Socio-Demographic and Clinical Profile of Asthmatic Children as Seen in a Tertiary Health Facility in Sokoto Metropolis, Nigeria

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ABSTRACT

Asthma is characterised by chronic airway inflammation with history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation. In children it contributes significantly to school absenteeism, sleep disturbance, limitation in play activities and parental anxiety. The objective was to determine the socio-demographic and clinical profile of asthmatic children seen at our Tertiary Health facility. Descriptive, prospective cross sectional study of asthmatic children attending the Pulmonology and Allergy clinic of Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto over a 1-year period. Children who assented and whose parents/guardian consented were recruited consecutively. Relevant information was obtained using a questionnaire while data was analysed using SPSS version 20. The level of significance was set at $p \leq 0.05$. Of the 78 children enrolled, 45(57.7%) were males, 45(57.7%) were under-fives while 44(56.4%) belonged to the high socio-economic class (SEC). No significant association was observed between gender and age group (Fisher's exact p=0.632), gender and SEC ($\chi 2=2.572$, p=0.276) nor between age range and SEC (Fischer's exact p=0.191). Exposure to cold, 41(52.6%), acute respiratory infection (ARI), 38(48.7) and exposure to dust, 23(29.5%) were the most common triggers of asthma exacerbation. Mild intermittent asthma was the commonest form of asthma severity encountered (76.9%). Our study showed a male preponderance with mild intermittent asthma being the most common form of asthma. Majority of our study participants had a positive family history of atopy and belonged to the high SEC.

Keywords: Asthma, Children, Socio-demography, Sokoto

INTRODUCTION

Asthma is a heterogenous disease usually characterised by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.[1] In children it contributes significantly to school absenteeism, sleep disturbance, limitation in play activities and parental anxiety.[2] The aetiology is yet to be determined, however, a combination of genetic predisposition and environmental factors have been identified as risk factors in the manifestation of asthma.[2,3]

Most surveys of childhood asthma suggest that boys are more frequently affected than girls before puberty.[4,5] In general boys are thrice as affected as girls, but during adolescence, the prevalence becomes equal between the genders.[3] Beyond adolescence however, the prevalence is higher in women than men.[3] Mielck *et al.*[6] in Munich, Germany found the prevalence of severe asthma to be significantly higher in the low compared with the high socioeconomic group. This association could not be explained by established risk factors.[6]

There is a paucity of studies on the socio-demograhic features and clinical profile of paediatric asthma in northern Nigerian with no documented study in Sokoto, North Western Nigeria. This study was therefore designed to determine the socio-demographic and clinical profile of asthmatic children seen in our facility.

SUBJECTS AND METHODS

This was a descriptive, prospective cross sectional study of asthmatic children attending the Pulmonology and Allergy clinic of Usmanu Danfodio University Teaching Hospital (UDUTH), Sokoto, Nigeria over a one-year period from 1st April 2017 to 31st March 2018. Asthmatic children who assented and whose parents/guardian consented to the study were recruited consecutively.

All newly diagnosed and previously diagnosed asthmatic children recently enrolled in the clinic or already on follow up were included in the study. Children whose parents/caregivers refused to give consent and older children who did not assent to the study were excluded.

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Data were collected using a pre-tested interviewer administered questionnaire. The bio-data, socio-demographic and clinical examination relating to allergy were documented. Asthma was diagnosed according to the Global Initiative for Asthma (GINA) 2018 guidelines[1] in children younger than 5 years based on

1. Symptom pattern (wheeze, cough, breathlessness [typically manifested by activity limitation] and nocturnal symptoms or awakenings).
2. Presence of risk factors for development of asthma.
3. Therapeutic response to controller treatment.

While in children older than 5 years, it was based on identifying both characteristic pattern of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough and variable air flow limitation. Asthma severity was classified according to GINA guidelines[7] using frequency of symptoms per week, exercise tolerance and nocturnal symptoms.

The socio-economic classes of the patients were assessed using the method described by Oyedeji.[8] The social class of each child was determined from the occupational and educational level of both parents using standard scoring scales. The social class allocated for the family was the mean of the four scores (two for the father and two for the mother) to the nearest whole number. The classification is Social class 1 as High, Social class 2 and 3 as middle while Social class 4 and 5 as low. Ethical approval was obtained from UDUTH ethical clearance committee while consent/assent was also gotten from parents or care givers/child.

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences 20 (Chicago Illinois, USA). Quantitative variables were presented as median and inter quartile range (IQR) in tables; while qualitative variables were summarized using frequency and percentages. Qualitative variables were analysed using Chi square and Fisher's exact test where applicable. The level of significance was set at $p \leq 0.05$.

RESULTS

Demographic characteristics of study population

The age ranged from 7 months to 15 years with a median age of 52.50, IQR 67.75. In table 1, the 0.5-5 year age-group constituted the highest percentage of subjects, followed by those aged 6-10 years. There were 45 males (57.7%) and 33(42.3%) females giving male to female ratio of 1.4:1, however this was not statistically significant (Fisher's exact p=0.632).

Table 1: Age and gender distribution of the study population

Age group (years)	Males No.(%)	Females No.(%)	Total
0.5-5	27(34.6)	18(23.1)	45(57.7)
6-10	13(16.7)	9(11.5)	22(28.2)
11-15	5(6.4)	6(7.7)	11(14.1)
Total	45(57.7)	33(42.3)	78(100.0)

Age at asthma diagnosis

The youngest age at asthma diagnosis (either at our facility or another facility) was six months of age while the oldest age at diagnosis was 14 years. The median age at diagnosis was 36 months, IQR 42.75.

Socio-economic class of study subjects

Forty-four (56.4%) of the subjects belonged to the high SEC, 24(30.8%) belonged to the middle SEC while10 (12.8%) belonged to the lower SEC. There was no significant association between gender and SEC ($\chi 2=2.572$, p=0.276). Similarly, there was no significant association between age range and SEC (Fischer's exact p=0.191).

Trigger factors

Exposure to cold 41(52.6%), acute respiratory infection (ARI) 40(51.3) and exposure to dust 22(28.2%) were the most common triggers of

asthma exacerbation as shown in Table 2. Five (6.4%) of the children had no identifiable trigger factor. None of the trigger factors was significantly associated with SEC as shown in table 2 below using $\chi 2$ or Fischer's exact.

Table 2: Association between trigger factors of asthma exacerbation and socio-economic class (SEC)

Trigger factor	High SEC No. (%)	Middle SEC No. (%)	Low SEC No. (%)	Total No. (%)	p-value
Exposure to cold	24(58.5)	13(31.7)	4(9.8)	41(52.6)	0.766
ARI	20(50.0)	14(35.0)	6(15.0)	40(51.3)	0.502
Dust	15(68.2)	6(27.3)	1(4.5)	22(28.2)	0.348
Exercise	11(52.4)	7(33.3)	3(14.3)	21(26.9)	0.878
Perfume	8(57.1)	6(42.9)	0(0.0)	14(17.9)	0.260
Insecticide	6(50.0)	6(50.0)	0(0.0)	12(15.4)	0.205
Smoke	6(60.0)	3(30.0)	1(10.0)	10(12.8)	1.000
Incense	2(50.0)	2(50.0)	0(0.0)	4(5.1)	0.777
Crying	0(0.0)	1(100.0)	0(0.0)	1(1.3)	0.436

Some of the children had multiple trigger factors

Asthma symptoms

Majority of the children had multiple symptoms. Chronic and recurrent cough with nocturnal or seasonal exacerbations was seen in 56(71.8%), recurrent difficulty in breathing in 68(87.2%), exercise intolerance in 34(43.6%) and recurrent wheezing 32(41.0%).

Sixty-one (78.2%) of the children had history of nebulization, while 19(24.4%) were hospitalized on account of asthma exacerbation.

Asthma severity using GINA guidelines

Figure 1 shows that mild intermittent asthmatics were the majority with 60(76.9%), while none had severe persistent asthma.

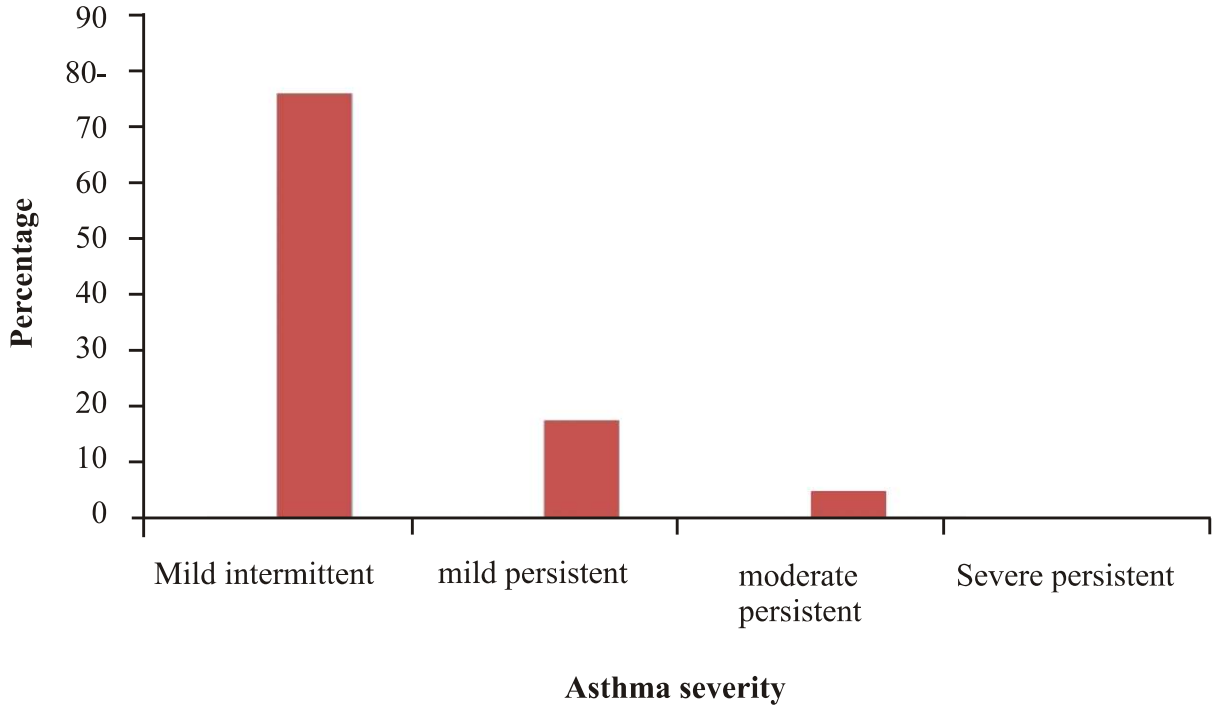

Figure 1: Classification of asthma severity of the study population

More males had mild intermittent asthma while more females had mild persistent asthma, as shown in Table 3. However, this was not statistically significant (Fischer's exact p=0.390). Similarly, there was no significant association between asthma severity and age range (Fischer's exact p=0.354) as shown in table 3 below.

Table 3: Association between asthma severity by age and gender

Factor	Asthma severity			p- value
	Mild intermittent no (%)	Mild persistent no (%)	Moderate persistent no (%)	
Gender				
Male	36(46.2)	6(7.7)	3(3.8)	0.390
Female	24(30.8)	8(10.3)	1(1.2)	
Age range				
0.5-5years	36(46.2)	7(9.0)	2(2.5)	0.354
6-10 years	17(21.8)	5(6.4)	0(0.0)	
11-15years	7(9.0)	0(0.0)	2(2.5)	

Family history of atopy

Sixty-one (78.2%) of the children had family history of atopic diseases, of which 18(29.5%) had multiple atopic diseases. The diseases included asthma in 50(64.1%), allergic rhinitis in 16(20.5%), allergic conjunctivitis in 14(17.9%) and urticaria in 3(3.9%). There was no family history of relatives with atopic dermatitis.

Concomitant atopic diseases

Sixty-seven (85.9%) of the children had concomitant atopic disease with 28(41.8%) having multiple diseases. The commonest atopic disease was allergic rhinitis seen in 66(84.6%), followed by eczema in 23(29.5%) and allergic conjunctivitis in 10(12.8%).

Clinical features of atopy

Table 4 shows that Dennie Morgan's lines and allergic shiners were the commonest of the general clinical stigmata of atopy encountered.

Table 4: Atopic features in study population (N=78)

Atopic feature	Frequency (n)	Percentage (%)
Dennie Morgans lines	39	50.0
Allergic shiners	39	50.0
Allergic salute	22	28.2
Mouth breathing	10	12.8
Throat honking	4	5.1

Not all subjects had atopic features and some had multiple features.

DISCUSSION

The present study had majority of the children within the 0.5-5-year age group similar to a previous study by Aderele[9] in Ibadan which reported that majority of the asthmatic children were under the age of five years. In contrast, an earlier study done in Kano, North- western Nigeria by Garba *et al.*[10] reported a predominance of asthma in 6-10 year old children. This may be partly due to the fact that most children with asthma tend to present with symptoms by six years of age.[10,11] In addition, the Kano study

excluded children below the age of 4 years due to inability to carry out peak expiratory flow rate.

Male preponderance was observed in this study, which appears to be a universal finding as similar observations were made by Aderele,[9] Garba *et al*.,[10] Abdurrahman *et al*.[12] and other workers.[13-16] This contrasts findings from Tanzania[17] where females predominated. The adduced reason include male-related narrower airways, increased airway tone, and higher IgE levels.[18] In addition, increased physical activities in boys with a higher likelihood of exposure to trigger factors could also contribute.

Most of the children were observed to be from high SEC similar to those of Aderele, [9] Akhikwu *et al*.,[12] Faniran *et al.*[19] and Addo-Yobo *et al.*[20] This was however in contrast with reports by Mielck *et al.*[6] Ernest *et al.*[21] and other researchers[22,23] where asthmatics were found to be more in the low SEC. Reason for this disparity could be explained by the difference in the socio-economic classification used, methodology and environment. In addition, lower rates of childhood infections, cleaner environments, better immunization status and tendency for prompt hospital presentation would contribute to the differences in these studies.

The trigger factors identified in our study were similar to those reported from Ibadan[9] and Kano.[10-15] Multiple trigger factors were identified in our study subjects, similar to observations by other researchers.[9,10,13-15] Exposure to cold was the commonest identifiable trigger factor observed. It was a common finding in Ibadan[9] and Kano.[10, 3-15] Respiratory infections which are known triggers of asthma exacerbations[10,14,24,25] was among the top three triggers identified in our study.

Exposure to dust was also a common trigger in this study similar to findings by Garba *et al*.,[10] Akihwu *et al.*[14] and Asani *et al.*[15] This may be due to similar geographical location between Kano and Sokoto and having similar harmattan season which is usually dusty and cold. However, exercise as a trigger factor was only seen in about a quarter of the study population in contrast to reports from Kano[10,14,15] and Gusau[16] where it ranged between 39.7% to 83.2%. Reason for this cannot be explained, as we cannot confirm if asthmatic children in Sokoto do not engage in more exercise than those in Kano or other localities.

A family history of atopy was reported in majority of the children with a percentage higher than findings in Ibadan,[9] Kano[10] and Zaria.[26] Family history of asthma was found to be the commonest familial atopic disease similar to reports by other researchers.[9,13,15,16] In our study, the children were mostly mild intermittent asthmatics. This is in contrast to reports from Kano[10] and Benin,[27] where mild persistent asthma was the commonest asthma severity. An explanation for this difference may be the more cosmopolitan nature of Kano and Benin compared to Sokoto hence more exposure to air pollutants that could affect the asthma severity.

None of the children had severe persistent asthma. This is in contrast with findings from Qian *et al.*[28] in China who reported severe persistent asthma, which could be attributed to sample size variations. In addition, the higher level of industrialization and outdoor air pollution in china would contribute to the development of severe persistent asthma. The presence of concomitant atopic diseases was a common finding, similar to reports by earlier workers.[9,10,12,15,29,30]

CONCLUSION

Our study showed a male preponderance with mild intermittent asthma being the most common form of asthma. Majority of our study participants had a positive family history of atopy and belonged to high socioeconomic class.

We recommend all asthmatic children should be classified according to the GINA guidelines and concomitant atopic diseases identified for adequate management.

CONFLICT OF INTEREST: None to declare.

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