Co-existing allergic rhinitis among asthmatics attending the Paediatric Pulmonology Clinic: implications for control

A A Gobir, S S Mohammed, and W B R Johnson

Abstract

Asthma is the most common chronic airway disorder and the prevalence has been increasing in the last two decades. Asthma causes significant morbidity among children due to its effects on daily and sporting activities, as well as school attendance. The focus of asthma management is to achieve good control of symptoms to enable better quality of life among those affected. Identifying and treating co-morbid conditions such as allergic rhinitis (AR) is important in the level of asthma control that is achieved. In Africa, there is a dearth of literature on the subject of AR among children with asthma. Furthermore, there is no study on the severity of AR and its effect on level of asthma control. This study was therefore designed to determine the prevalence of AR in children with asthma seen at the University of Ilorin Teaching Hospital Ilorin, Nigeria. In addition, the study assessed the level of asthma control and the association with AR severity.

A cross-sectional study was conducted among all patients with asthma aged between six and 17 years at the Paediatric Pulmonology Clinic between March and July 2016. Using standard tools, prevalence of AR, severity of the disorder, and level of asthma control were assessed. A total of 66 asthmatics were recruited, of which 30 (45.5%) had AR. Among those with AR, 12 (40.0%) had uncontrolled asthma compared with four (11.1%) of the 36 without AR (p=0.018). Those with mild AR had better levels of asthma control compared with those with moderate-severe AR (p=0.010). The data from this study show the high prevalence of AR among asthmatic children. In addition, asthmatic children with AR are more likely to have poor levels of asthma control. Hence, routine assessment of all asthmatic children for AR is recommended.

Introduction

Asthma is the most common chronic airway disorder worldwide. There are indications that the prevalence of asthma is increasing in both developed and developing countries, although at different speeds.[1] Prevalence data vary between and within countries due to many factors. Asthma prevalence among Nigerian children is said to be between 5.1 and 14.3%.[2–4] Asthma is a cause of significant morbidity among children although asthma-related deaths are not so high. Asthma causes significant limitation in terms of daily activities, school attendance, and participation in recreational and sporting activities.[1] This is the reason why the concept of control is important and central to the Global Initiative for Asthma (GINA) 2014 guidelines.[5]

Identifying and treating co-morbidities is an important step in achieving control and better quality of life in asthmatic patients. Of particular interest are allergic rhinitis (AR) and allergic rhinosinusitis in line with the 'one linked airway disease concept' that suggest a shared pathophysiology for asthma and allergic rhinitis.[6–8] There have been publications in the last decade that have proposed actively searching for other allergic/inflammatory conditions that are considered of same pathogenesis as asthma. However, there is a dearth of literature in Africa in general, and Nigeria in particular, on the occurrence of AR among children with asthma. Furthermore, to the best of our knowledge, there have been no studies in the country on the implications of AR for control of asthma symptoms in the paediatric population. The Paediatric Pulmonology Unit of the University of Ilorin Teaching Hospital (UITH) conducted a study on AR among children being managed for bronchial asthma at the unit. The implications for control were also studied among the population seen. It is hoped that the findings will influence routine practice in asthma care among children.

Materials and method

This was a cross-sectional study among children aged 6–17 years with previously diagnosed asthma attending the pulmonology clinic. None of the patients had had previous assessment or therapy for AR. The International Study of Asthma and Allergies in Childhood (ISAAC) rhinitis questionnaire was used as the study instrument to assess all asthmatics for AR. The severity of AR was classified according to Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines into mild and moderate-severe.[9] Asthma symptom control was assessed using the Global Initiative for Asthma (GINA) 2014 guidelines. The Oyedeji Scheme for social classification was used with Classes 4 and 5 merged as 'lower class', Class 3 was 'middle class', and Classes 1 and 2 combined as 'upper class'.10An automated micro-peak flow meter (Piko-1®) (nSpire Health Inc., Longmont, USA) was also used in the study.

The study was nested in a larger study on asthma. Ethical approval was obtained from the UITH ethical review committee. The study adhered strictly to the Helsinki Declaration for the conduct of such studies. Only those who consented to the study had the questionnaire administered. The study was carried out between

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	Number	Percentages (%)
Age group (years)		
6–9	29	44.0
10–13	21	31.8
14–17	16	24.2
Total	**66**	**100.0**
Sex		
Male	37	56.0
Female	29	44.0
Total	**66**	**100.0**
Social class		
Upper	21	31.8
Middle	27	40.9
Lower	18	27.3
Total	**66**	**100.0**

Table 1: Socio-demographic characteristics of the study population

Symptoms	Number (%)*
Watery nose	30 (100.0)
Excessive sneezing	22 (73.3)
Nasal obstruction	18 (60.0)
Itchy nose	15 (50.0)
Watery, itchy eyes	13 (36.7)
*Many subjects had multiple symptoms.	

Table 2: Symptoms of allergic rhinitis in those subjects with AR

Parameters	Mean±SD		t	p value
	Asthma	Asthmatic and AR		
Weight (kg)	37.4±11.8	33.7±11.5	1.299	0.199
Height (cm)	143.5±14.6	138.4±15.8	1.352	0.181
BMI (kg/m2)	17.7±3.1	17.0±2.6	1.003	0.320
Abbreviations: t, independent samples t test value; SD, standard deviation; BMI, body mass index.				

Table 3: Distribution of some selected anthropometric parameters of the study participants

Parameters	Mean±SD		t	p value
	Asthma	Asthmatic + AR		
PEFR (l/min)	222.5±86.7	214.3±90.8	0.375	0.709
FEV_1 (l)	1.9±1.3	1.6±1.0	0.910	0.367
Abbreviations: PEFR, peak expiratory flow rate; FEV_1, forced expiratory volume in 1 second; t, independent samples t test value.				

Table 4: Distribution of the FEV_1 and PEFR of the study participants

March and July 2016. All asthmatics registered in the clinic attended and were recruited between these periods.

After obtaining informed consent, data were obtained on the age, sex, and social class of each subject. Anthropometric measurements were taken routinely but the body mass index (BMI) was only calculated for the purpose of this study. Each subject was taken through the questionnaire with a focus on five main symptoms: watery nose, excessive sneezing, nasal obstruction, itchy nose, and watery red itchy eyes. A micro-peak flow meter was used for the measurement of peak expiratory flow rate (PEFR), while forced expiratory volume in one second (FEV_1) was automatically generated by the equipment. GINA guidelines were used for the classification of control of symptoms into 'well-controlled', 'partially controlled' or 'uncontrolled'.[5] It took an average of 20 minutes to complete the recruitment and study procedure for each patient. Data were analysed using SPSS version 20.0.

Results

A total of 66 asthmatic children were recruited; ages ranged between six and 17 years: 29 (44.0%) were aged 6–9 years; 21 (31.8%) were aged 10–13 years, and 16 (24.2%) were between 14 and 17 years. There were 37 (56.0%) males and 29 (44.0%) females; M:F of 1.3:1. Twenty-one (31.8%) were in the upper social class; 27 (40.9%) in the middle class, while 18 (27.3%) were of the lower social classes. The socio-demographic characteristics of the study population are presented in Table 1.

Of the 66 subjects, 30 (45.5%) had co-existing AR. Table 2 shows symptoms found among the 30 patients with AR.

The mean±SD weight, height, and BMI of asthmatic subjects with AR were 33.7±11.5 kg, 138.4±15.8 cm and 17.0±2.6 kg/m^2 respectively, while the corresponding values in their peers without AR were 37.4±11.8 kg, 143.5±14.6 cm and 17.7±3.1 kg/m^2 respectively. The anthropometric parameters were not significantly different between the two groups (Table 3).

The mean±SD PEFR and FEV_1 of the subjects with AR were also compared with those without AR. No significant differences were found in the lung function parameters between the two groups (Table 4).

The relationship between the co-existence of AR and the level of asthma control is shown in Table 5. Among the 30 subjects with AR, 12 (40.0%) had uncontrolled asthma compared with four (11.1%) of the 36 who had asthma alone (p value 0.018).

The effect of AR severity on the level of asthma control among the subjects with AR was studied. Of the 11 subjects with moderate-severe AR, 9 (81.8%) had uncontrolled asthma compared with three (15.8%) out of the 19 subjects with mild AR (p=0.01). This is shown in Table 6.

Discussion

About 50% of the asthmatic children in our study had AR that had been previously untreated. An even higher prevalence of AR in asthmatic children has been reported in studies from Peru (66.4%), Netherlands (76.2%), Japan (77.7%), and France (58.7%).[11–14] This shows that AR is a frequent co-morbidity in asthmatic children. This has also been documented by earlier workers, especially in respect to allergic asthma.[7–9] In order of descending frequency of occurrence, the following symptoms have been found among study subjects: watery nose, excessive sneezing, nasal obstruction, itchy nose, and watery red itchy eyes. Many patients had multiple symptoms. No significant age, sex, or social class differences were found among those who had AR co-existing with asthma. The anthropometric measurements, including BMI, were also similar between those with AR and those without AR.

AR was mild in most of the asthmatics studied. Fewer patients had moderate-severe AR. This finding is consistent with those of earlier workers who documented mild AR to be more common than the other more severe forms. Asthma symptoms were well controlled in the majority of patients. However, those with co-existing AR were significantly more likely to have poor control of asthma symptoms. Although many of the earlier reports on co-existence of AR with asthma did not examine the implications of AR on asthma control in children, a Netherlands study found a significant effect of AR on the degree of asthma control, similar to the finding of this study. Furthermore, there was significant association between severity of AR and level of asthma control. Those with moderate-severe AR were more likely to have poor asthma control. This study has thus gone a step further than the Netherlands study by exploring the severity of AR in the study subjects and the relationship between AR severity and level of asthma control. Since there are no comparative data on the co-existence of AR among asthmatic children in Africa, it is noteworthy that a similar study among adult asthmatics reported by Desalu et al[15] in Ilorin (north-central Nigeria), where our study was also conducted, observed that as high as 63.9% of asthmatic adults had co-existing AR. However, the impact of AR on asthma control in the adult subjects studied was not examined. A retrospective study of patients aged 12–60 years with asthma co-existing with AR, reported a significantly lower risk of subsequent asthma-related events in those who were treated for AR compared with those who were not.[16] It may thus be inferred that treatment of AR may improve the observed significant effect of AR on asthma control. There is however no documented randomised controlled trial on the effects of AR treatment on asthma control in children with asthma co-existing with AR and this is a possible direction for future research.

Level of asthma control	Asthma without AR n = 36 (%)	Asthma with AR n = 30 (%)	χ^2	p value
Well controlled	23	11		
Partly controlled	9	7	8.006	**0.018**
Uncontrolled	4	12		

Table 5: Relationship between co-existence of AR and level of asthma control

	AR severity			
Level of asthma control	Mild n = 19 (%)	Moderate-severe n = 11 (%)	χ_y^2	p value
Well controlled	10	1		
Partly controlled	6	1	9.245	**0.010**
Uncontrolled	3	9		
χ_y^2: Yates corrected chi square.				

Table 6 Relationship between AR severity and level of asthma control among asthmatic subjects with co-existing AR

Although this study is hospital-based and the sample size is not large, it provides preliminary data to support the active search for AR in asthmatic children as a significant co-morbidity.

In conclusion, AR co-exists with asthma in a significant proportion of asthmatic patients, and the presence of AR is associated with poorer levels of asthma control. Recognition of AR in children with asthma and its appropriate treatment is likely to improve asthma control.

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Author declaration

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