

## Original Article

# A Survey of Asthma Management Practices and Implementation of Global Initiative for Asthma Guidelines among Doctors in a Resource-limited Setting in Nigeria

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### ABSTRACT

**Background:** Bronchial asthma is a global health problem that causes significant morbidity and mortality in all age groups. Global Initiative for Asthma (GINA) seeks to standardize the care asthma patients receive. We assessed the knowledge, attitude, and practices of doctors in Umuahia, Southeast Nigeria, regarding asthma and determined the extent to which they abide by GINA guidelines in their management of asthma. **Methodology:** It was a descriptive cross-sectional study. A pretested self-administered questionnaire was used to obtain information from the participants regarding knowledge of asthma prevalence, asthma risk factors, and management practices. **Results:** Out of 142 questionnaires administered, 117 were retrieved giving a response rate of 82%. About 70% were men, and the most common age group was 30–39 years (57.3%). The median duration of medical practice was 6 (3–12) years. About 77% reported asthma prevalence to be on the increase. While 105 (89.7%) respondents had seen a spirometer, only 28 (23.9%) use spirometry in asthma diagnosis. Similarly, 95 (81.2%) had seen a peak flow meter, but only 41 (35.5%) use it in asthma diagnosis. Only 7 (6.0%) respondents reported that their patients keep a peak flow diary. Of 117 respondents, 94 (80.3%) know about GINA guidelines for asthma control, 45 (38.5%) apply GINA guidelines in patient care, 86 (73.5%) regularly review patient inhaler technique, 33 (28.2%) use adult asthma control test while 17 (14.5%) regularly review asthma action plan with patients. **Conclusion:** There is a wide gap between GINA guidelines and the knowledge, attitude, and practices of doctors in Umuahia regarding asthma management. Improvement and standardization of asthma care are recommended.

**KEYWORDS:** Asthma, attitude, doctors, Global Initiative for Asthma, knowledge, practices, Umuahia

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## INTRODUCTION

Asthma is a global health problem that affects about 300 million people and causes more than 250,000 deaths annually.<sup>[1]</sup> It affects children and adults of all ages, and its prevalence is increasing.<sup>[1]</sup> It is becoming a major health issue in many developing countries due to increasing air pollution, fast modernization, widespread construction work, westernized diet, improved living standards, and more dust mites.<sup>[2]</sup>

In recent years, there has been a remarkable improvement in the management of asthma due to the development

and increasing adherence to guidelines such as the Global Initiative for Asthma (GINA) guidelines<sup>[1]</sup> and national guidelines for asthma management, especially in developed countries.<sup>[3]</sup> Rovithis *et al.*<sup>[4]</sup> in Greece, and Lagerløv *et al.*<sup>[5]</sup> in a study involving five European countries, showed that many doctors have accepted the recommendations given in asthma guidelines, although

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the level of implementation by the doctors was variable. In developing countries, the knowledge, attitude, and practices of doctors regarding asthma have evolved over the years in synchrony with improved understanding of the inflammatory pathophysiological basis of the disease.

At the moment, Nigeria has no local guideline for asthma management. However, there are growing efforts to improve asthma management through use of international guidelines such as GINA. This study assessed the knowledge, attitude, and practices of doctors in Umuahia, Southeast Nigeria, regarding asthma and determined the extent to which they abide by GINA guidelines in their management of asthma.

## METHODOLOGY

### Study design, setting, and population

This was a descriptive cross-sectional survey conducted among doctors practicing in Umuahia, Southeast Nigeria. The participants included house officers and medical officers in public hospitals, resident doctors, and consultants in the Departments of Family Medicine and Internal Medicine of Federal Medical Centre, Umuahia. There is a total of about 485 doctors registered with Nigerian Medical Association Umuahia zone comprising 68 consultants, 240 resident doctors, 35 medical officers, 56 private practitioners, and 90 house officers.<sup>[6]</sup> Umuahia is the capital of Abia State. The geographical coordinates are 5° 32' 0" North, 7° 29' 0" East.<sup>[7]</sup>

### Ethical considerations

Ethical clearance was obtained from the Ethics Committee of Federal Medical Centre, Umuahia. Written informed consent was obtained from each respondent. The information obtained from the respondents was treated with utmost confidentiality.

### Data collection

A self-administered pretested questionnaire developed by the researchers was used to obtain information from the participants. The pretest involved twenty doctors, and necessary corrections were made before actual commencement of data collection. Those who participated in the pretest were excluded from the actual study.

The participants were contacted at their workplace and printed questionnaires given to them. The questionnaires were collected back after 48–72 h. A total of 142 questionnaires were distributed. The items in the questionnaire included gender, age, professional designation, duration of practice, trends in prevalence of asthma in the last 30 years, risk factors for developing asthma, roles of genetic loci and vitamins, role of inflammatory cells such as neutrophils, eosinophils,

and mast cells, use of spirometry and peak flow meters in making diagnosis of asthma, use of peak flow diary, knowledge about GINA guidelines, frequency of review of patients' inhaler technique, and use of adult asthma control test (ACT) and asthma action plan [Appendix 1].

### Data analysis

This was done using EpiInfo version 3.5.3 (CDC, Atlanta, GA, USA). The mean  $\pm$  standard deviation was used to describe numerical variables that were normally distributed. Nonnormally distributed numerical data were described using median (interquartile range). Percentages were calculated for categorical variables, and Chi-square test was used to determine the significance of observed differences.  $P < 0.05$  was considered statistically significant.

## RESULTS

### Sociodemographic characteristics

Out of 142 questionnaires that were administered, a total of 117 were retrieved giving a response rate of 82%. The sociodemographic characteristics of the participants are presented in Table 1. Of the 117 participants, males comprised 83 (70.9%) and females 34 (29.1%). Most (57.3%) of the respondents were aged from 30 to 39 years. Resident doctors (54.7%) comprised most of the participants. The median duration of medical practice was 6.0 (3.00–12.00) years.

### Knowledge of asthma and risk factors

Table 1 also shows information on the knowledge of Asthma and risk factors. Concerning perception of the prevalence of asthma in the last 30 years, the majority (76.9%) of the doctors reported asthma prevalence to be on the increase, (11.1%) said it had decreased while (12%) were of the opinion that asthma prevalence had remained unchanged.

Regarding risk factors for asthma, the variables that were more frequently identified were atopy (97.4%), genetics (96.6%), air pollution (93.3%), occupation (89.7%), urbanization (89.7%), and smoking (82.1%) while low birth weight (60.7%), diet (59.8%), and vitamins (56.4%) were less frequently identified. Mast cells (94.0%) and eosinophils (88.9%) were identified by an overwhelming majority as the cells involved in the cellular mechanism of asthma.

### Attitude and practices of the respondents regarding asthma management

Attitude and practices of the respondents regarding asthma management are summarized in Table 2. One hundred and five (89.7%) participants reported that they had seen a spirometer, but only 12 (23.9%) affirmed use of spirometry in asthma diagnosis. Similarly, 95 (81.2%)

**Table 1: Sociodemographic characteristics and knowledge of asthma among the respondents (n=117)**

Sociodemographics	n (%)
Sex	
Female	34 (29.1)
Male	83 (70.9)
Age (years)	
20-29	25 (21.4)
30-39	67 (57.3)
40-49	20 (17.1)
50-59	5 (4.3)
Professional designation	
House officers	18 (15.4)
Medical officers	24 (20.5)
Residents	64 (54.7)
Consultants	11 (9.4)
Duration of medical practice (years), median (IQR)	6.0 (3.0-12.0)
Knowledge of asthma	
Asthma prevalence in the last 30 years	
Decreased	13 (11.1)
Increased	90 (76.9)
Same	14 (12.0)
Risk factors for asthma	
Atopy	114 (97.4)
Genetics	113 (96.6)
Smoking	96 (82.1)
RTI	84 (71.8)
Diet	70 (59.8)
Air pollution	109 (93.2)
Low birth weight	71 (60.7)
Occupation	105 (89.7)
Urbanization	105 (89.7)
Vitamins	66 (56.4)
Cellular mechanisms of asthma	
Neutrophils	26 (22.2)
Eosinophils	104 (88.9)
Mast cells	110 (94.0)

IQR=Interquartile range; RTI=Respiratory tract infection

doctors had seen a peak flow meter, but only 41 (35.5%) reported use of peak flow meter in asthma diagnosis.

When the respondents were asked if their asthma patients keep a peak flow diary, only 7 (6.0%) gave an affirmative response. The reported reasons for the low usage of peak flow diary were as follows: the patients have not been told about it (92.7%), lack of personal peak flow meters (98.2%), and doctors do not know about it (59.1%).

About 80.3% of the respondents know about GINA guidelines for asthma control, 38.5% of the respondents said they apply GINA guidelines in the care of their patients, 86 (73.5%) regularly review patients inhaler technique, 33 (28.2%) make use of adult ACT while 17 (14.5%) of the respondents regularly review asthma action plan with their patients. Two-thirds of

**Table 2: Attitude and practices of the respondents regarding asthma management**

	Yes	No
Have you seen a spirometer?	105 (89.7)	12 (10.3)
Do you use spirometry in asthma diagnosis?	28 (23.9)	89 (76.1)
Have seen a peak flow meter?	95 (81.2)	22 (18.8)
Do you use peak flow in asthma diagnosis?	41 (35.0)	76 (65.0)
Do your asthma patients keep a peak flow diary?	7 (6.0)	110 (94.0)
Why patients don't keep diary		
They have not been told about it	102 (92.7)	8 (7.3)
Lack of personal peak flow meters	108 (98.2)	2 (1.8)
Doctors don't know about it	65 (59.1)	45 (40.9)
Do you know about GINA guidelines for asthma control	94 (80.3)	23 (19.7)
Do you apply GINA guidelines in the care of your patients?	45 (38.5)	72 (61.5)
Do you regularly review patient's inhaler use technique?	86 (73.5)	31 (26.5)
Do you use adult asthma control test	33 (28.2)	84 (71.8)
Do you regularly review asthma action plan with patients?	17 (14.5)	100 (85.5)
Preferred Initial route of maintenance steroid therapy		
Inhaled	38 (32.5)	-
Oral	78 (66.7)	-
Intravenous	1 (0.009)	-

GINA=Global Initiative for Asthma

participants (66.7%) reported oral route as the preferred route of initial routine steroid administration in asthma patients.

### Impact of duration of medical practice on asthma management practices

When we compared doctors who had practiced for <6 years and those who had practiced for ≥6 years, the later were significantly more likely to use adult ACT (37.9% vs. 19.3%,  $P = 0.03$ ), asthma action plan (30.0% vs. 14.0%,  $P = 0.04$ ), and regular review of asthma action plan (23.3% vs. 5.3%,  $P = 0.006$ ). There were no statistically significant differences between the two groups in the other parameters assessed.

## DISCUSSION

In this study, we assessed the knowledge, attitude, and practices of doctors in a Nigerian city regarding asthma and determined the extent to which they abide by GINA guidelines in their management of asthma. About three-quarters of the respondents reported asthma prevalence to be on the increase. At least, 90% were knowledgeable of the various traditional risk factors for asthma. The use of spirometer and peak flow meter in asthma diagnosis was poor. Only 38.5% of doctors applied GINA guidelines in care of asthma patients.

Asthma prevalence has increased worldwide in the last 30 years and it is expected to steadily rise, especially in poorer countries largely due to lifestyle changes and urbanization in Africa.<sup>[1]</sup> We found that only about three-quarters of the participants responded that asthma prevalence had increased in recent times. The remaining one-quarter thought it had either reduced or remained the same. This suggests that the perception of a reasonable proportion of the doctors regarding asthma prevalence is not in line with contemporary epidemiology of the disease. It could also be that in their practice in recent times, the number of patients seen has declined due to asthma patients patronizing patent medicine dealers or alternative medicine providers. In 2002, Ibes and Ele found an asthma prevalence of 14.2% among Nigerian adolescents<sup>[8]</sup> and in 2006, Erhabor *et al.* found a prevalence of 14.1% among Nigerian undergraduates.<sup>[9]</sup> The global prevalence of doctor-diagnosed asthma in adults was estimated to be 4.3% in 2012; this ranged from 0.2% in China to 21.0% in Australia.<sup>[10]</sup> In a systematic review of asthma prevalence in Africa involving studies largely from Nigeria and South Africa, Adeloje *et al.* showed an increase in the prevalence of asthma in Africa. They estimated a prevalence of 11.7% for asthma, totaling over 74 million people in 1990, and a prevalence of 12.8%, about 120 million people in 2010.<sup>[11]</sup>

An overwhelming majority of the respondents knew about the traditional risk factors of asthma, especially atopy, genetics, occupation, and urbanization. However, their knowledge of the newly recognized risk factors of asthma such as diet, vitamins, and low birth weight was not impressive. It has been recently suggested that eating lots of fruits and vegetables which are rich sources of antioxidants such as beta carotene and Vitamins C and E significantly reduce oxidant stress, minimize the development of asthmatic symptoms and should prove to be an effective new approach to asthma management in addition to current pharmacological strategies.<sup>[12]</sup> The role of nutrition in bronchial asthma is related to antioxidant Vitamins A, C, and E. By counteracting oxidants and reducing external attacks (bacteria, virus, toxins, xenobiotics) in the lung, antioxidant vitamins modulate the development of asthma and the impairment of pulmonary function. Dietary studies suggest a positive relationship between oxidative stress, bronchial inflammation, development of asthmatic symptoms, and reduction of cellular functions.<sup>[13]</sup> Dietary interventions may therefore reduce oxidant stress and prevent or minimize asthmatic symptoms.<sup>[13]</sup> Studies have shown that low birth weight infants may have increased risk of developing asthma symptoms in childhood and

adolescence.<sup>[14]</sup> The excess risk of asthma may be the outcome of acute lower respiratory tract infections in infancy including bronchitis, bronchiolitis, and pneumonia which are known to be more common among low birth weight children.<sup>[15]</sup>

The responses showed that the participants were quite knowledgeable of the well-established roles of eosinophils and mast cells in the pathogenesis of asthma. The same could not be said of the perceived role of neutrophils which was acknowledged by only one-fifth of the respondents. The role of neutrophils was once thought to be restricted to phagocytosis and release of enzymes and other cytotoxic agents, but it is now known that these cells can release diverse mediators that have profound effects on the airways of asthmatic individuals during both early and late asthmatic responses.<sup>[16]</sup> The mediators among others include myeloperoxidases, reactive oxygen species, leukotriene B<sub>4</sub>, platelet activating factor, metalloproteinases, and elastases.<sup>[16]</sup> There is increasing evidence of the participation of neutrophils in allergic processes in general, and in asthma, in particular.<sup>[16]</sup> Neutrophils have also been associated with a phenotype of asthma that is difficult to treat.<sup>[16]</sup>

Although a large proportion of the respondents had seen spirometers and peak flow meters, only few (23.9% and 35.0%, respectively) apply them in making diagnosis of asthma. These findings are in keeping with the findings of the study by Desalu *et al.* which revealed that only 38% and 29.4% of the tertiary hospitals had peak flow meters and spirometers, respectively.<sup>[17]</sup> Worse still, only 6% of the doctors reported that their asthmatic patients keep a peak flow diary. Lack of personal peak flow meters, unavailability and high cost of peak flow meters and failure of doctors to inform the patients about peak flow diary were perceived to be the main reasons why peak flow diaries were not kept by patients. However, the GINA guidelines recommend that the diagnosis of asthma is made in the setting of typical symptoms of chest tightness, wheeze, cough, and breathlessness. These symptoms vary in time and intensity, occur at night or worse at night or on waking, triggered by exercise, laughter, allergen or cold air, and symptoms occur with or worsen with viral infections. Diagnosis also requires the evidence of variable expiratory airflow limitation such as low forced expiratory volume in 1 s FEV<sub>1</sub>/forced vital capacity at some point in the diagnostic process, FEV<sub>1</sub> increases by more than 12% or 200 ml from baseline after inhaling a bronchodilator, Peak expiratory flow (PEF) diurnal variation more than 10% and FEV<sub>1</sub> increases by more than 12%, or 200 ml from baseline after 4 weeks of anti-inflammatory treatment.<sup>[18]</sup> More so, the GINA guidelines recommend that the diagnosis of

bronchial asthma should be made before commencement of controller treatment because it is more difficult afterward.<sup>[18]</sup>

We found that as high as four-fifth of the respondents know about GINA guidelines but only two-fifth of them affirmed that they apply GINA guidelines in the care of their asthma patients. GINA was established to enhance awareness about asthma among health professionals, public health authorities, and the community and to improve prevention and management through a coordinated worldwide effort. It prepares scientific reports on asthma, encourages dissemination and implementation of recommendations, and promotes international collaboration on asthma research.<sup>[18]</sup> About 73.5% of the respondents said they regularly review patient's inhaler use technique. The observation that one quarter of asthma patients do not receive a regular review of their inhaler use technique should be considered worrisome bearing in mind the GINA finding that up to 80% of the patients do not use their inhalers correctly, and this contributes to poor symptom control and frequent exacerbations.<sup>[18]</sup> The GINA guidelines recommend that practitioners should choose the most appropriate devices for patients putting into consideration patient's skills, comorbidities and cost; check inhaler technique at every opportunity and correct poor techniques using physical demonstrations.<sup>[18]</sup>

We observed that only a minority (28.2%) of the respondents make use of adult ACT in the care of their patients. This is considered poor because the ACT has been recommended by GINA for use by health-care providers and patients to improve asthma management.<sup>[16]</sup> It is a patient-based tool for identifying patients with poorly-controlled asthma who may therefore benefit from early intervention. The ACT has been developed for asthma patients aged  $\geq 12$  years and is found to compare well with asthma specialists' global assessment of asthma control.<sup>[19]</sup> It provides greater predictive values in determining asthma control than percent FEV1 values.<sup>[20]</sup>

A very low proportion of respondents reported that they regularly review asthma action plan with their patients. GINA guidelines recommend that all asthma patients should be provided with a written asthma action plan appropriate for their level of asthma control and health literacy so that they know how to recognize and respond to worsening asthma. The plan can be based on symptoms and/or PEF. The action plan includes the patient's usual medications, when and how to increase medications and start oral corticosteroids, and how to access medical care if symptoms fail to respond.<sup>[18]</sup>

Only one-third of the respondents prescribe inhaled corticosteroids (ICS) as initial route of administration for asthma patients requiring maintenance steroid therapy.

Nearly, all the other doctors would prescribe oral steroids initially. A multicenter study by Desalu *et al.* revealed that 81.9% of the participating physicians agreed that ICS should be the drug of choice for asthma patients requiring maintenance steroids. However, with regard to knowledge of the first-line treatment of persistent asthma, all participating pulmonologists were aware of this line of treatment while, 46.2% of internists and 56.0% of general practitioners (GPs)/family physicians (FPs) admitted their ignorance of the as first-line treatment for persistent asthma or symptoms. From this result, Desalu *et al.* inferred that ICS is not readily prescribed by FP/GPs and internists and most of the prescriptions were not in line with GINA guidelines.<sup>[21]</sup> It is a bit difficult to draw firm inferences about the practice of doctors in our study regarding the initial route of maintenance steroid therapy vis-a-viz the observations of Desalu *et al.* bearing in mind that there could have been some differences in the asthma clinical presentation of the patients managed by the two groups of respondents. For example, it is possible that the patients seen by doctors in our study comprised a higher proportion of individuals who experienced acute attacks, in which case oral steroids would be the drug of choice. It deserves to be highlighted that GINA recommends use of ICS initially for maintenance of asthma patients and oral steroids for those who remain uncontrolled or who are having exacerbations.<sup>[17]</sup>

When we assessed the possible impact of duration of medical practice on asthma knowledge, attitude, and practices, doctors who had practiced for up to 6 years or more were more likely to use adult ACT, give patients asthma action plan, and regularly review asthma action plan with patients. The reason for the statistically significant difference may be that the doctors who had practiced for a longer time possibly improved the care they render to their asthma patients following continuing medical education (CME) received as part of Medical and Dental Council of Nigeria prerequisite for annual practicing license registration which was introduced within the last few years. The usefulness of CME was evident in the study by Rovithis *et al.* which showed that nonspecialized physicians and the GPs had higher posttraining test scores than pretraining test scores.<sup>[4]</sup> It could also be that the respondents with more years of practice are likely to be those in residency training or are consultants and more probable to adopt international standards of care.

## CONCLUSION

This study has shown that doctors in Umuahia, Southeast Nigeria, have a fairly good knowledge of the rising trend in the prevalence of asthma and the traditional

risk factors of the disease. However, the practices of the majority of the doctors regarding asthma diagnosis and management fell short of the recommendations by GINA guidelines. This suggests that the care an average asthma patient receives in the locality would be below standard. Therefore, there is an urgent need to improve asthma management practices among Nigerian doctors. In the light of constraints in health-care delivery faced by resource-limited settings, the Nigerian Thoracic Society and other concerned professional bodies should take up the challenge of developing national guidelines for asthma management which can incorporate GINA guidelines or adapt it based on prevailing socioeconomic, infrastructural, and clinical challenges. Beyond this, efforts should be made to regularly update health-care providers on asthma care through various avenues such as CME programmes. Furthermore, periodic clinical audit of care given to asthma patients will help a developing country like Nigeria to achieve a level of service delivery in asthma care that is at par with international best practices.

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### Conflicts of interest

There are no conflicts of interest.

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## APPENDIX

### Appendix 1

A questionnaire on survey on management practices and implementation of Gina guidelines among doctors in a resource-limited setting in Nigeria

#### Demographics

1. Sex: Male ( ) Female ( )
2. Age (years): 20–29 ( ) 30–39 ( ) 41–50 ( ) 51–60 ( ) 61–70 ( )
3. Professional designation: HO ( ) MO ( ) SMO ( ) PMO ( ) CMO ( ) Reg ( )  
Snr Reg ( ) Consultant ( )
4. Duration of practice as a doctor (years).....
5. Nature of current place of practice: Public ( ) Private ( ) Mission ( ) NGO ( )
6. Level of healthcare delivery: Primary ( ) Secondary ( ) Tertiary ( )

#### Epidemiology/risk factors

7. The incidence and prevalence of asthma in the last 30 years have: Remained same ( ) Increased ( )  
Decreased ( )
8. The following have been implicated as risk factors for developing asthma:
  - a. Atopy Yes ( ) No ( )
  - b. Genetics Yes ( ) No ( )
  - c. Smoking Yes ( ) No ( )
  - d. RTI Yes ( ) No ( )
  - e. Diet Yes ( ) No ( )
  - f. Air Pollution Yes ( ) No ( )
  - g. Birth weight Yes ( ) No ( )
  - h. Occupation Yes ( ) No ( )
  - i. Urbanization in Africa Yes ( ) No ( )
9. Have some genetic loci been implicated? Yes ( ) No ( )
10. Have vitamins been implicated in reducing risk for developing asthma? Yes ( ) No ( )
11. Which of these vitamins do you know?.....

#### Cell biology

12. The following inflammatory cells are involved in the pathogenesis of asthma
  - a. Neutrophils Yes ( ) No ( )
  - b. Eosinophils Yes ( ) No ( )
  - c. Mast cells Yes ( ) No ( )

#### Diagnosis of asthma

13. Have you ever seen a spirometer? Yes ( ) No ( )
14. Did you have any training in the use of a spirometer? Yes ( ) No ( )
15. Have you ever used spirometry in making a diagnosis of Bronchial Asthma? Yes ( ) No ( )
16. How did it help you? Reversibility ( ) Variability ( )

17. Have you ever seen a peak flow meter? Yes ( ) No ( )
18. Did you receive any training in the use of a Peak Flow meter? Yes ( ) No ( )
19. Has it ever assisted you in making a diagnosis of asthma? Yes ( ) No ( )
20. How did it help you? Reversibility ( ) Variability ( )

Control of asthma

21. Do you know about peak flow diary? Yes ( ) No ( )
22. Do your patients keep peak flow diary? Yes ( ) No ( )
23. What are the possible reasons why they don't?
- a. The patients have not been told about it Yes ( ) No ( )
  - b. They do not have personal peak flow meters Yes ( ) No ( )
  - c. The doctor does not know how to use it Yes ( ) No ( )
  - d. The doctor feels it is not important Yes ( ) No ( )
24. Do you know about GINA guidelines for asthma control? Yes ( ) No ( )
25. Do you routinely enquire about the following during each clinic visit?
- a. Nighttime awakenings due to asthma symptoms Yes ( ) No ( )
  - b. Daytime symptoms Yes ( ) No ( )
  - c. Limitations of activities Yes ( ) No ( )
  - d. Exacerbations Yes ( ) No ( )
  - e. Compliance with medications Yes ( ) No ( )
26. Do you frequently review your patients' inhaler technique? Yes ( ) No ( )
27. If yes, how frequently? Regularly ( ) Only after an exacerbation ( ) When patients make request ( )
28. Do you know about Adult Asthma Control Test? Yes ( ) No ( )
29. Do you know about Asthma Action Plan? Yes ( ) No ( )
30. Do you regularly and routinely review the action plan with your patients? Yes ( ) No ( )
31. Do you regularly prescribe steroids for your asthma patients? Yes ( ) No ( )
32. If yes, which route of administration do you routinely use? IV ( ) Oral ( ) Inhaled ( )
33. If no, the reason (s) may be any of the following:
- a. Steroids are not known to be effective Yes ( ) No ( )
  - b. Steroids have many and serious side effects Yes ( ) No ( )
  - c. The patients have phobia for steroids Yes ( ) No ( )

Thank you very much for your time.