

Challenges in the Management of Bronchial Asthma Among Adults in Nigeria: A Systematic Review

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Abstract

Inadequate attention given to the management of asthma and ways of improving bronchial asthma control could be an important factor for the rising morbidity and mortality from asthma despite major advances in our understanding of the disease process. There is a paucity of data concerning the challenges faced in the management of asthma in Africa. This review was aimed at highlighting the challenges facing asthma management and to discuss various strategies in improving asthma control in Nigeria. Data were sourced from PubMed, Medline, African Journals Online, Google Scholar, SCOPUS, and by reviewing the references of relevant literature. Additional articles were obtained via communications with colleagues and reviewing the Abstract Books of Nigeria Thoracic Society Annual Scientific Conference from 2005 to 2012. The data search was up-to-date as of December 31, 2012. Challenges in asthma management were found during diagnosis, treatment, and follow-up. There are wide variations in diagnostic criteria for bronchial asthma and lack of standard diagnostic equipment leading to under or misdiagnosis. Treatment challenges include poor communication gap between the health-care providers and the patients, a high-cost and unavailability of essential asthma medications. Poor technique uses for medication devices, especially the inhalational drugs and Lack of National/hospital protocol or guidelines for treating asthma. Several challenges affect asthma management in developing countries, which borders on poverty, inadequate resources, weak health systems, and poor infrastructure. Efforts should be made to address these challenges by the Nigerian government, Nigerian Thoracic Society, pharmaceutical industries, and the health-care workers in general.

Keywords: Asthma, Challenges, Diagnosis, Follow-up, Nigeria, Treatment

Introduction

Asthma is a chronic inflammatory condition characterized by airway hyper-responsiveness to a variety of stimuli largely of allergic origin with reversible airflow limitation.^[1] The major clinical features of asthma are wheezing, shortness of breath, and cough.^[1] It is a major cause of impaired quality of life with impact on work and recreational as well as physical activities and emotions.^[1] The goal of treatment is to achieve overall clinical control, which entails the achievement of

symptom-free control and to minimize future risks.^[2] The goal is the same for all severity of the disease.

Current (day-to-day) control of asthma include achievement of symptom relief, reduction in the use of on demand inhalers, improvement in activity, and improvement in lung function.^[2] Future risk minimization is achieved by ensuring the absence of asthma exacerbations, the prevention of accelerated decline in lung function over time, and no side-effects from medications.^[2]

World-wide, it is estimated that 300 million people are affected with bronchial asthma.^[3] The prevalence of asthma is variable. It is a disease that has been observed to be more prevalent in developed countries with higher rates seen in Australia, UK, and New Zealand.^[3] In Nigeria, the prevalence of asthma ranges from 7% to 18% in the general population.^[3-6] Sex ratio varies according to age:^[3] In childhood, asthma affects more boys than girls for unknown reasons, but by the third decade, the

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prevalence becomes equal and subsequently, more women than men are affected.^[3-7] Asthma prevalence is increasing despite recent advances being made in its management.^[7,8]

Enormous advances have been made in the understanding and management of asthma in the past 20 years. These include; understanding the inflammatory nature of the disease, use of steroids, add-on of long acting bronchodilators to steroids, use of devices to deliver the medications more appropriately/ conveniently, and appreciation of the value of self-management education.^[3,7,8]

In managing asthma, health-care providers and the patients are often faced with lots of challenges and these challenges of asthma management include challenges in diagnoses, challenges in the treatment, follow-up challenges, and other general challenges.^[9,10] This paper attempts to systematically review the challenges affecting asthma management in Nigeria and suggest ways of improvement.

Materials and Methods

Search strategy

We reviewed asthma-related publications from Nigeria from 1995 to 2012. Data were sourced from PubMed® Medline, African Journals Online, SCOPUS, Google Scholar (up to the first 1500 articles) and by reviewing the references of relevant literature. Additionally, conference presentations were obtained through communication with colleagues and reviewing the Abstract Books of Nigeria Thoracic Society Annual Scientific Conference from 2005 to 2012. The data search was up-to-date as of December 31, 2012. Search terms used were: “asthma and Nigeria,” or “bronchial asthma and Nigeria,” AND “diagnosis” or “treatment” or “management” limited to human studies and among the adults within the time frame 1995-2012. Only articles published in English language were considered.

Selection criteria

Possible relevant publications identified were initially screened according to their title and abstract. Full-text of articles considered to be relevant for inclusion in the review was retrieved. Selection criteria for the identified publications were specified by the challenge considered: Challenges in diagnosis, challenges in treatment, challenges in follow-up, and other general challenges. Publications with the following characteristics were excluded; (i) duplicate publications, (ii) the publication was not an original research; (iii) the article was found not to be about challenges of asthma management in Nigeria. The full texts of all the included papers were reviewed. The reference list of one review paper on management of asthma identified was evaluated,^[8] but was excluded from the list of included studies.

Data extraction

Three reviewers' (UKN and EC DOO) selected the included articles and extracted data from each accepted paper. Data

were verified by a fourth independent reviewer (OCC) and discrepancies were settled by consensus. All data were extracted using a pro-forma designed for the review. Specifically, we extracted the following: author(s) and date of publication, years of study, design, the focus of the challenge (diagnosis, treatment, follow-up or general challenge).

Results

Description of studies

The electronic searches generated a total of 1762 publications; of these, 43 duplicate articles were removed. 1719 were screened using titles and abstract, 1653 of the articles were excluded for lack of relevance. A total of 66 full-text publications were sourced and retrieved for further considerations. Checking of references did not generate any additional citations to be included. In all, 13 articles met the inclusion criteria.^[7,11-22] Of the 13 studies selected, 10 were cross-sectional studies and one case-control study [Figure 1]. Most of the studies focused on urban as well as urban/rural population. Six studies addressed challenges during diagnosis, six during treatment, and one study during follow-up [Table 1].

Challenges in diagnoses

The major clinical challenge facing asthma diagnoses is that there is no single satisfactory diagnostic test for all asthmatic patients. As a result, physicians often use different criteria in making a bronchial asthma diagnosis. In addition, simple prompt diagnoses are not achieved.^[8] Another challenge is that there are very few respiratory physicians in Nigeria. A study found an average of 0.8 respiratory physicians per hospital in a survey of 68 tertiary hospitals in Nigeria.^[11] Furthermore, reviewing adherence to international guidelines in asthma management in Nigeria showed that most hospitals lacked the services of respiratory physicians, internists, and pediatricians that are needed to provide the standard of care required for asthma management.^[11]

Other problems encountered in asthma management in this setting include lack of standard diagnostic equipment such as peak flow meters, and spirometers. Skin allergy tests test/allergen specific IgE estimation, equipment for exhaled nitric oxide, histamine/methacholine challenge tests are also lacking too.^[11-16] In a review of 68 tertiary hospitals in Nigeria, 26 (38.2%) had peak expiratory flow rate meter in the emergency rooms, Twenty hospitals (29.4%) had spirometer, only 10 of the 68 hospitals reviewed (14.7%) had skin allergy test facilities.^[11] Even when the equipment are available, physicians often are not conversant with their use owing to lack of proper training on their use.^[11,12,14-16]

The overall effect of these diagnostic challenges will lead to under diagnoses, over diagnoses, misdiagnosis, and sometimes undiagnosed/unreported cases of asthma. This will lead to increased morbidity and mortality due to asthma.

Table 1: Summary of studies addressing challenges of asthma management in Nigeria

1 st author (year)	Sample size/Res	Study design	Challenge assessed
Desalu ^[11]	68 hospitals (rural/urban)	Cross-sectional survey	Diagnostic
Ige ^[13]	24 patients (urban)	Case-control study	Diagnostic
Desalu ^[15]	119 patients (urban)	Cross-sectional audit	Diagnostic
Desalu ^[12]	321 doctors (rural/urban)	Cross-sectional survey	Diagnostic
Onyedum ^[14]	52 patients (rural/urban)	Cross-sectional audit	Diagnostic
Adeyeye ^[16]	849 patients (urban)	Cross-sectional audit	Diagnostic
Adeyeye ^[17]	106 patients (urban)	Cross-sectional survey	Treatment
Onyedum ^[22]	140 patients (urban/rural)	Cross-sectional survey	Treatment
Fawibe ^[18]	320 doctors (urban/rural)	Cross-sectional survey	Treatment
Oni ^[7]	120 patients (urban)	Cross-sectional study	Treatment
Ayuk ^[19]	285 doctors (urban/rural)	Cross-sectional survey	Treatment
Fawibe ^[21]	149 doctors (urban)	Cross-sectional survey	Follow-up
Desalu ^[20]	124 patients (urban)	Cross-sectional survey	Follow-up

Res: Residence

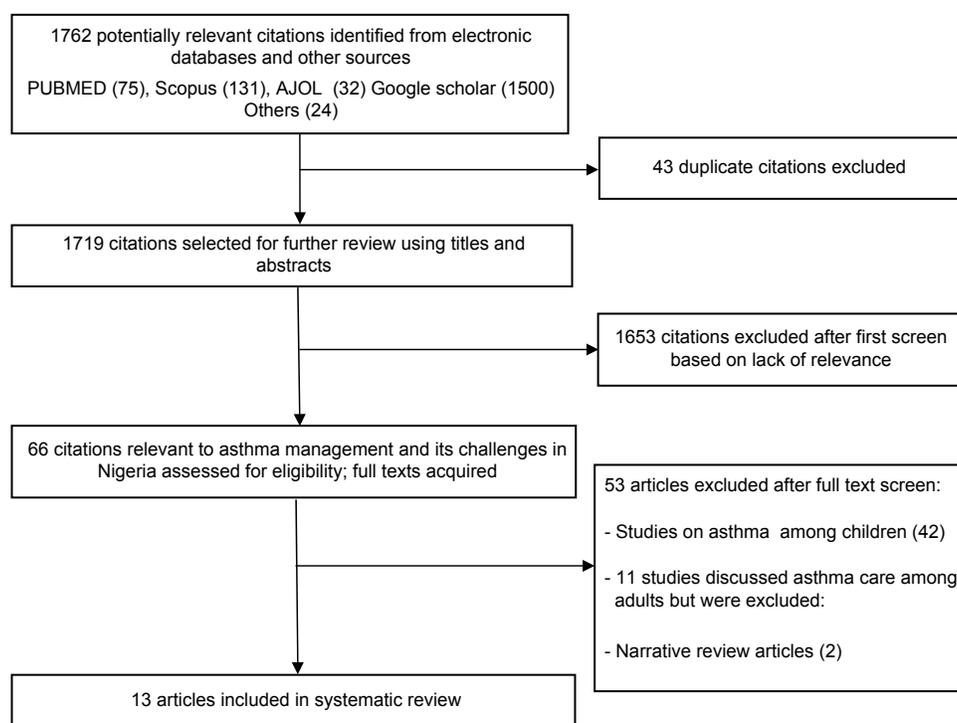


Figure 1: Flow chart for study selection

Challenges in treatment

Treatment challenges include a high-cost and unavailability of essential asthma medications.^[23-27] The unaffordability of inhaled corticosteroids as a potential barrier to treatment of asthma in developing countries has previously been documented.^[23,27] The Lack of essential devices like nebulisers, spacer devices that are used for effective medication administration constitute a strong challenge affecting correct management of asthma. Even when the devices are provided, poor technique of use of medication devices especially the inhalational drugs contribute to poor delivery of medications to the required site of action, poor asthma control, and the resultant increase in the health resource utilization.^[20,22,28,29]

The pressurized metered-dose inhaler (pMDI) is the most commonly used and the cheapest device, which may also be used in conjunction with a spacer device. The drug is dissolved or suspended in the propellant under pressure. When activated, a valve system releases a metered volume of drug and propellant. Other devices include breath-activated devices which incorporate a mechanism activated during inhalation that triggers the drugs. Dry powder inhalers, such as Turbohaler, Diskhaler, Diskus, Accuhaler, and Rotahaler, are activated by inspiration by the patient. The powdered drug is dispersed into particles by the inspiration. These devices require careful, repeated, and sustained education of patients by the health-care providers to enable the patients benefit maximally from their use. These educations are not generally given to the patients leading to poor use.^[17,22,28,29]

With nebulizers, oxygen, compressed air or ultrasonic power is used to break up solutions or suspensions of medication into droplets for inhalation. The aerosol is administered by mask or by a mouthpiece. Spacer devices are inhalation aids of varying dimension and complexity specifically designed to overcome problems with the use of pMDIs. Spacers minimize problems of poor inhalation technique with pMDI, reduce oropharyngeal deposition and increase lung deposition.^[28] They reduce the incidence of oropharyngeal candidiasis. Spacers improve the clinical effect of inhaled medications, especially in patients unable to use a pMDI properly.^[28] A pMDI plus spacer has proven to be viable lower cost alternative to the use of a nebulizer for delivering large bronchodilator doses in patients with severe acute asthma or chronic obstructive pulmonary disease. The use of large-volume spacers is recommended for delivering high doses of inhaled corticosteroids and may permit a lower maintenance dose to be used.

Lack of blood gas analysis machine including pulse oximeters, which are used for severity assessment poses challenges to asthma management.^[11] In some cases, oxygen delivery systems were unavailable as was found that standard oxygen delivery system was available in only 36 (52.9%) of Nigerian tertiary hospitals in one recent review.^[11] In the same review of tertiary hospitals in Nigeria, 36 (38.2%) had pulse oximeter, 28 (41.2%) had nebulisers while only 14 (20.6%) had spacer devices.^[11]

Lack of national/hospital protocol or guidelines also contribute to the challenges as less than 20% of the surveyed hospitals had a standard protocol for asthma management in that particular review of asthma management in tertiary hospitals in Nigeria.^[11] Furthermore, even when available these management protocols are poorly implemented.^[18,19]

Another challenge of asthma treatment is that the very newer asthma medications are of limited benefit, for a small percentage of patients, and often more expensive, e.g., leukotrienes antagonist, omalizumab (monoclonal IgE antibody), thermoplasty etc., thereby making it impossible for patients with poor resources to benefit from them.

Thus, treatment challenges highlighted could lead to under-treatment, unnecessary treatments and poor control. It will also lead to increased adverse drug reactions, increased morbidity and mortality, and poor quality of life.^[7,30] In a survey of asthma patients in Ife, 40% of respondents reported the presence of depressive symptoms, 48.1% of them reported low scores on the Mini-Asthma Quality of Life questionnaire.^[30] In another survey at South Region of Nigeria, patients with bronchial asthma reported a reduction in quality of life via: Impaired daily activities including sports (84%), job career (60%), physical activity (55%), social activity (54%), household chores (61%), disturbed sleep (53%), and daytime symptoms (51%).^[7]

Challenges with follow-up

There is often a communication gap between the health-care providers and the patients, Lack of patients self-monitoring equipment, and lack of educational materials. Follow-up challenges will lead to lost to follow-up, poor asthma control, increased frequency of asthma exacerbations and subsequent frequent emergency room visits.

A survey of level of asthma control among bronchial asthma patients attending follow-up in two tertiary hospitals in north-central and southwestern Nigeria showed that: 69.3% of them had uncontrolled asthma, 22.6% had partly controlled asthma, and only 8.1% had controlled asthma.^[20] Similarly, a survey of general practitioners (GP) in three states in north-central Nigeria demonstrated that overall, only 48.3% of the GPs reported that their asthma patients usually come for scheduled follow-up visits. About 40-64% of the GPs in the states reported that their bronchial asthma patients came for scheduled visits in the month prior to the study [Figure 2].^[21]

General challenges

There is often lack of will by the government/hospital administrative staff in the provision of basic infrastructure such as asthma clinics, asthma clinic registers, appointment and recall systems in the clinics, and attendance of asthma care training courses by doctors and nurses.^[11] Furthermore, there are very few trained public health nurses-who usually play a major role in ensuring quality care in asthma programs by periodically identifying staff needs and developing strategies to address asthma management challenges.

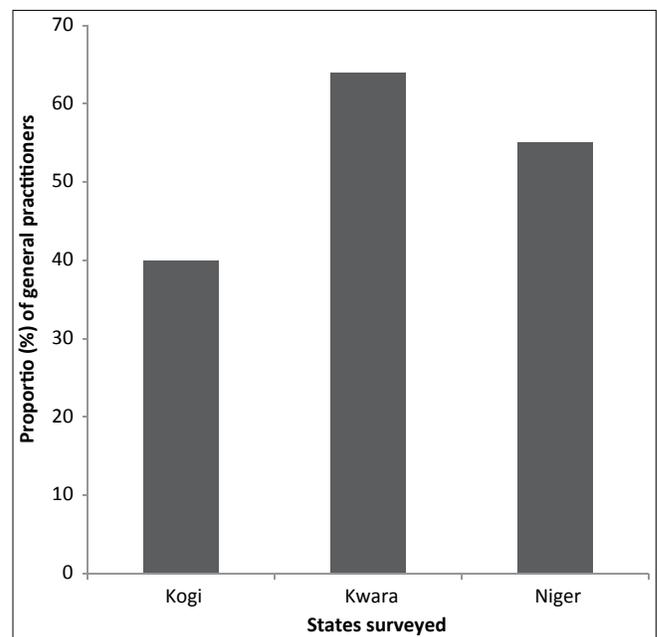


Figure 2: Proportions of general practitioners who reported that their patients attended a scheduled follow-up visit

There is poor medication purchase regulations as people are able to buy medications to wrongly treat asthma or even to trigger attacks. Purchase of over the counter medications such as NSAIDs and beta blockers are known to trigger attacks of asthma.^[1,31]

Other general challenges include; failure to understand the reason for increasing prevalence of asthma despite all efforts at the management, failure to develop a meaningful primary preventive strategy and high-cost of transport to a health facility. In addition, we need proper enclosure of industrial processes and adequate ventilation with a view to curtailing the influence of general atmospheric pollution as a trigger for asthmatic attacks.

Conflicting reports from physicians and patients about levels of symptom and side-effects, awareness, and adherence to physician-recommended treatment regimens, point to poor communication as a significant barrier to better asthma control.^[32] Often these lead to differences between the goals of professionals and the goals of the patient.^[32]

Assumptions that physicians make about how much their patients understand asthma symptoms and side-effects frequently lead to patient confusion about their tolerability and success with treatment; consequently, patients often compromise their respiratory health by making their own therapeutic decisions resulting in poor adherence to treatments. Results from the Asthma Insights and Reality study have shown that many patients often settle for a quality of life considerably less than that achievable if recommended management practices and asthma treatments are used.^[33] Improving patients' and physicians' expectations of what can be achieved with asthma therapy may lead to improved overall asthma control.

Conclusion

Several challenges affect asthma management in a developing country like Nigeria, which borders on poverty, inadequate resources, weak health systems, and poor infrastructure. Efforts should be made to address these challenges by the Nigerian government through the provision asthma diagnostic facilities at all levels of care, training of health-care workers, coverage of asthma care in the National Health Insurance Scheme in order to ensure affordability of asthma care.

Furthermore, the Nigerian Thoracic Society (NTS) could help in addressing these challenges by increasing advocacy to the government as well as education of the populace to ensure the availability of the facilities and services. They could also help to create awareness in Nigeria that asthma care services are available where patients can receive appropriate care. The NTS could also play a role in the training of health workers and the development of national guidelines in order to ensure standardized asthma care is given throughout the country.

In addition, pharmaceutical companies could help address these challenges by partnering with government to reduce/subsidize the price of asthma medications as this will in the long run ensure good asthma control as asthma patients will not lose control due to inability to purchase asthma drugs. Furthermore, there is a need to commence training and re-training of health care providers through sustained continuing professional development CPD/CME activities on current management of asthma. This should form part of the annual CPD courses organized by the Nigerian Medical Association and competence determined by passing a prescribed assessment at the end of the CPD activity should be the pre-requisite for renewal of annual practicing licenses.

For the patients, health workers need to approach their management with the understanding that patients will have to live with their illness and still perform their daily activities-so they themselves need to be expert managers of asthma. Therefore, continuing education of patients and their relatives, formation of treatment support groups and opportunities for out-of-hours clinics interactions and telephone reviews will ensure they aim for prevention of asthma exacerbations as cure. We believe that the implementation of these suggestions will help in addressing these challenges and accelerate the achievement of total asthma control in Nigeria.

References

1. Frew AJ, Holgate ST. Respiratory disease. In: Kumar P, Clarke M, editors. *Clinical Medicine*. 7th ed. Spain: Saunders Elsevier Limited; 2009.
2. National Asthma Education and Prevention Program, Third Expert Panel on the Diagnosis and Management of Asthma. Bethesda (MD): National Heart, Lung, and Blood Institute (USA); 2007 Aug. Available at: <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf> [Last accessed 2013 Aug 16].
3. Masoli M, Fabian D, Holt S, Beasley R, Global Initiative for Asthma (GINA) Program. The global burden of asthma: Executive summary of the GINA Dissemination Committee report. *Allergy* 2004;59:469-78.
4. Ibe CC, Ele UP. Prevalence of bronchial asthma among adolescents in Anambra State, Nigeria. *Nig J Int Med* 2002;5:23-6.
5. Erhabor GE, Agbroko SO, Bamigboye P, Awopeju OF. Prevalence of asthma symptoms among university students 15 to 35 years of age in Obafemi Awolowo University, Ile-Ife, Osun State. *J Asthma* 2006;43:161-4.
6. Desalu OO, Oluboyo PO, Salami AK. The prevalence of bronchial asthma among adults in Ilorin, Nigeria. *Afr J Med Med Sci* 2009;38:149-54.
7. Oni AO, Erhabor GE, Egbagbe EE. The prevalence, management and burden of asthma-a Nigerian study. *Iran J Allergy Asthma Immunol* 2010;9:35-41.
8. Saleh JA. Combination therapy in asthma: A review. *Niger J Med* 2008;17:238-43.
9. Partridge MR. Asthma: 1987-2007. What have we achieved and what are the persisting challenges? *Prim Care Respir J* 2007;16:145-8.

10. O'Byrne PM. Global guidelines for asthma management: Summary of the current status and future challenges. *Pol Arch Med Wewn* 2010;120:511-7.
11. Desalu OO, Onyedum CC, Iseh KR, Salawu FK, Salami AK. Asthma in Nigeria: Are the facilities and resources available to support internationally endorsed standards of care? *Health Policy* 2011;99:250-4.
12. Desalu OO, Busari OA, Onyedum CC, Salawu FK, Obateru OA, Nwogu KC, *et al.* Evaluation of current knowledge, awareness and practice of spirometry among hospital -based Nigerian doctors. *BMC Pulm Med* 2009;9:50.
13. Ige OM, Falade AG, Arinola OG. Atopy is a risk factor for adult asthma in urban community of Southwestern Nigeria. *Lung India* 2012;29:114-9.
14. Onyedum CC, Chukwuka CJ. Indications for spirometry at a tertiary hospital in south east, Nigeria. *Niger J Clin Pract* 2009;12:229-31.
15. Desalu OO, Salami AK, Fawibe AE, Oluboyo PO. An audit of spirometry at the University of Ilorin Teaching Hospital, Ilorin, Nigeria (2002-2009). *Ann Afr Med* 2010;9:147-51.
16. Adeyeye OO, Bamisile RT, Brodie-Mends AT, Adekoya AO, Bolarinwa FF, Onadeko BO, *et al.* Five-year audit of spirometry at the LASUTH, Ikeja, south-west Nigeria. *Afr J Respir Med* 2012;8:15-7.
17. Adeyeye OO, Onadeko BO. Understanding medication and use of drug delivery device by asthmatic in Lagos. *West Afr J Med* 2008;27:155-9.
18. Fawibe AE, Onyedum CC, Sogaolu OM, Ajayi AO, Fasae AJ. Drug prescription pattern for asthma among nigerian doctors in general practice: A cross-sectional survey. *Ann Thorac Med* 2012;7:78-83.
19. Ayuk A, Iloh K, Obumneme-anyim I, Ilechukwu G, Oguonu T. Practice of asthma management among doctors in south-east Nigeria. *Afr J Respir Med* 2010;6:14-7.
20. Desalu OO, Fawibe AE, Salami AK. Assessment of the level of asthma control among adult patients in two tertiary care centers in Nigeria. *J Asthma* 2012;49:765-72.
21. Fawibe AE, Joseph KJ, Olaosebikan OF, Salami AK, Oluboyo PO, Desalu OO. General practitioner reported follow-up visits among asthma patients in North Central Nigeria. *Ann Afr Med* 2011;10:209-13.
22. Onyedum CC, Desalu OO, Nwosu NI, Chukwuka CJ, Ezeudo C, Ukwaja KN. Evaluation of inhaler techniques among Asthma patients seen in Nigeria. *Book of Abstracts: The Nigerian Thoracic Society Annual General Meeting and Scientific Conference. Ilorin, Nigeria: 2012.*
23. Bahadori K, Doyle-Waters MM, Marra C, Lynd L, Alasaly K, Swiston J, *et al.* Economic burden of asthma: A systematic review. *BMC Pulm Med* 2009;9:24.
24. Chuesakoolvanich K. Cost of hospitalizing asthma patients in a regional hospital in Thailand. *Respirology* 2007;12:433-8.
25. Chan PW, Hussain S, Ghani NH, Debruyne JA, Liam CK. The direct cost of treating bronchial asthma in a teaching hospital in Malaysia. *Southeast Asian J Trop Med Public Health* 2002;33:600-3.
26. Celik GE, Bavbek S, Paşaoğlu G, Mungan D, Abadoğlu O, Harmanci E, *et al.* Direct medical cost of asthma in Ankara, Turkey. *Respiration* 2004;71:587-93.
27. Ait-Khaled N, Auregan G, Bencharif N, Camara LM, Dagli E, Djankine K, *et al.* Affordability of inhaled corticosteroids as a potential barrier to treatment of asthma in some developing countries. *Int J Tuberc Lung Dis* 2000;4:268-71.
28. Brocklebank D, Ram F, Wright J, Barry P, Cates C, Davies L, *et al.* Comparison of the effectiveness of inhaler devices in asthma and chronic obstructive airways disease: A systematic review of the literature. *Health Technol Assess* 2001;5:1-149.
29. Inhaler Error Steering Committee, Price D, Bosnic-Anticevich S, Briggs A, Chrystyn H, Rand C, *et al.* Inhaler competence in asthma: Common errors, barriers to use and recommended solutions. *Respir Med* 2013;107:37-46.
30. Kolawole MS, Olayemi AF, Erhabor GE, Abiodun AO, Obaseki DO, Bamidele AO. Health related quality of life and psychological variables among a sample of asthmatics in Ile-Ife South-Western Nigeria. *Libyan J Med* 2011;6:5846. Available at: http://www.libyanjournalofmedicine.net/index.php/ljm/article/view/5846/html_165.
31. Coates JR, Steven ID, Beilby J, Coffey G, Litt JC, Wagner C. Knowledge of and reported asthma management among South Australian general practitioners. *Br J Gen Pract* 1994;44:123-6.
32. Baena Cagnani C, Blaiss MS, Canonica GW *et al.* Global Asthma Physician and Patient Survey (GAPP): Treatment Limitations UK Findings, poster presented at the British Thoracic Society. Available from: <http://www.gappsurvey.org/healthcare-bts-abstract-uk.html>. [Accessed 2005 Dec 7-9].
33. Rabe KF, Vermeire PA, Soriano JB, Maier WC. Clinical management of asthma in 1999: The Asthma Insights and Reality in Europe (AIRE) study. *Eur Respir J* 2000;16:802-7.

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