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The prevalence of bronchial asthma among adults in Ilorin, Nigeria.

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Summary

Few data exist on the prevalence of asthma among Nigerian adults. The aim of this study was to determine the prevalence of bronchial asthma among adults in Ilorin, Nigeria. This study was conducted in Ilorin east and west local governments of Kwara State, Nigeria from October 2005 to April 2006. We recruited 810 subjects by the cluster sampling method. The European Community Respiratory Health Survey (ECRHS) asthma-screening questionnaire was used to collect data. The peak expiratory flow rate (PEFR), force expiratory volume in one second (FEV_1), force vital capacity (FVC) and FEV_1/FVC ratio were measured. Subjects with $FEV_1 < 80\%$ of predicted, $FEV_1/FVC < 80\%$, or one asthma symptom were subjected to PEF variability testing over the course of one week. Asthma was diagnosed in subjects with either two or more recurrent asthma symptoms (current asthma) or physician-diagnosed asthma, as well as PEF variability of $\geq 10\%$. The prevalence of bronchial asthma was 15.2%, the male to female ratio was nearly 2:1, and the mean age of the asthmatics was 32 ± 10.12 years. Current asthma and physician-diagnosed asthma were 12.7% and 2.0%, respectively. The most common complaint reported by the asthmatics was wheezing. The prevalence of bronchial asthma among adults in Ilorin in North Central Nigeria was high. It is important to increase awareness of the disease in this region.

Keywords: Prevalence, asthma, adults, Ilorin, Nigeria

Résumé

Peu de données existent sur la prévalence de l'asthme parmi les adultes Nigériens. Le but de cette étude était de déterminer la prévalence de l'asthme bronchiale parmi les adultes à Ilorin au Nigeria. Cette étude était conduite à l'Est d'Ilorin et au gouvernement local Ouest dans l'état de Kwara au

Nigeria d'octobre 2005 à avril 2006. Nous avons recruté 810 sujets par la méthode de groupe d'échantillons. L'étude de la communauté Européenne de Santé respiratoire par un questionnaire sur le test d'asthme était pour collecter les données. Le pic du taux d'expiration, le volume de la force expiratoire en une seconde (VFE 1), la capacité de force vitale (CFV) et le ratio VFE 1/CFV étaient mesurés. Les sujets avec VFE 1 < 80% de prédiction, VFE 1/CFV < 80%, ou un symptôme d'asthme étaient soumis à la variabilité du test de PEF pendant une semaine. L'asthme était diagnostiqué aux sujets avec deux ou plusieurs symptômes d'asthme ou l'asthme diagnostiqué par le médecin bien qu'une variabilité du PEF de > 10%. La prévalence de l'asthme bronchiale était de 15.2%, une proportion male/femelle de 2 : 1 et une moyenne d'âge chez les asthmatiques de 32 ± 10.12 ans. L'asthme courant et diagnostiqué étaient de 12.7% et 2.0% respectivement. La plainte la plus commune était d'éternuer. La fréquence de l'asthme bronchiale parmi les adultes à nord-Ilorin était élevée. Il est important d'accroître la campagne de sensibilisation de cette maladie dans la région.

Introduction

Asthma is now one of the world's most common long-term conditions; the disease is estimated to affect as many as 300 million people worldwide, which could increase by another 100 million by the year 2025 [1]. The prevalence and incidence for asthma throughout Africa have increased remarkably in recent years; this increase over a short period of time has been related to non-genetic or environmental changes [2]. The role of changing environmental factor has been supported by studies comparing prevalence in urban and rural areas in developing countries, which had shown large differences in asthma prevalence [3].

The condition was previously uncommon over most parts of the African continent [1]. In 1960, asthma accounted for 0.3% of total medical admissions at the University College Hospital (UCH) Ibadan Nigeria [4]. By 1971, it accounted for 2.1% of the medical admissions [5]. There are few studies on the prevalence of asthma in Nigeria [6-9]; however, there is a dearth of data on the prevalence and pattern of asthma in adult Nigerian. We believe

this study will add to the existing work on asthma in Nigeria. The aim of this study is to determine the prevalence of bronchial asthma among adults in Ilorin, Nigeria.

Materials and methods

The research study was a cross-sectional study conducted in Ilorin's East and West local government areas from October 2005 to April 2006. Ilorin city is on latitude 8° 30'N and longitude 4° 30' E; in West Africa [10]. Subjects between the ages of 18 to 65 years who met the inclusion criteria were recruited into the study. Inclusion criteria were: the subject must have lived in Ilorin for the past 12 months and exhibited no history of recent use of drugs that may affect the airway, such as beta blockers. Subjects with symptoms of tuberculosis, chronic obstructive pulmonary disease and chronic heart failure were excluded from the study.

The study was conducted among 810 subjects who were selected by the cluster sampling method. The European Community Respiratory Health Survey (ECRHS) asthma-screening questionnaire [11] with some modifications was used by the investigator and trained assistant to collect demographic information, asthma symptoms and medications, and history of previous asthma diagnosis. The height (meter) and body weight (kg) of the subject were measured by Hanson's weighing scale and modified metered rule, respectively; body mass index (BMI) was calculated by dividing the body weight by the square of the height.

The second phase of data collection involved lung volume measurements using a spirometer (microlab model 2004) made by the Microlab company (United Kingdom). The highest value of FEV₁, FVC, FEV₁/FVC ratio, and PEFR obtained with a difference of less than 0.2L was accepted as representative value for each subject.

Immediately after the questionnaire administration and measurement of lung volumes, those subjects who had two or more recurrent asthma symptoms in the preceding 12 months or were previously diagnosed by a doctor were judged to have asthma. Those who failed to meet these case definitions were judged not to have asthma. However, the use of these definitions leads to exclusion of atypical or indeterminate cases. These atypical cases were subjects with cough variants of asthma or one recurrent symptom of asthma in the preceding 12 months, as well as subjects not diagnosed by a doctor but who resorted to alternative medicine and self-medication. Also excluded were those with airflow

limitation (FEV₁ <80% predicted or FEV₁/FVC < 80%).

All the atypical or indeterminate cases were subjected to PEFR variability tests within 48 hours of questionnaire administration. Peak Expiratory Flow Rate was measured in the morning at 7:30 and in the evening at 7:30 for one week. PEFR variability was calculated using the simple index of PEFR variation formula [12].

Minimum morning Prebronchodilation PEF X 100%

Recent best PEF

In order not to underestimate the prevalence of asthma, those with any of the following three criteria were judged to have asthma. These were: (1) physician-diagnosed asthma; (2) Two or more recurrent asthma symptoms in the preceding 12 months [8,13-15]. (3) PEF variability of $\geq 10\%$ without using a bronchodilator [1,15].

It is important to mention that in diagnosing asthma, reversible and variable airflow limitations can be measured by using a spirometer (FEV₁ and FVC) or a peak flow meter [1,15]. Spirometry is the recommended method of measuring reversibility, the term reversibility is the rapid improvements in FEV₁ (or PEF), measured within minutes after inhalation of a rapid-acting bronchodilator. Variability refers to improvement or deterioration in symptoms and lung function occurring over time [1]. The degree of reversibility in FEV₁ and PEFR which indicates a diagnosis of asthma is $\geq 12\%$ change in FEV₁ or $\geq 15\%$ in PEFR from the pre-bronchodilator value [1,16,17].

The diagnosis of asthma can also be made if the day to day variability in PEF $\geq 20\%$ in patients already taking a bronchodilator or $\geq 10\%$ in patients who are not taking bronchodilator as in this study [15].

The data were analysed using Epi-info version 6.04. Descriptive and frequency statistics were performed to examine the characteristics of this representative sample of the general population of Ilorin. The University of Ilorin teaching hospital ethics and research committee approved the study. Each of the subjects gave verbal consent to participate in the study.

Results

The study recruited 810 subjects, of which 478 were males and 332 were females; their mean age was 32.75 ± 9.60 years. After questionnaire administration and measurement of lung volumes, 32 subjects were identified as indeterminate cases. PEF diurnal variation in these 32 subjects revealed 4 (0.5%)

Table 1: The prevalence of asthma among adults in Ilorin, Nigeria

Diagnostic criteria	Frequency	Percentage(%)
Physician -diagnosed Asthma symptoms in 12 months	16	20
PEF variability \geq 10%	103	12.7
Asthmatic subjects	4	0.5
	123	15.2

subjects with PEF variability \geq 10%, while 28 (3.5%) had PEF variability < 10%. Those with physician-diagnosed asthma numbered 16 (2.0%), those with two or more asthma symptoms in the last 12 months (current asthma) numbered 103 (12.7%), and those for whom PEF diurnal variability was \geq 10% without bronchodilator represented 0.5% of the sample population. The prevalence of bronchial asthma using the three case definitions in this study was 15.2%. Table 1 shows the prevalence of asthma using the three case definitions.

Table 2: Demographic characteristics of the asthmatic subjects

Characteristic	Number (n)	Percentage (%)
<i>Sex</i>		
Male	84	68.3
Female	39	31.7
<i>Age (Distribution in years)</i>		
<20	8	6.5
20-29	44	35.8
30-39	34	27.6
40-49	31	25.2
50-59	4	3.3
60+	2	1.6
<i>Education</i>		
Arabic education/ No education/primary	33	26.8
Secondary	58	47.2
Undergraduate	15	12.2
Graduate	17	13.8
<i>Occupation</i>		
Housewife/Unskilled	62	50.4
Professional	19	15.4
Intermediate	13	10.6
Skilled non-manual	10	8.1
Skilled manual	19	15.4
Unemployed	0	0

N = 123

N=810

Eighty-four (68.3%) asthmatics were males, while 39 (31.7%) were females; the male to female ratio

was 2:1. The mean age of the asthmatic subjects was 32.90 ± 10.12 years. Table 2 shows the socio-demographic characteristics of the asthmatic subjects.

The most common respiratory symptom was wheezing in 107 subjects (87%), followed by cough in 97 (78.9%), chest tightness in 90 (73.2%) and breathlessness in 60 (48.8%). Out of 123 asthmatic subjects, 42 (34%) reported nocturnal attack, 36 (29.3%) had an asthma attack in the last 12 months, and 84 (68.3%) had nasal allergies. The respiratory symptoms reported by the asthmatic subjects are shown in table 3.

Table 3: Respiratory symptoms reported by the asthmatic subjects

Symptoms	Frequency	Percentage (%)
Wheezing	107	87.0
Cough	97	78.9
Chest tightness	90	73.2
Breathlessness	60	48.8
Nocturnal attack	42	34.0
Asthma attack in the last 12 months	36	29.3
Nasal allergy	84	68.3

Discussion

At the end of this study, the prevalence of asthma among the adult population of Ilorin was 15.2%. This was higher than the 9.6% found in Burkina Faso and the 12.2% in Colombia, but it was closer to the 14.1% documented among university undergraduates in Ile-Ife Nigeria and the 14.2% reported among adolescents in Eastern Nigeria. The result in our study was also lower than the 18.4% observed in the International Study on Asthma and Allergy in Childhood (ISAAC) performed in Nigeria, and it was also lower than the 17% found in India and the 24.1% in Australia [7-9, 12, 18-20]. The differences in the prevalence of asthma were due to different epidemiological tools and case definitions adopted in these studies.

The definition of asthma demands streamlining for the benefit of the advancement of science. A few studies on asthma prevalence measure ever asthma, others measure current asthma, and still others measure physician- or hospital-diagnosed asthma. The last category may especially be the most valuable because of the medical certification.

In this study, current asthma was 12.7%; this was less than the 14.2% among adolescents in Eastern Nigeria [8]. The similarity of results from these two

studies is most likely due to agreement in the case definition of asthma.

The physician-diagnosed asthma in this study was 2.0%; this is lower than the 3.6% from Gambia [21] 4.4% from Finland [22] and 11.6% from South Africa [23]. The low results in this study may be due to poor utilization of medical services and low awareness of asthma among the study population. The mean age of asthma subjects was 32 ± 10.12 years, which is similar to the 31 years documented in the epidemiological study of asthma from Mali in West Africa [24].

The study shows that 69.9% of asthmatic subjects were below the age of 40 years, comparable to 80.8% in Burkina Faso [18]. This high percentage of asthmatics supports the assertion that asthma is common above the age of 40, although under-diagnosis of asthma in the elderly may contribute to this age distribution pattern. Elderly people are also less likely to complain about asthma symptoms because of their poorer perception of shortness of breath and because asthma symptoms are often similar to those of cardiovascular disease and other age-related diseases [1].

In this study, the male to female ratio of the asthmatics was 2:1; this is similar to the study in Eastern Nigeria [8] but different from studies in Mali, China and the USA that document a predominantly female distribution [24-26].

The heavily male distribution may be due to the skewed nature of the population recruited into the study. In this study, 74% of the asthmatics never had College or University education. Socioeconomic status of a population is determined by income, occupation or educational class. By division into low or high socioeconomic class, 74% of the asthmatic subjects will fall into the category of lower socioeconomic status. This result is similar to other studies in India, Ghana, Bangladesh, Spain, and U.S.A [11, 27-30].

The increase in the frequency of asthma among the lower socioeconomic class may be because of living in damp, poorly ventilated homes with house dust mite colonization, which are common in the inner-city [1].

The most common symptom among the asthmatics in this study was wheezing. The prevalence in the asthmatic population was 13.2%, while wheezing afflicted 16.9% of the subjects in this study population. Wheezing is a sign of airflow limitation, and one of the cardinal symptoms of asthma, the paroxysm of wheezing, calls to mind the diagnosis of bronchial asthma. Furthermore, asthma, COPD,

acute pulmonary oedema, bronchiectasis, endobronchial tumour or tuberculosis and beta adrenergic blocker can also present with wheezing. Therefore, attempts at equating a symptom with diagnosis should be discouraged in medical practice. From our study, it can be inferred that all wheezes are not indicative of asthma; this is similar to other studies in Great Britain [31] (15.9% vs 12.6%) and South Africa (26.8% vs 10.8%) [32].

This observation is different from that obtained by the International Study on Asthma and Allergy in Childhood (ISAAC) in Nigeria (10.7% vs 18.4%) and Japan (13.4% vs 18.8%) [7]. Our study is different from the ISAAC study because of the under-reporting of asthma symptoms by parents and the over-reporting of asthma symptoms by adolescents and younger adults. Other reasons for the discordance in reporting were absence of local expressions for wheezing and asthma, as well as the environmental influence on the expression of disease in different countries. The disparity in reporting asthma symptoms among parents and adolescents has also been noted in a study of asthma morbidity [33].

Wheezing, cough, chest pain and breathlessness were the most common symptoms in all the age groups of asthma subjects; these findings were in keeping with other studies in India [11] and Bangladesh [28]. These symptoms of asthma were the best surrogate for the diagnosis of bronchial asthma in the adult Nigerian population.

A high prevalence of nasal allergy (31.5%) was noted in this study population; this is similar to 31.4% in Kenya [34] and 37.3% found in Finland [22]. The high rate of nasal allergy may be because of high-levels of industrial or biological gas pollution. Out of the 123 asthmatic subjects, 25 (26%) used asthma medication for relief of symptoms, which is less than the 36.5% in Brazil [35]. However, the low level of medication may be due to poor recall of events and poor patronage of medical services.

Conclusion

The prevalence rate of asthma in our study, 15.2%, was high in comparison to documented studies of other populations. There is an urgent need to increase the awareness of this disease among the people of this region.

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