban 14 (58.3%) and majority teachers located in urban settings 251 (62.3%). The teachers scored the schools poorly on questions about availability of school policies on asthma care for the children in or out of emergency situations, quick access to asthma medications at school, availability of a full-time nurse or responsible personnel for children with asthma, training of teachers on asthma and monitoring of Air Quality Index. Adherence was scored high on questions referring to recommendations about keeping the school environment tobacco smoke free and preventing exposures to asthma triggers such as excessive dust. Majority of the schools had a poor asthma-friendliness level 300 (74.4%) based on the teachers report.

Conclusion: Given the importance of asthma among children, concerted efforts should be made to ensure that schools in Abuja, Nigeria are asthma-friendly. This can be achieved by strengthening school health programmes.

Key words: asthma, friendly, schools, teachers

Introduction

Children spend an average of six hours each day in primary school.[1] These hours could be longer with extra- and non-extra-curricular activities. School should therefore be a home away from home wherehealthy children and those with chronic illnesses such as asthma can feel safe and protected to learn and achieve more.[1]

Asthma is a leading chronic disease among children and adolescents. It is a major cause of school absenteeism and hospitalisation among children younger than 15 years of age.[2,3] In 2019, asthma affected about 262 million people and lead to the death of 455,000.[4] In Nigeria, the prevalence of asthma varies from place to place.[5,6] It is therefore important to have asthma-friendly schools.

Asthma-friendly schools strive to create safe and supportive learning environments for students with asthma with policies and procedures that allow students to manage their asthma successfully.[7] Asthma-friendly schools should have at least a policy on asthma, asthma action plan for each affected child, train school staff on asthma, have an asthma register, named individual responsible for asthma and a system for identifying children who miss school or do not participate in physical activities because of asthma.[8]

Children with asthma should therefore be able to count on their schools to help prevent and treat asthma exacerbations should they occur while they are at school. This study aimed to determine how friendly primary schools in Abuja are towards children with asthma from teachers' perspective.

Materials and methods

This was a survey among teachers in public (government-owned) primary schools in Gwagwalada Area Council (GAC), one of the six area councils in Abuja, FCT. Gwagwalada Area Council is semi-urban community. Its occupants consist of mainly farmers, civil servants and artisans among other professions. The

Area Council is made up of 10 wards: Zuba, Ibwa, Dobi, Kutunku, Tunga-Maje, Gwako, Paikon-kore, Ikwa, Quarters and Gwagwalada Central. According to the Gwagwalada Zonal Education Board, Ministry of Education at the time of the study, GAC had 302 registered primary schools, 84 public-owned and 224 private-owned.

The survey was among teachers in public primary schools who had given their consent, were at least 18 years old and present in school at the time of the study. Fischer's formula[9] for sample size determination was used to calculate a sample size of 461 inclusive of 10% attrition. Participants for the survey were selected using a multi-stage random sampling method. Twenty-four schools were selected using simple random sampling method by balloting. Secondly, the 461 teachers were selected using proportionate allocation from the 24 schools. Thirdly, every third teacher from the arms of each class was selected from each of the 24 schools.

The questionnaires were completed by the teachers in the school hall or classroom. The consent forms were signed after the teachers had read through the participant's information sheet. Teachers who declined participation were replaced with other teachers. The questionnaire contained the checklist on asthma-friendliness of schools developed by the National Heart, Lung and Blood Institute National Asthma Education and Prevention Programme[10] and has been validated in a previous study.[11] The questions were mainly on socio-demography, air pollution, asthma triggers and allergens in and around the school environment, and asthma – related school policies. The asthma-friendly questionnaire is used to identify challenges and actions of schools to help improve asthma management.The questionnaire[12] only provides a checklist of recommendations that schools should meet but does not state what percentage or score is required or the number of recommendations that should be met in order to be termed an asthma-friendly school. In this study a percentage of ≥ 50% was termed good, ≥25% to 49% was termed fair while <25% was termed poor.

The data was collected from May to June, 2021 and analysed using IBM SPSS version 25. The mean ages were calculated, frequency distribution tables were used to present frequencies and percentages. Chi square was used to determine associations between variables and a p value of < 0.05 was taken as significant. The confidence interval was set at 95%.
Ethical approval was obtained from the FCT Health Research Ethics Committee prior to commencement of the study as well as approvals from the FCT Administration Universal Basic Education Board and Head teachers of the selected primary schools. The principles of research ethics according to the Helsinki Declaration of 1975 as revised in 2000 were adhered to and participants informed of their rights to withdraw consent at any time during the study without any penalty.

Results

General characteristics of teachers

Four hundred and sixty-one teachers were approached and accepted to participate in the study. However, only results from 403 (87.4%) were analysed as 58 (12.6%) questionnaires were poorly completed giving a response rate of 87.4%. Majority were females (249; 61.8%) giving a male to female ratio of 0.6:1. The participants' ages ranged from 20 years to 58 years. The mean age was 35SD ±8 years with most teachers aged 31 years to 40 years (169; 41.9%) All teachers had received formal education with most attaining a Bachelor's degree (200; 49.6%) as the highest level of education. Three (0.7%) teachers held Doctorate degrees. Majority of the teachers taught in schools located in urban settings 14 (58.3%) and were more in number 251 (62.3%) compared with those who taught in schools located in rural settings. The general characteristics are shown in Table 1.

Table 1: General characteristics of teachers

Variable	n (%)
Gender	
Male	154 (38.2)
Female	249 (61.8%)
Age (years)	
20 – 30	147 (36.5)
31 – 40	169 (41.9)
41 – 50	71 (17.6)
51 – 58	16 (4.0)
Highest educational level of teachers	
Bachelor's degree	200 (49.6)
Nigeria Certificate in Education	155 (38.5)
Diploma in education	26 (6.5)
Master degree	16 (4.0)
Doctorate degree	3 (0.7)
Missing data	3 (0.7)
School setting	
Urban	14 (58.3)
Rural	10 (41.7)
Total	24 (100)
Teachers in school setting	
Urban	251 (62.3)
Rural	152 (37.7)
Total	403 (100)

Adherence of primary schools to recommended asthma-friendly practices and policies

Two hundred and forty-two (60%) teachers reported that the school buildings and grounds were kept tobacco smoke free while 180 (44.7%) reported that the school vehicles were also kept free of tobacco smoke. Concerning asthma medications, only 17 (18.4%) of teachers reported that the school children had quick access to their asthma medications where the child's own was unavailable and there was a need.
Two hundred and eighty-seven (71.2%) teachers responded that there were no nurses or other school health staff in the school buildings during the school day while 255 (63.3%) reported that none of these category of staff identified, assessed and monitored the children who had

asthma at the school. Only, 58 (14.4%) teachers reported that an asthma education expert taught all school staff about asthma, asthma action plans, and asthma medicines, while 124 (30.8%) reported that asthma information was incorporated into health, science, first aid, and other classes as appropriate.

Two hundred and sixteen (53.6%) teachers reported that children who had asthma could choose a physical activity different from others when medically necessary and that they could do so without fear of their grades being reduced 196 (48.6%). Fifty-four (13.4%) teachers reported that local Air Quality Index was monitored to assist with reducing the children's exposure to unhealthy air quality. The adherence of primary schools to recommended asthma-friendly practices and policies is shown in Table 2.

Table 2: Adherence of primary schools to recommended asthma-friendly practices and policies

Variable	Yes n (%)	No n (%)	Do not know n (%)	Total n (%)
Air pollution and Air Quality Index				
School buildings and grounds were free of tobacco smoke at all times	242 (60.0)	124 (30.8)	37 (9.2)	403 (100)
School buses, vans, and trucks were free of tobacco smoke	180 (44.7)	127 (31.5)	95 (23.6)	402 (99.8)
School events like field trips, athletic events, inter-house sports ("at home" and "away") were free from tobacco smoke	204 (50.6)	105 (26.1)	94 (23.3)	403 (100)
School had a no-idling policy for vehicles on school grounds?	18 (4.5)	349 (86.6)	36 (8.9)	403 (100.0)
School monitored daily local Air Quality Index (AQI) information to help reduce students' exposure to unhealthy air quality	54 (13.4)	260 (64.5)	89 (22.1)	403 (100.0)
Asthma medications and asthma emergency plans				
School had a policy or rule that allowed students to carry and use their own asthma medicines	148 (36.7)	129 (32)	126 (31.3)	403 (100)
Students who do not carry their asthma medicines had quick and easy access to their medicines	74 (18.4)	193 (47.9)	136 (33.7)	403 (100)
School had a written emergency plan for teachers and other staff to follow to take care of a student who had an asthma attack	87 (21.6)	207 (51.4)	109 (27.0)	403 (100)
School had standing orders and quick-relief medicines for students to use in an emergency such as fire, weather event, or lockdown, or if a student forgot his or her medicine	66 (16.4)	245 (60.8)	92 (22.8)	403 (100)
Students' quick-relief medicines were nearby before, during and after exercise and other physical activity	109 (27.0)	134 (33.3)	160 (39.7)	403 (100)
All students who have asthma had updated asthma action plans on file at the school	51 (12.7)	176 (43.7)	176 (43.7)	403 (100)
Responsible asthma personnel School had nurse or other school health staff in school building during the school day	50 (12.4)	287 (71.2)	66 (16.4)	403 (100)
School had nurse or other school health staff identify, assess and monitor students who have asthma at the school	55 (13.6)	255 (63.3)	93 (23.1)	403 (100)
School had nurse or other school health staff help students with their medicines and help them participate fully in exercise and other physical activity, including physical education, sports, recess (break time) and field trips (excursions)	81 (20.1)	203 (50.4)	119 (29.5)	403 (100)
Where school nurse or other school health staff was not full-time in school, a nurse was readily and routinely available to write and review plans and give the school guidance	77 (19.1)	201 (49.9)	124 (30.8)	402 (99.8)
Asthma Education				
An asthma education expert taught all school staff about asthma, asthma action plans, and asthma medicines	58 (14.4)	248 (61.5)	97 (24.1)	403 (100)
Asthma information was incorporated into health, science, first aid, and other classes as appropriate	124 (30.8)	155 (38.5)	124 (30.8)	403 (100)
Physical activity				
Students who have asthma can choose a physical activity that is different from others in the class when it is medically necessary	216 (53.6)	91 (22.6)	96 (23.8)	403 (100)
Students who have asthma can choose another activity without fear of being ridiculed or receiving reduced grades	196 (48.6)	95 (23.6)	112 (27.8)	403 (100)
Asthma partnerships				
School partners with parents and health care providers to assess students' asthma needs	17 (4.2)	261 (64.8)	125 (31.0)	403 (100.0)
School worked with an asthma specialist in the community	11 (2.7)	265 (65.8)	127 (31.5)	403 (100.0)

Asthma action plan: a written plan from the student's doctor to help manage asthma and prevent asthma attack).
No idling policy: vehicles do not leave their engines running while stationary on school grounds.

Adherence of primary schools to prevent students' contact with asthma triggers

The teachers reported that the schools helped to reduce or prevent children's contact with excessive dust 277 (68.7%), cockroach droppings 251 (62.3%) and strong odours and sprays 208 (51.6%) among six other substances inside and outside the classrooms. This is shown in Table 3.

Level of asthma-friendliness of schools

Based on the reports from the teachers majority of the asthma-friendliness of the schools were assessed as poor 300 (74.4%). Only 22 (5.5%) of the teachers reported their schools as asthma-friendly. The level of asthma-friendliness of schools is shown in Table 4.

Association between level of asthma friendliness and teachers' gender, age, level of education and type of school.

There was no association between the level of asthma-friendliness and the teachers' gender, ($p = 0.131$, age ($p = 0.915$), educational level ($p = 0.847$) and school setting ($p = 0.854$) as shown in Table 5.

Table 3: Adherence of primary schools to prevent students' contact with asthma triggers

Asthma triggers	Yes n (%)	No n (%)	Do not know n (%)	Total n (%)
The school helped to reduce or prevent students' contact with any of the following inside and outside the classrooms?				
Cockroach droppings	251 (62.3)	69 (17.1)	83 (20.6)	403 (100)
Excessive dust	277 (68.7)	71 (17.6)	54 (13.4)	403 (100)
Carpets	170 (42.2)	113 (28.0)	119 (29.5)	402 (99.8)
Pillows	148 (36.7)	126 (31.3)	128 (31.8)	402 (99.8)
Cloth-covered or upholstered furniture	154 (38.2)	109 (27)	133 (33)	403(100.0) 403
Stuffed toys	162 (40.2)	114 (28.3)	124 (30.8)	(100.0)
Mould	155 (38.5)	111 (27.5)	137 (34)	403 (100.0)
Pets with fur or hair	175 (43.4)	113 (28.1)	115 (28.5)	403 (100.0)
Strong odours or sprays (such as paint, perfume, insecticides and cleaning products)	208 (51.6)	89 (22.1)	106 (26.3)	403 (100.0)

Table 4: Level of asthma-friendliness of schools

Asthma-friendliness of schools	n (%)
Good (≥50%)	22 (5.5)
Fair (≥ 25% - 49%)	81 (20.1)
Poor (< 25%)	300 (74.4)

Table 5: Association between level of asthma friendliness and gender, age, level of education and type of school

	Level of asthma friendliness				
Variable	Good	Fair	Poor	X^2	P value
Gender					
Male	17 (4.2)	136 (33.7)	1 (0.2)		
Female	27 (6.7)	212 (52.6)	10 (2.5)	4.07	0.131
Age (years)					
20 – 30	16 (15.5)	127 (31.5)	4 (1.0)		
31 – 40	20 (5.0)	143 (35.5)	6 (1.5)		
41 – 50	6 (1.5)	64 (15.9)	1 (0.2)	2.05	0.915
51 – 58	2 (0.5)	14 (3.5)	0 (0)		
Highest educational level					
Bachelor's degree	25 (12.5)	168 (84)	7 (3.5)		
Nigeria Certificate in Education	17 (11)	135 (87.1)	3 (1.9)		
Diploma in education	1 (3.9)	24 (92.2)	1 (3.9)	4.107	0.847
Master degree	1 (6.3)	15 (93.7)	0 (0)		
Doctorate degree	0 (0)	3 (100)	0 (0)		
School setting					
Rural	16 (10.5)	131 (86.2)	5(3.3)		
Urban	28 (11.2)	217 (86.5)	6 (2.3)	0.315	0.854

Discussion

Based on the responses of the teachers, the public primary schools in Abuja performed poorly on adherence to the recommendations by the National Heart, Lung and Blood Institute National Asthma Education and Prevention Programme[10] and therefore majority cannot be considered as asthma-friendly. Of the 30 recommendations/questions the teachers responded to, only six questions got a score of ≥ 50%. The highest score of 68.7% was on the question of whether the school helped to reduce or prevent students' contact with excessive dust.

Majority of teachers responded that the school buildings and grounds, as well as organised school events, were free of tobacco smoke at all times. However, less than half of the teachers reported that their school vehicles were free of tobacco smoke. The positive responses towards asthma school friendliness obtained in this study are lower than reports from a similar study done in the United States using the same questionnaire.[11] Nigeria has laws that prohibit smoking in public areas, however, the laws are poorly enforced unlike what obtains in the United States. It is very important that schools and their environments as well as activities linked to schools are kept tobacco smoke free. Active and passive smoking are associated with poorly controlled asthma, increased frequency and severity of exacerbations, life-threatening exacerbations and increased hospital admissions.[12,13] Passive exposure in children without asthma has also been linked to increased risk of developing asthma in

adulthood.[14] Smokers tend to have a reduced response to inhaled corticosteroids making asthma control difficult.[12] Majority of the children in this study would most likely not be active smokers because of their expected young age being that they are in primary school. It is therefore important that they are not exposed to second-hand smoke.

Outdoor air pollution is a recognised trigger for exacerbations.[2] The reports showed that most of the schools did not have a no-idling policy for vehicles on school grounds. Also, the schools did not monitor Air Quality Index (AQI) with the aim of using the information to aid reduction in the children's exposure to poor air quality. An AQI value of ≤ 50, indicated with a green colour code is considered good and has little risk of affecting public health, while an AQI value of greater than 300 with a maroon colour code is considered hazardous.[15] The AQI in Abuja FCT in general and more specifically in GAC, has been reported to be poor.[16,17] It is therefore recommended that AQI in Gwagwalada should be monitored by the schools and the readings used to guide care of children with asthma such as preventing them from engaging in outdoor sporting activities during periods of poor air quality.[2] Reports of AQI are readily available from credible online websites.[15]

The schools also performed poorly on the availability of policies for pupils to self-medicate when exacerbations occurred in school by not allowing them carry their own medications or having quick access to asthma medications. Most teachers also reported that there were no written emergency plans for teachers and other staff to follow when children had exacerbations in school and that there were no standing orders and quick-relief medicines for students to use in an emergency or when they forgot their medications. This suggests that both teachers and pupils were free to do as they felt right in such situations, thereby putting the child with an exacerbation at great risk of harm. This finding emphasises the need for school authorities to work with asthma specialists to develop such policies and provide guidance. A study in Lagos, western Nigeria reported that none of the schools assessed even had facilities to manage asthma in emergency situations.[18] A study reported a much higher positive response to these questions,[11] demonstrating their commitment in having asthma-friendly schools. The difference may be from the greater awareness of asthma and the priority given to the disease as the prevalence of asthma is higher in developed countries.[19]

Most students who had asthma did not have updated asthma action plans in their school files. Every person diagnosed with asthma should ideally have a written asthma action plan which should contain instructions guiding them on how to manage their asthma and what to do with regards to medications and health care service if their condition worsens. This is not surprising as physicians in Nigeria who manage asthma rarely use asthma action plans as reported in a study where only about one-sixth of the doctors sampled regularly reviewed asthma action plans with patients.[20] While another cross-sectional study also in Nigeria showed that only one-third of the 66 participants who were Paediatric resident doctors provided asthma action plans to their patients.[21] In a study in the United States, over 90% of the children had updated asthma action plans.[11]

Majority reported the absence of a school nurse or school health staff during the school day, similar to the finding in other studies within and outside Nigeria.[11, 18] A full-time nurse in the employ of all schools will provide better management for asthma and other health conditions in the schools. However given the cost and the lack of adequate health workers in Nigeria, this may not be feasible. In the absence of full-time nurses, dedicated personnel (s) should be trained and assigned the responsibility for the health of the children.

Majority of teachers also reported that no one was responsible for monitoring the children who had asthma or helping children with asthma participate in sports or other physical activities during break time or excursions and that there was no one who readily or routinely wrote and reviewed health plans or gave the school guidance. Exercise, sports and physical activity are known triggers of asthma exacerbations but these exacerbations can be curbed when asthma is well controlled with appropriate medications and also the use of medications prior to engagement in such physical activities prevents exacerbations.[2] Furthermore, patients with asthma are encouraged to participate in physical activities to improve their general wellbeing, lung function and reduce asthma symptoms.[22,23] Where asthma control has not been achieved or when medically necessary, children who have asthma should be free to choose a physical activity that is different from their classmates without being ridiculed or having their grades reduced. Encouragingly, most teachers reported that the children with asthma were allowed to choose other sports without penalty in the schools they taught in. Physical Education teachers, coaches and others involved in sporting activities of the children need to be trained on asthma prevention and care so they can be of great assistance to children with asthma.

Teachers should also be trained on asthma care as majority reported absence of training by an asthma education expert. Also, about one-third of teachers in each category reported they, "did not know", "yes" or "no", respectively to the question of whether asthma was incorporated into their health, science, first aid or other classes. Most teachers also reported that their schools did not have any partnerships with parents and health care providers to assess students' asthma needs or work with an asthma specialist in the community. There is a need to fill this gap in order to build the capacity of teachers to prevent exacerbations and manage children with asthma in school. A systematic review on the impact of educational interventions for asthma showed that they reduced morbidity and created awareness about asthma.[24] Furthermore, a study in Abuja, Nigeria reported that majority of teachers were willing to participate in trainings about asthma.[25]

The most asthma-friendly school responses were on questions about schools reducing exposure of children with asthma to known asthma triggers such as excessive dust, carpets, furry pets and furnishings known to carry substances that can trigger exacerbations. Of the nine substances referred to in the questionnaire, three of them (exposures to cockroach droppings, excessive dust and strong odours or sprays) received good asthma-friendly responses. Avoidance of asthma triggers is an important non-pharmacological method of preventing exacerbations.[2]

The findings in this study reveal several unmet needs in achieving asthma-friendly schools in Abuja, Nigeria. There is a dire need to have asthma policies, programmes and partnerships for primary schools. It may not be feasible to meet all recommendations due to lack of funds and availability of skilled manpower but there should be concerted efforts to achieve as many as possible in order to increase the productivity and quality of life of children with asthma even while in school.

The main goal of the Nigerian National school health is to improve the health of learners and staff.[7] The scope of the School Health Programme in this policy include the provision of school health services, healthful school environment, skills-based health education, school-home -community relationships and school feeding services.[7] These programmes are used to improve the health of the school populace and greatly influence their intellectual growth and development.[7]

Studies show that the best ways to manage asthma in schools are through co-ordinated school-based asthma programs which can be within the school health programme.[1]

Limitations of the study include that the findings were based on teachers recall and self-reports with the risk of social desirability bias and that no assessments were made to determine if the responses tallied with the facilities, policies and practices actually on ground at the schools. Another limitation is that the questionnaire was not designed to assess levels of school adherence to the recommendations but mainly as a checklist. The scoring system used in the study was developed by the researchers. However, this study has provided baseline data to aid development of policies and practices for the promotion of school health among children with asthma.

Conclusion

In conclusion, asthma is a very important disease in children and so should be a priority in schools. A lot more effort should be made to ensure that primary schools in Abuja are asthma-friendly. This can be achieved by strengthening the school health programmes in the various schools.

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