Original Article

# Relationship between Knowledge and Quality of Asthma Care among Physicians in South-West Nigeria

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**Abstract**

**Introduction:** Adequate knowledge of asthma management and adherence to international guidelines are known to increase the quality of care offered by Physicians. We conducted this study to assess the level of asthma knowledge and quality of care among physicians practicing in Ondo State. **Methods:** We conducted a cross sectional survey of 96 physicians from various specialties participating in a continuous professional development (CPD) lecture using adapted questionnaires. **Result:** Respondents ranged in age from 23-62years (42.5±19.4). There were more male (70%). The minority (17%) had additional postgraduate medical qualifications. There was a high distribution of correct answers for individual knowledge questions. The greatest areas of knowledge gaps appeared in diagnostic instruments, asthma severity and drugs. We observed gaps regarding the use of GINA guidelines (6%) and prescribing combined inhaled steroid and long acting bronchodilator for patients who are not controlled on inhaled steroid alone (29%). A large number of the respondents do not confirm the diagnosis of asthma by spirometry (32%). Only 8% of the respondents with high knowledge reported a corresponding high quality of Asthma care. **Conclusion:** We concluded that although physicians in South-West Nigeria appear to have good knowledge, there are areas of gap in the quality of asthma care with regards to standard guideline. There is need for constant training and re-training of physicians in order to keep them up to date with international guidelines. In addition, increase access to diagnostic facilities and adapting international guideline to local realities will help improve standard of Asthma care.

**Keywords:** *Asthma, knowledge, practice*

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## Introduction

Bronchial asthma is one of the commonest chronic respiratory diseases worldwide.[1] It contributes significantly to morbidity and mortality of noncommunicable respiratory diseases. There is wide variation in the global prevalence of asthma; however, current estimates suggested that there are over 300 million persons with asthma in the world with an expected increase to 400 million by the year 2025.[2] In Africa, asthma cases were estimated at 34.1 million (12.1%), among children <15 years, 64.9 million (11.8%) among people aged <45 years, and 74.4 million (11.7%) in the total population.[3]

Adequate knowledge of diseases and adherence to international guidelines are known to increase the quality of care offered by physicians.[4] These not only impact positively on disease outcomes like good asthma control and better quality of life for the patients but also help to reduce the overall burden of disease and mortality.[5]

Like many developing countries, there is a dearth of respiratory physicians in Nigeria.[6] There are about 80 respiratory physicians [6] in Nigeria to cater for a

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population of 170 million people. As a result, most asthma cases are managed by general physicians.

Previous studies have documented suboptimal knowledge of asthma management and poor adherence to standard guidelines among physicians;[7-9] however, we are unaware of any study among physicians in Ondo State, South-West Nigeria that has evaluated knowledge of standard asthma management and predictors of high-quality care according to the generally acceptable standard of care published in the Global Initiative for Asthma (GINA) guideline.[10]

The reason for this study was to assess the level of asthma knowledge and quality of asthma care in comparison with standard care (GINA) among physicians in Ondo State, South-West Nigeria.

## Materials and Methods

We conducted a cross-sectional survey of 96 physicians from various specialties participating in a continuous professional development (CPD) lecture. From roughly 700 physicians in Ondo State, Nigeria, 110 physicians attended the CPD in March 2014 at the state capital and completed an adapted, self-administered questionnaire. A total of 96 physicians had complete data and were included in our analyses. It was a two-page questionnaire divided into three parts. The questionnaire was administered and filled before the CPD and averagely took 20 min for each participant to complete. We obtained verbal consent from the physicians and officials of the Nigerian Medical Association, Ondo State.

### Asthma knowledge

The knowledge questions were extracted from the summary of recommendations from the GINA and Canadian Asthma Consensus Guidelines, 2003 and questions asked in a study assessing the knowledge of bronchial asthma among primary health care physicians in Crete.[11,12] We evaluated total knowledge and knowledge subcategories (general knowledge (five questions), symptom history [(four questions), asthma triggers (10 questions), diagnostic testing (three questions), severity of attacks (three questions), drug management (10 questions)]. Each correct response was scored as 1, giving a total possible score of 35.We summarized in percentages, the number of correct responses for individual questions for the participants. Given that asthma is a common condition with which physicians are expected to be conversant, an overall score of 75% and above was set as the cut off for high knowledge.

### Asthma management

We used the previously validated Asthma Physician Practice Assessment Questionnaire,[13] which was developed by the Canadian Thoracic Society Respiratory Guidelines Committee. It consists of a 14-item list of questions with subcategories including diagnostic testing and assessment, treatment and follow-up. Each response was scored as 1 and in order to determine the level of care, a score of 80% and above was set as cut off for high-quality care.

### Data analysis

We recoded missing knowledge responses to "no" ($N$ = 6 general; $N$ = 1 triggers; and $N$ = 2 instrument). One person had no value for all knowledge categories except general and was categorized as missing. Data were analyzed with SPSS version 21.0. Descriptive statistics were carried out.

## Results

### General characteristics of the doctors

Respondents ranged in age from 23 to 62 years (42.5 ± 19.4). There were more males (70%) than females (30%) [Table 1]. Only 17% of the respondents had additional postgraduate medical qualifications. Nearly half (45%) had worked from 1 to 5 years in a hospital or health facility, more than half (79%) had seen asthma patients in the previous 12 months, and 52 (54.2%) had managed asthma patients on their clinic days at any time.(54%).

### Asthma knowledge and quality of care

In most of the individual asthma knowledge questions, over 80% of the respondents answered correctly [Table 2]. Fewer number of respondents recorded correct responses to questions on diagnostic instruments and asthma drugs. Only 61% of physicians knew chest radiograph should be used to exclude other diseases and only 41% of the respondents recognized adrenaline, 62% ipratropium bromide, and 52% cromolyn as appropriate therapy under GINA guideline-recognized instances.

The majority (85% and 71%) indicated they identified environmental triggers/inducers and schedule regular follow-up appointments for their asthma patients and two-third provided smoking cessation counselling to their patients [Table 3].

With respect to use of GINA guidelines in their clinical practice, only 6% reported that they follow GINA guideline.Only 29% reported prescribing a combined inhaled steroid and long-acting bronchodilator for their patients who are not controlled on inhaled steroid alone.

Only 32% of the respondents confirm the diagnosis of asthma by spirometry, while only 41% refer their patients with difficult to control asthma to a respiratory physician. Less than 50% assess their patients' inhaler technique regularly during clinic visits.

**Table 1: Characteristics of study population based on physicians participating in an asthma continuous professional development in South-West Nigeria 2014**

| | | *N* = 96 (%) |
|---|---|---|
| Age (years) | 20--29 | 32 |
| | 30--39 | 24 |
| | 40--49 | 18 |
| | 50--59 | 13 |
| | 60--69 | 6 |
| | Missing | 7 |
| Work experience (years) | 0--9 | 54 |
| | 10--19 | 14 |
| | 20--29 | 19 |
| | 30--39 | 14 |
| How long ago did you manage a patient with Asthma(Months) | 0--12 | 73 |
| | >12 | 14 |
| | Missing | 14 |
| Average number of patients seen each clinic day | 0--10 | 19 |
| | 11--50 | 53 |
| | >50 | 5 |
| | Missing | 23 |
| Number of Asthma cases seen on your clinic day | 0 | 16 |
| | 1--5 | 45 |
| | 6--10 | 2 |
| | 11--20 | 2 |
| | Missing | 35 |
| Sex | Male | 70 |
| | Female | 30 |
| Department | Internal medicine | 6 |
| | Family medicine | 22 |
| | Pediatrics | 17 |
| | Emergency | 11 |
| | Obstetrics and gynecologists | 6 |
| | Surgery | 7 |
| | Other | 15 |
| | Missing | 16 |
| Job description | Consultant/chief medical officers/principal medical officers | 26 |
| | Senior registrar/senior medical officers | 16 |
| | Junior registrar/medical officers | 17 |
| | National youth service corp doctor/house officer | 35 |
| | Missing | 6 |

**Table 2: Percent distribution of correct responses to asthma knowledge categories**

| Knowledge subgroups | Correct (%) |
|---|---|
| General knowledge | |
| Asthma is not a chronic inflammatory disorder of the airways | 81 |
| Symptoms of asthma occur or worsen at night, awakening the patient | 91 |
| Symptoms of asthma does not have a seasonal pattern | 94 |
| Family history is not relevant | 94 |
| Asthmatic chronically inflamed airways are usually hyperresponsive | 81 |
| History | |
| Cough (worse particularly at night ) | 94 |
| Recurrent wheeze | 99 |
| Recurrent difficulty with breathing | 96 |
| Recurrent chest tightness is possible | 99 |
| Triggers | |
| Animal fur | 100 |
| Aerosol | 89 |
| Changes in temperature | 87 |
| Domestic dust | 99 |
| Drugs | 85 |
| Exercise chemicals | 88 |
| Pollen | 97 |
| Respiratory (viral) infections | 96 |
| Smoke | 98 |
| Strong emotional expression | 87 |
| Diagnostic instruments | |
| Spirometer | 95 |
| Peak flow meter | 97 |
| Chest radiography | 61 |
| Severity | |
| Cyanosis | 94 |
| Fast pulse rate | 88 |
| Duration of attack | 82 |
| Drugs | |
| Oral prednisolone | 96 |
| Salbutamol | 98 |
| Adrenaline | 41 |
| Cromolyn | 52 |
| Antibiotics | 73 |
| Intravenous hydrocortisone | 95 |
| Intravenous aminophylline | 88 |
| Ipratropium bromide | 62 |
| Intranasal oxygen | 93 |

**N*=95 for all categories except general knowledge, which has 96 physicians

### *Asthma knowledge by physician categories*

The knowledge of asthma by physician categories has been compared in [Table 4].

A total of 55% and 69% of those who had total high knowledge scores were among those who are aged less than 40 years and had practiced less than 20 years respectively.

This same trend was also observed after the knowledge score was subdivided into specific categories of history, triggers,

**Table 3: Distribution of responses to "In your management of asthma patients, do you do the following"**

| "In your management of asthma patients do you do the following" | Yes (%) |
|---|---|
| Confirm diagnosis by pulmonary function tests (either spirometry and bronchodilator reversibility or bronchoprovocation | 32 |
| Provide written referral for asthma education | 24 |
| Provide a written action plan for exacerbation management | 38 |
| Assess inhaler technique (or refer to asthma educator) at each visit | 49 |
| Identify environmental triggers/inducers | 85 |
| Provide smoking cessation counselling and/or recommend cessation measure | 64 |
| Prescribe an inhaled corticosteroid as initial maintenance therapy | 42 |
| Prescribe an inhaled inhaled corticosteroid and a long-acting beta 2-agonist when asthma is not controlled by inhaled corticosteroid low dose alone | 29 |
| Check for treatment adherence at each visit | 56 |
| Use the Canadian Thoracic Society (CTS) control criteria or the Global Initiative for Asthma (GINA) guidelines to assess patient's asthma control | 6 |
| Address patients' concerns about disease/treatment | 54 |
| Refer to a specialist because asthma is difficult to control | 41 |
| Refer to a specialist if the asthma diagnosis is uncertain | 51 |
| Schedule regular follow-up appointments | 71 |

*$N = 96$ for all questions

**Table 4: Physician characteristics by Asthma knowledge categories (column)**

| Physician characteristics | Total knowledge | | History (symptoms) | | Triggers | | Diagnostic instruments | | Severity | | Drugs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| | $N = 12$ (%) | $N = 83$ (%) | $N = 2$ (%) | $N = 93$ (%) | $N = 10$ (%) | $N = 85$ (%) | $N = 4$ (%) | $N = 91$ (%) | $N = 29$ (%) | $N = 66$ (%) | $N = 54$ (%) | $N = 41$ (%) |
| Age (years) | | | | | | | | | | | | |
| 20--29 | 50 | 30 | 100 | 31 | 60 | 29 | 25 | 33 | 34 | 32 | 39 | 24 |
| 30--39 | 17 | 25 | 0 | 25 | 10 | 26 | 75 | 22 | 34 | 20 | 19 | 32 |
| 40--49 | 17 | 18 | 0 | 18 | 20 | 18 | 0 | 19 | 10 | 21 | 13 | 24 |
| 50--59 | 8 | 13 | 0 | 13 | 0 | 14 | 0 | 13 | 7 | 15 | 13 | 12 |
| 60--69 | 0 | 6 | 0 | 5 | 0 | 6 | 0 | 5 | 7 | 5 | 6 | 5 |
| Missing | 8 | 7 | 0 | 8 | 10 | 7 | 0 | 8 | 7 | 8 | 11 | 2 |
| Work experience (years) | | | | | | | | | | | | |
| 0--9 | 67 | 53 | 50 | 55 | 80 | 52 | 75 | 54 | 66 | 50 | 50 | 61 |
| 10--19 | 0 | 16 | 0 | 14 | 0 | 15 | 0 | 14 | 10 | 15 | 13 | 15 |
| 20--29 | 8 | 19 | 0 | 18 | 0 | 20 | 0 | 19 | 10 | 21 | 20 | 15 |
| 30--39 | 25 | 12 | 50 | 13 | 20 | 13 | 25 | 13 | 14 | 14 | 17 | 10 |
| How long ago did you manage a patient with asthma (months)? | | | | | | | | | | | | |
| 0--12 | 58 | 75 | 0 | 74 | 60 | 74 | 50 | 74 | 69 | 74 | 65 | 83 |
| >12 | 25 | 12 | 50 | 13 | 20 | 13 | 25 | 13 | 14 | 14 | 19 | 7 |
| Missing | 17 | 13 | 50 | 13 | 20 | 13 | 25 | 13 | 17 | 12 | 17 | 10 |
| Sex | | | | | | | | | | | | |
| Male | 67 | 70 | 100 | 69 | 60 | 71 | 75 | 69 | 62 | 73 | 63 | 78 |
| Female | 33 | 30 | 0 | 31 | 40 | 29 | 25 | 31 | 38 | 27 | 37 | 22 |
| Department | | | | | | | | | | | | |
| Internal medicine | 8 | 6 | 0 | 6 | 0 | 7 | 0 | 7 | 10 | 5 | 4 | 10 |
| Family medicine | 0 | 25 | 0 | 23 | 0 | 25 | 25 | 22 | 10 | 27 | 15 | 32 |
| Pediatrics | 25 | 16 | 50 | 16 | 40 | 14 | 25 | 16 | 31 | 11 | 17 | 17 |
| Emergency | 0 | 13 | 0 | 12 | 0 | 13 | 0 | 12 | 14 | 11 | 7 | 17 |

*Contd...*

**Table 4: Contd...**

| Physician characteristics | Total knowledge | | History (symptoms) | | Triggers | | Diagnostic instruments | | Severity | | Drugs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High | Low | High | Low | High |
| | *N* = 12 (%) | *N* = 83 (%) | *N* = 2 (%) | *N* = 93 (%) | *N* = 10 (%) | *N* = 85 (%) | *N* = 4 (%) | *N* = 91 (%) | *N* = 29 (%) | *N* = 66 (%) | *N* = 54 (%) | *N* = 41 (%) |
| Obstetrics and gynecology | 17 | 5 | 0 | 6 | 10 | 6 | 25 | 5 | 10 | 5 | 9 | 2 |
| Surgery | 8 | 7 | 0 | 8 | 0 | 8 | 25 | 7 | 3 | 9 | 7 | 7 |
| Other | 25 | 13 | 50 | 14 | 30 | 13 | 0 | 15 | 14 | 15 | 19 | 10 |
| Missing | 17 | 14 | 0 | 15 | 20 | 14 | 0 | 15 | 7 | 18 | 22 | 5 |

**Table 5: The association between physician characteristics and quality of asthma management**

| Physician characteristics | Asthma management quality | | | | | |
|---|---|---|---|---|---|---|
| | Overall | | Diagnostic and assessment | | Treatment and follow-up | |
| | Low | High | Low | High | Low | High |
| | N = 88 (92%) | N = 8 (8%) | N = 87 (91%) | N = 9 (9%) | N = 81 (84%) | N = 15 (16%) |
| | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) |
| **Age (years)** | | | | | | |
| 20--29 | 33 | 25 | 31 | 44 | 35 | 20 |
| 30--39 | 23 | 38 | 24 | 22 | 21 | 40 |
| 40--49 | 19 | 0 | 18 | 11 | 20 | 7 |
| 50--59 | 13 | 13 | 14 | 0 | 12 | 13 |
| 60--69 | 7 | 0 | 7 | 0 | 7 | 0 |
| Missing | 6 | 25 | 6 | 22 | 5 | 20 |
| **Work experience (years)** | | | | | | |
| 0--9 | 53 | 63 | 52 | 78 | 56 | 47 |
| 10--19 | 14 | 13 | 14 | 11 | 12 | 20 |
| 20--29 | 18 | 25 | 20 | 11 | 19 | 20 |
| 30--39 | 15 | 0 | 15 | 0 | 14 | 13 |
| **How long ago did you manage a patient with asthma (months)?** | | | | | | |
| 0--12 | 72 | 88 | 72 | 78 | 70 | 87 |
| >12 | 15 | 0 | 15 | 0 | 15 | 7 |
| Missing | 14 | 13 | 13 | 22 | 15 | 7 |
| Sex | | | | | | |
| Male | 70 | 63 | 69 | 78 | 72 | 60 |
| Female | 30 | 38 | 31 | 22 | 28 | 40 |
| **Department** | | | | | | |
| Internal medicine | 7 | 0 | 7 | 0 | 6 | 7 |
| Family medicine | 24 | 0 | 23 | 11 | 23 | 13 |
| Pediatrics | 18 | 0 | 16 | 22 | 19 | 7 |
| Emergency | 9 | 38 | 11 | 11 | 9 | 27 |
| Obstetrics and gynecology | 7 | 0 | 6 | 11 | 7 | 0 |
| Surgery | 7 | 13 | 7 | 11 | 7 | 7 |
| Others | 14 | 25 | 14 | 22 | 14 | 20 |
| Missing | 15 | 25 | 16 | 11 | 15 | 20 |

diagnosis, drugs, and severity. When asthma knowledge was compared with the specialties, more family physicians had high knowledge scores in all knowledge domains, that is total knowledge, symptoms, triggers, diagnostic instrument, severity, and drugs (25%, 23%, 25%, 22%, 27%, and 32% ), while those in obstetrics and gynecology had the least (5%, 6%, 6%, 5%, 5%, and 2%) respectively.

**Table 6: The relationship between asthma diagnosis and treatment knowledge and the quality of asthma management**

| | | Quality of asthma management | | |
|---|---|---|---|---|
| | | High | Low | Total |
| Overall knowledge | High | 8 (9.6%) | 75(90.4%) | 83 |
| | Low | 0 | 12(100%) | 12 |
| | Total | 8(8.4) | 87(91.6) | 95 |

Fisher's exact test = 0.32

### *Asthma quality of care*

[Table 5] summarised the quality of care offered by the physicians in their practice, which is indicated by a score of 80% and above in the practice category. In overall, diagnosis and assessment, treatment and follow-up scores, 92%, 91%, and 84% respectively of the physicians indicated they offered low quality of care.

Physicians with less than 10 years work experience constituted 53%, 52%, and 56% of those who had low quality of care score in all the domains of practice, while family medicine physicians had the highest percentage of those who offer low quality care as indicated by scores in the overall, diagnosis and assessment, treatment and follow-up categories (24%, 23%, and 23%).

### *Association between knowledge and quality of asthma care*

Only 8 (10%) of the individuals who had high overall knowledge (indicated by a score of 75% and above in the knowledge category) also had high quality of care (i.e., had 80% and above in the practice category) [Table 6]. The majority 75 (90%) of physicians who had high knowledge scores offered low quality of care (i.e., score less than 80%). None (0%) of those who had low knowledge score offered high-quality care.

This relationship is however not statistically significant, $P$ =0.32 (Fisher's exact test).

## Discussion

This study sought to identify possible gaps in asthma management by physicians in South-West Nigeria. The findings in this study showed that overall knowledge regarding asthma is largely high. This was particularly informative in this study because knowledge assessment was subdivided into different domains of symptoms, triggers, diagnosis, severity, and drugs. This has the potential to identify knowledge gaps that can be specifically targeted for intervention. In a study by Obumneme-Anyim *et al.*[14] involving three South-Eastern states in Nigeria, good knowledge of asthma symptoms (wheeze, chest tightness, dyspnea, and cough) was also reported. The reason for this could be the new legislation in recent years requiring doctors to earn compulsory CPD points before renewal of registration thus making many more doctors to have increase assess to knowledge. The findings of high level of knowledge in this study is in contrast with what was reported by Umoh and Ukpe[7] among doctors in a tertiary hospital in Niger Delta region of Nigeria. In their study, the overall knowledge regarding management of asthma using GINA guideline was low among other physicians other than the pulmonologists.

We observed a low score regarding respondents' knowledge of the use of adrenaline, ipratropium bromide, and cromolyn in asthma treatment. This may be due to the fact that chest physicians are more likely to use these drugs than other physicians. This finding is similar with that by Hemnes *et al.*[8] in their study where they reported low knowledge scores in pharmacotherapy of controller medications (inhaled steroid and long acting B-2 agonists) for asthma among internal medicine residents.

Although not statistically significant, it was interesting to observe that even though the physicians had good individual knowledge scores, it did not reflect in the quality of care where most of them scored low. This is particularly of note because all the questions that were asked were the basic indices of practice recommended by the GINA guideline and thus were expected to be routine practice.

It has been observed that despite wide promulgation, clinical practice guidelines have had limited effect on changing physicians' behavior.[15] Desalu *et al.*[16,17] recorded that many of the physicians in their two studies do not follow most recommendation of the GINA guideline in their practice. Our findings agree with the observations by Lindenaue *et al.*[18] which showed similar results among physicians managing Chronic Obstructive Pulmonary Disease.

To transform knowledge to practice, frequent continuing professional development, use of incentives for the physicians, constant reminders in form of pictures, short messages, regular audit of practice, and improved practice setting are some of the measures that may be required.[19,20]

Regarding their work experience, a higher percentage of those who have worked for less than 20 years scored low on quality of care although they have a higher percentage of those with high knowledge score. This clearly shows that having knowledge is one thing; carrying your knowledge into practice is another.

More physicians who had managed asthma cases in the last year were observed to offer low quality of care than those who had last managed asthma patients over 12 months prior to the time of the of the study. This implies that although they see more cases frequently, this does not mean they offered optimal care.

A higher percentage of the house officers were found to offer low quality of care to their patients, while the medical officers have a higher number of them offering high-quality care. This is in agreement with the study by Umoh and Ukpe [7] where they observed that the house officers have the least knowledge scores. Although their study showed that residents in respiratory medicine had the highest scores, our study could not explore this area because there were no institutions training residents in respiratory medicine at the time of the study in the state where the study was carried out.

It was interesting to observe that the family physicians had higher total knowledge score than the internal medicine physicians. Residency training in internal medicine was recently commenced in one of the centers in the state where the study was done unlike family medicine residency, which has been ongoing for several years. This may account for the better score among family physicians.

## Conclusion

Although physicians in South-West Nigeria appear to have good knowledge, there are practice gaps in the management of asthma compared with standard guidelines. High level of knowledge does not appear to directly imply high-quality practice. There is need for constant training and re-training of physicians in order to keep them up to date with international guidelines and urgent need to adapt international guidelines to local practice. This will help improve the standard of asthma care.

## Limitations

The small sample size in this study was an obvious limitation. The study, however, may have under estimated the knowledge of the physicians in the region given that those who came for the continuing medical education are doctors who showed interest in updating their knowledge and thus likely to be more knowledgeable about asthma.

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## Conflicts of interest

There are no conflicts of interest.

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