

Asthma management by medical practitioners: the situation in a developing country

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Background: Asthma is a common chronic disease worldwide and is responsible for considerable morbidity, socioeconomic burden, and depletion of health resources. Clinically, diagnosis of asthma is based on information obtained from symptom questionnaires, physical examination and demonstration of variable airflow obstruction. Proper diagnosis of asthma is mandatory in clinical practice in order to avoid undue use of potentially toxic asthma medications and prevent unwarranted social stigmatization. This study aimed to determine how medical practitioners in Nigeria diagnose asthma and use asthma medications during asthma exacerbation and the follow-up period.

Methods: A semi-structured self-administered questionnaire on asthma management was distributed to medical practitioners attending the annual scientific meeting/update course in August, 2009. Forty-nine practice centers in the 6 geopolitical zones in Nigeria were included in this survey.

Results: Totally 131 medical practitioners (80 males, 51 females) completed the questionnaire. Post National Youth Service Corp practice (mean \pm SD) was 9.95 ± 7.78 years, ranging from 2 to 39 years. The practice centers of respondents included university teaching hospitals (65.6%), state specialist hospitals (17.6%), private hospitals (10.7%), and missionary hospitals (6.1%). Respondents' assessment of burden of asthma was high (30.5%), moderate (63.4%) and low (6.1%). Asthma diagnosis was made by various methods including: symptoms only (35.9%), health personnels (32.3%), mother/self evaluation (20.3%), and use of spirometry/peak expiratory flow rate (11.5%). Thus inappropriate

asthma diagnosis could have been practiced by 116 (88.5%) medical practitioners.

Conclusion: The study revealed inadequate knowledge of asthma diagnosis and drug management of asthma by medical practitioners in Nigeria.

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Key words: airflow obstruction; asthma; medical practitioner; peak expiratory flow rate

Introduction

Asthma is a common chronic disease around the world.^[1-4] The disease leads to considerable childhood morbidity, socioeconomic burden, and depletion of health resources.^[2-5] Asthma prevalence varies globally^[1,2] and yet there are no national values for Nigeria. Most studies on asthma prevalence were derived from school children and hospitalized subjects.^[3-6] Falade et al^[5] documented a prevalence of 5.1% among secondary school children in Ibadan (South West Nigeria, 2004) using the ISAAC guideline. Oviawe^[3] on the other hand observed a prevalence of 0.7% in children living in the rural community. In other African countries, the prevalence rate varies remarkably from 0.0% (rural Gambia) to 18.0% (Nairobi, Kenya), 18.6% (Conakry, Guinea), 19.3% (Abidjan), and 20.3% (Cape Town).^[6]

Diagnosis of asthma is usually based on patient's medical history, physical examination and laboratory tests that measure pulmonary function.^[7-10] Support for a diagnosis of asthma is obtained typically by looking for signs that the airflow of patients is obstructed and that the obstruction can be induced and at least partially reversible.^[7-10] Although patient's symptoms and medical history are helpful in asthma diagnosis, definitive diagnosis is dependent on spirometric measurements.^[8-10] These eliminate possibilities of asthma mimics which abound.^[7,8] Consequently, application of irrational asthma medication based on inclusion of these mimics may accentuate the burden of

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asthma management, produce adverse drug effects and worsen morbidity and mortality.^[11,12]

Physiologic test is generally recommended to confirm the diagnosis of asthma.^[7-10] The diagnosis of airway obstruction may be provided by bronchial provocation.^[9,12-14] The most reliable way to determine reversible airway obstruction is the use of spirometry^[9,15] or peak expiratory flow rate monitoring,^[9,16,17] a test that can be performed in the physician's office or at patient's bedside. These tests require about 6 minutes to perform and in the case of peak expiratory flow rate monitoring, 2 weeks are required to establish the pattern of variability.^[9]

Asthma is a dual component disease (chronic inflammation and bronchial spasm), hence treatment is tailored to curtailing underlying inflammation and bronchoconstriction.^[1,2] Although a national guideline for asthma management is yet to evolve in Nigeria, studies have shown that inhaled corticosteroid and beta-2 agonist are preferred drugs for asthma exacerbation and in a follow-up period.^[3,18]

Undiagnosed and mis-managed asthma may lead to compromised quality of life of individuals and their families, absenteeism from school and work,^[3,11,18] hence proper diagnosis of asthma is mandatory.^[1,2,12,13] This study, therefore, determines how medical practitioners in Nigeria diagnose asthma as well as prescribe asthma medications at presentation and during the follow-up period.

Methods

This was a descriptive cross-sectional study that took place in two cities (Benin and Ibadan) in Nigeria. The study was carried out in August 2009 during the annual scientific conference of the Nigerian Medical Association (NMA) in Benin city and the annual update course of the West African College of Physicians, Faculty of Paediatrics that took place in University College Hospital, Ibadan. The study was carried out in two locations for the study, Benin (south-south region) and Ibadan (south-west region) respectively. Respondents were enrolled from 49 practice institutions in the 6 geopolitical zones of Nigeria. Interns and those on the one-year National Youth Service Corps (NYSC) posting were excluded. Approval for this research was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital, Benin City, Nigeria.

In this study, the appropriate method for asthma diagnosis was demonstration of airflow limitations and/or its reversibility and variability.^[9,12-17] Data were analyzed using Statistical Package for Social Sciences (SPSS) 13.0 software. Quantitative variables were summarized

using means \pm standard deviations. The significance of association between proportions was tested using the chi-square test or Fisher's exact test (where appropriate) while Student's *t* test was used for comparison of means. The level of significance of each test was set at $P < 0.05$.

Results

Totally 131 medical practitioners (80 males, 51 females) completed the questionnaire. The mean period of practice was 9.95 ± 7.78 years (range: 2-39 years). Respondents' practice institutions were university teaching hospitals (65.6%), state specialist hospitals (17.6%), private hospitals (10.7%), and missionary hospitals (6.1%). Most of the respondents (86, 65.6%) were resident doctors, and the rest were medical officers (28, 21.4%) and consultants (17, 13.0%).

Most respondents (50.4%) belonged to the specialty of pediatrics, followed by private practitioners (13.0%), anesthesia (5.3%), family medicine (4.6%), and internal medicine (3.8%). Other specialties constituted 22.9%. Sub-specialties were not determined. Respondents' assessment of asthma burden was high (30.5%), moderate (63.4%) and low (6.1%). None reported "not at all" for asthma burden.

Asthma diagnosis was commonly diagnosed by symptoms only (35.9%), and appropriate diagnosis of asthma was made by 11.5% of the respondents (Table 1). Gender, practice period, respondents' status and place of practice of respondents were not significantly associated with appropriateness of diagnosis ($P = 0.930, 0.474, 1.000, \text{ and } 0.221$, respectively) (Table 2). None of the medical officers made appropriate diagnosis of asthma. Reasons for non-appropriate method for diagnosis of asthma were not determined in the study. However, only 18 (13.7%) of the respondents reported the availability of spirometry and another 51 (38.9%) reported availability of peak flow meter in their practice centers.

The commonly prescribed drug was salbutamol for acute asthma care (89.3%) and follow-up therapy (90.8%) (Table 3). Fixed combination of drugs (tedral and franol) was used by 30 (22.9%) and 25 (19.1%) respondents during an asthma exacerbation and follow-up period, respectively. Concerning route of drug administration, 26 (19.8%) respondents prescribed oral medication during an asthma exacerbation, while

Table 1. Methods of asthma diagnosis

Methods	n (%) [*]
Symptoms only	47 (35.9)
Health personnel diagnosis (referral)	42 (32.1)
Mother/self diagnosis	27 (20.6)
Determined reversible airflow limitation	15 (11.5)

*: multiple methods in some cases.

Table 2. Gender, practice period, respondents' status and place of practice of respondents versus appropriateness of diagnosis of asthma

Outcome measures	Appropriateness of diagnosis of asthma		P value
	Yes (%)	No (%)	
Gender			
Male (n=80)	9 (11.3)	71 (88.7)	0.930
Female (n=51)	6 (11.8)	45 (88.2)	
Practice period (y)			
<10 (n=90)	12 (13.3)	78 (86.7)	0.474
10-19 (n=26)	1 (3.8)	25 (96.2)	
20-29 (n=12)	2 (16.7)	10 (83.3)	
30-39 (n=3)	0 (0.0)	3 (100.0)	
Status			
Consultants (n=17)	2 (11.8)	15 (88.2)	1.000
Residents (n=86)	13 (15.1)	73 (84.9)	
Medical officers (n=28)	0 (0.0)	28 (100.0)	
Place of practice			
Teaching hospitals (n=86)	13 (15.1)	73 (84.9)	0.221
State specialist hospitals (n=23)	2 (8.7)	21 (91.3)	
Private hospitals (n=6)	0 (0.0)	6 (100.0)	
Missionary hospitals (n=16)	0 (0.0)	16 (100.0)	

Table 3. Drug prescription for asthma during acute asthma episodes and follow-up period

Drugs	Acute asthma episodes, n (%)	Follow-up period n (%) [*]	P value
Salbutamol	117 (89.3)	119 (90.8)	0.836
Aminophylline	114 (87.0)	47 (35.9)	<0.0001
Adrenaline	57 (43.5)	0 (0.0)	<0.0001
Corticosteroid	111 (84.7)	36 (27.5)	<0.0001
Others, e.g., tedral, franol	30 (22.9)	25 (19.1)	0.545

*: multiple prescriptions in some cases.

18 (13.7%) prescribed parenteral drugs during a follow-up period. None of the respondents attempted determination of severity of asthma control.

Discussion

This study showed that most of the respondents made inappropriate diagnosis of asthma before managing the disease. The rate (88.5%) of inappropriate methods for asthma diagnosis by medical practitioners in Nigeria as demonstrated in this study was comparable to that (78.9%) reported by Ayuk et al^[19] in 2010 on asthma management by doctors in south-east Nigeria. Most medical practitioners irrespective of places of medical practice (whether university or private hospitals) diagnosed and managed asthma according to symptoms and signs complexes without lung function tests. The major reasons included non-availability of relevant personnel, poor funding of health services, and non-availability of instruments required for measurement of lung volume/function as only 38.9% and 13.7% of

the medical practitioners reported availability of space peakflow meter and spirometer in their practice centers. While Nigeria may be perceived to be a rich country, health care services and delivery are heralded by poor funding, inappropriate medical facilities and lack of qualified personnel.^[20] The inappropriate government policy on health is further evidenced by meager allocation to health care sector of 3.0% annual budget as against the recommended 15.0% by the World Health Organization.^[20] There is therefore the need for improved health care funding in Nigeria that will enhance the state of health care provision and delivery in each of the geopolitical zones of the country.

Diagnosis of asthma based on symptoms (such as episodic cough, chest tightness, difficulty with breathing and wheezing) is an inappropriate method for asthma diagnosis because most of these symptoms are not specific for asthma.^[12-14,19] Parents often use wheezing as the most specific label to describe any abnormal respiratory noise such as snoring and stridor, most of which are not asthma. Most areas of Nigeria (possibly Africa) lack equivalent word for "wheezing", and are compelled to laboriously describe the sound or mimic sounds made by domestic animals, such as cat. Asthma diagnosis based on these principles ignores the assertion that "not all that wheezes are asthma".^[1,2,12,13] Secondly, mother-reported and to a lesser extent some health care providers' diagnosis of asthma are based on conclusions reached by various cadres of health care providers, elderly relatives, influential and supposedly enlightened people in the family and community.^[9] These methods are bound to lead to over-diagnosis rather than under-diagnosis of asthma. This finding is comparable to observation of several studies.^[12-14,19] In 2006, Metha et al^[13] found asthma to be over-diagnosed in 61.0% of adult patients whose initial asthma diagnosis was based on health workers' referral. Similarly, Aaron who studied a large number of asthma subjects in eight Canadian cities following the guideline-approved method had to discontinue asthma medication in 65.0% of asthma patients whose asthma diagnosis had been based on symptoms only.^[12] Alternate diagnosis from these studies included laryngobronchiomalacia, tracheobronchial foreign body, and laryngeal papillomatosis.^[12,13]

Consequently, application of asthma medication based on these mimics may accentuate the socio-economic burden of asthma management.^[9-13] Asthma can only be reliably distinguished from other similar diseases that present with similar symptoms by spirometric evaluations.^[12,13,15] It is instructive that only 11.5% of medical practitioners determined reversible airflow limitation for asthma diagnosis in this study. In a similar study in Abidjan, Cote d'Ivoire in 2001, Koffi et al^[14] observed that only 12.75% of physicians had a lung function test for asthma diagnosis. Possibly, the

predominant specialty of pediatrics played a role in non-performance of spirometric measurements as lung function values are often difficult to obtain in young children. Furthermore, medical practice in Nigeria functions mainly at primary level of health care even at the tertiary center as against the practice in most developed countries. Detailed investigative procedures at this level are unavailable and often viewed by health care consumers as time-wasting. With the low doctor-patient ratio (28 per 100 000 patients),^[21] medical practitioners are likely to base diagnosis on scanty history. The situations are worse in mission, private and some state controlled health facilities.

The respondents in this study mis-managed asthma in the area of drug prescription for all asthma situations. Oral franol/tedral (drugs that contained ephedrine, theophylline, and phenobarbitone in a fixed component dosage forms) and corticosteroid were drugs prescribed by the respondents during asthma exacerbation and oral franol and parenteral aminophylline during the follow-up period. Asthma over diagnosis and consequent mismanagement in terms of drugs prescription have also been observed by other studies.^[12,13,18] The side-effects of these drugs on the patients are a major concern since some of these drugs allude to some complications which may increase asthma morbidity and consequent asthma mortality.^[12,13,18] Infrequent use of anti-inflammatory medication by the respondents during the follow-up period showed a lack of evidence of recent trend in asthma medication. The use of salbutamol alone for all stages of asthma is bound to lead to inappropriate management and contrary to the Global Initiative for Asthma (GINA) guideline.^[1]

The present study has not only ascertained the inadequate knowledge of asthma diagnosis and drug management of the disease in both exacerbation and follow-up periods by medical practitioners in Nigeria but also calls for urgent need for capacity building in medical personnel. This capacity building should start from the basic medical sciences to training of specialists (pulmonologists, allergists) with improved asthma care especially in children. National guidelines on diagnosis and management of childhood asthma as well as simple instrument for asthma diagnosis should be made available in all health institutions in Nigeria.

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Competing interest: None.

Contributors: Osarogiagbon WO proposed the study. Nwaneri DU wrote the first draft and analyzed the data. All authors contributed to the design and interpretation of the study and to further drafts. Oviawe O is the guarantor.

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