

# Knowledge and management of allergic rhinitis by general practitioners in Benin City

Wilson Osaretin Osarogiagbon, Dominic Osaghae<sup>1</sup>

Department of Child Health, University of Benin Teaching Hospital, Benin City, <sup>1</sup>Department of Paediatrics and Child Health, Igbinedion University Okada, Edo State, Nigeria

## Abstract

**Background:** Allergic rhinitis is a common manifestation of atopy among children, affecting up to 10%–20% of the world's population. Usually presents with rhinorrhoea and sneezing and may co-exist with other allergic conditions like asthma.

**Aims:** The aim of this study is to evaluate the knowledge and appropriateness of management of allergic rhinitis by general practitioners in Benin City, Nigeria. To determine physician-related factors that are related to the management of allergic rhinitis by general practitioners in Benin City, Nigeria.

**Settings and Design:** This was descriptive cross-sectional study.

**Methods:** General practitioners that gave consent and were non-experts were interviewed with the help of a researcher-administered questionnaire. Data generated were analysed using SPSS software version 19.0.

**Statistical Analysis Used:** Descriptive statistics performed and group Chi-square was used to check for the relationship between variables.

**Results:** Sixty-three (63) general practitioners had complete data, of which 45 were male, 11 were consultants. A total of 50 (79.4%) worked in medical centre, whereas 7 (11.1%) worked in private hospitals. Twenty-nine (46%) of the respondents had practiced for 1–10 years, 19 (30.2%) of the respondents were aged 20–30 years. Twenty-nine (46%) of the respondents had good knowledge of symptoms of allergic rhinitis while 6 (9.5%) had poor knowledge. In terms of differentials, 19 (30.2%) each had very good knowledge and good knowledge, respectively. However, only 2 (3.2%) had very good knowledge of treatment and 9 (14.3%) has good knowledge of treatment. Thirty-six (57.1%) had poor knowledge of treatment.

**Conclusions:** Despite good knowledge of symptoms and differential diagnosis, the respondents had poor knowledge of standard treatment protocol in the management of allergic rhinitis.

**Keywords:** Allergic rhinitis asthma, co-morbidities, knowledge

**Address for correspondence:** Dr. Wilson Osaretin Osarogiagbon, Department of Child Health, University of Benin, Benin City, Nigeria.

E-mail: [divinewilbel@yahoo.com](mailto:divinewilbel@yahoo.com)

**Received:** 28.06.2017, **Accepted:** 09.10.2017

## INTRODUCTION

Allergic rhinitis is a common problem among atopic children, it is a global health problem affecting 10%–20% of the population,<sup>1–3</sup> such children present with chronic

symptoms which affect their social life and school performance. Affected children usually present with sudden onset of several bouts of sneezing associated with watery nasal discharge. Many of such children also observe itching

Access this article online	
Quick Response Code:	Website: <a href="http://www.phmj.org">www.phmj.org</a>
	DOI: 10.4103/phmj.phmj_25_17

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Osarogiagbon WO, Osaghae D. Knowledge and management of allergic rhinitis by general practitioners in Benin City. Port Harcourt Med J 2017;11:141-7.

of their nostrils which necessitate their frequent touching and squeezing of the nose (allergic salute); this leads to a shining crease on the bridge of the nose.<sup>4-6</sup> In some cases, some children may not want to touch the nostrils when they experience itching, rather they twist their upper lip from side to side in an attempt to settle the itching, this is called rabbit nosing. Majority of the children also develops redness of the eyes and excessive tearing.<sup>7-10</sup> These symptoms may be seasonal or may persist all through the year. Allergic rhinitis and asthma are linked by epidemiological, pathological, and physiological characteristics and may sometimes have a common therapeutic approach. They frequently co-exist, and some studies suggest that asthma is found in as many as 15%–38% of patients with allergic rhinitis, while other studies suggest that nasal symptoms are present in at least 75% of patients with asthma, but these estimates vary widely from 6% to 85% depending on the study. Currently, the complete management of allergic rhinitis based on the recommendation of the allergic rhinitis and its impact on asthma (ARIA), is that allergic comorbidities in asthmatics should be properly identified and treated for appropriate control of asthma.

In various centres, however, nasal symptoms of allergy in asthmatics are seen as different manifestations of the same disease rather than two different disease entities co-existing together. The management of the patient depends on the realisation that the patient has two disease conditions that are closely related. In several countries of the world where the ARIA protocol is being religiously followed in the management of allergic conditions, it is a standard practice to screen for symptoms and signs of allergic conditions in every asthmatic patient since achieving proper control of asthma depends on proper management of such co-existing morbidities.

Despite increasing interest in the epidemiological and environmental links between allergic rhinitis and asthma, there is a relative paucity of data in the literature describing the characteristics of asthma in patients with co-existing rhinitis.

Furthermore, it is very likely that when these two conditions co-exist in the same patient, this may only be recognised by experts in tertiary centres, while non-experts may see the presentation as part of the complete picture of allergy and as such address such patient with nasal symptoms like other asthmatics without nasal symptoms. This will grossly affect the quality of life and the degree of control of such asthmatic.

Therefore, it has become important for this study to be done to find the ability of non-experts, especially those

in private practice and secondary and tertiary hospitals to clearly diagnose allergic rhinitis when it co-exists with asthma. Based on the result of this survey, there may be a need for an intervention.

This study was carried out to evaluate the knowledge and appropriateness of management of allergic rhinitis by general practitioners and to determine physician-related factors that are related to the management of allergic rhinitis by general practitioners in Benin City, Nigeria.

## METHODS

### Study location

Benin City is a city and the capital of Edo State in Southern Nigeria. It is situated approximately 40 km north of the Benin River and 320 km by road East of Lagos. Benin City occupies lies on Lat 6° 20' 17"N and Log 5° 37' 32"E and its 88 m above sea level. Benin City 1204 km<sup>2</sup> with a population of 1496 million.<sup>11</sup>

### Study design

This was a cross-sectional descriptive study.

### Study duration

This study was carried out from May 2016 to October 2016.

### Study population

All general practitioners in Benin City.

### Sample size

All general practitioners in Benin City, except those that declined or were experts (therefore, there was no need for randomisation). There also no bias since everybody was to be sampled.

### Inclusion criteria

All general practitioners who gave consent and consultant private practitioners that are non-experts in the area of allergy.

### Exclusion criteria

General practitioners who are experts in the field of allergy, these include consultant pulmonologist (adult), consultant paediatric pulmonologist and ENT surgeons.

### Definition of allergic rhinitis

Participants are diagnosed with having allergic rhinitis if they present with two or more recurrent nasal symptoms such as the excessive and sudden onset of sneezing, nasal itching, watery nasal discharge, nasal congestion or obstruction with or without itching of the eyes with redness

and these symptoms resolve spontaneously or following treatment.<sup>12-15</sup>

### Definition of asthma

Asthma is diagnosed if an individual has two or more recurrent asthma symptoms such as a cough, wheezing, chest tightness and symptoms worse at night, or if a physician has objectively diagnosed an individual as asthmatic.<sup>16</sup>

### Data collection

The list of private hospitals in Benin City was obtained from the State Ministry of Health, and the city was mapped according to the political wards. All the private hospitals were identified. The hospitals were visited one after the other with the help of research assistants who were employed and trained by the researcher. When a hospital is visited, the aim of this study is explained to the owner if present or the administrator and any doctor working in such a hospital who is not an expert in the area of allergy was interviewed with the help of a questionnaire administered by the researcher or the research assistant.

### Statistical analysis

The generated data were entered into the Excel Spreadsheet which was transported into SPSS version 19.0 (IBM Corp: Armonk, NY). Data analysis was performed using the SPSS software version 19.0. Proportions were computed and compared using Chi-square. Group Chi-square was used to determine the significance of knowledge.

### Quality control

There was the double entry of data, and regular supervision of research assistants during data collection and questionnaires was administered only by qualified medical doctors (research assistants).

### Ethical consideration

- Ethical approval was obtained from the Institutional Review Board
- Consent was obtained from recruited subjects.

## RESULTS

### General characteristics of subjects

A total of 63 physicians had complete data and 8 had incomplete data. Out of the 63 physicians, 45 (71.4%) were males, while 18 (28.6%) were females. In terms of rank, 11 (17.5%) were consultants, 15 (23.8%) were senior medical officers, 29 (46.0%) were medical officers, 4 (6.4%) were house officers/NYSC doctors. Registrar was 1 (1.6%), senior registrar were 3 (4.8%). Fifty (59.4%) worked in a medical centre, 7 (11.1%) worked in a private hospital and 6 (9.5%) worked in clinics. Majority of the respondents

29 (46%) had practiced for 1–10 years. In terms of age of respondents, majority of the respondents were aged 20–30 years; 19 (30.2%) [Table 1].

### Knowledge of general practitioners concerning allergic rhinitis

The 63 respondents who had complete data agreed that they knew what allergic rhinitis meant. However, only 27 (42.9%) could correctly define or describe the meaning of allergic rhinitis. In terms of symptoms of allergic rhinitis, 36 (57.1%) had good knowledge. In terms of differential diagnosis, 38 (60.4%) each had very good knowledge and good knowledge respectively. When

**Table 1: General characteristics of subjects**

Variable	Parameter	Frequency (%)
Rank	Consultant	11 (17.5)
	SMO	15 (23.8)
	MO	29 (46.0)
	HO/NYSC	4 (6.4)
	Registrar	1 (1.6)
	Senior registrar	3 (4.8)
Years of practices	1-10 years	29 (46.0)
	11-20 years	6 (9.5)
	21-30 years	13 (20.6)
	31-40 years	14 (22.2)
	41-50 years	1 (1.6)
	51-60 years	0 (0.00)
Age of respondents	20-30 years	19 (30.2)
	31-40 years	13 (20.6)
	41-50 years	5 (7.8)
	51-60 years	13 (20.6)
	61-70 years	10 (15.9)
	71-80 years	3 (4.8)
Sex	Male	45 (71.4)
	Female	18 (28.6)
Size of practice	Private hospital	7 (11.1)
	Private medical centre	50 (79.4)
	Private clinic	6 (9.5)

SMO: Senior Medical Officer, MO: Medical Officer, HO/NYSC: House Officer/National Youth Service Corp

**Table 2: Knowledge of general practitioners concerning allergic rhinitis**

Variable	Parameter	Frequency (%)
Self-reported knowledge	Yes	63 (100.0)
	No	0
Knowledge of definition and meaning	Correct	27 (42.9)
	Incorrect	31 (49.2)
	Don't know	5 (7.9)
Knowledge of symptoms of allergic rhinitis	Poor	6 (9.5)
	Fair	21 (33.3)
	Good	36 (57.1)
Knowledge of differential diagnosis	Poor	11 (17.5)
	Fair	14 (22.2)
	Good	38 (60.4)
Knowledge of co-morbidity	Poor	18 (28.6)
	Fair	10 (15.9)
	Good	35 (55.5)
Knowledge of treatment	Poor	36 (57.1)
	Fair	16 (25.4)
	Good	11 (17.5)

knowledge of co-morbidities of asthma were considered, 35 (55.5%) had good knowledge. Knowledge of treatment showed that 11 (17.5%) had good knowledge [Table 2].

### Effect of subjects characteristics on knowledge of allergic rhinitis

As shown in Table 3a, when the relationship between the rank and knowledge of definition was tested, 11 (40.7%) of all those who got the definition correctly were medical officers. The Chi-square gave a *P* value that was not significant (*P* = 0.537). Considering the years of practice and ability to define allergic rhinitis correctly, majority (13, 48.1%) of those who gave correct definition had practiced for between 1 and 10 years. The Chi-square was not significant (*P* = 0.366). In terms of age of respondents, majority (8, 29.6%) of those who could correctly define allergic rhinitis was from the age range 20–30 years (*P* = 0.420). Males had better knowledge of definition than females (*P* = 0.487). Those from private medical centres also had better knowledge of definition than others (*P* = 0.503).

When general characteristics of subject and knowledge of symptoms of allergic rhinitis were cross tabulated, and significant relationship determined, in terms

of rank, 17 (47.2%) medical officers had good knowledge (*P* = 0.745). In terms of years of practice, the majority (55.6%) of those who have practice for between 1 and 10 years had good knowledge of allergic rhinitis. When age was considered, 47.2% of those who had good knowledge were in the age range 20–30 years. This was statistically significant (*P* = 0.010). 63% of those who had good knowledge were male while 50.9% of those who had good knowledge worked in private medical centres [Table 3a].

In terms of the knowledge of differentials of allergic rhinitis, majority (62.9%) of those who had good knowledge were also medical officers. Nearly 60.5% of those with good had practiced for 1–10 years, while 39.5% of those with good knowledge were aged 20–30 years. 71.1% of males had good knowledge of differentials and 76.3% of those who had good knowledge of differentials worked in private medical centres, none of them had significant *P* value. In terms of knowledge of comorbidities, 52.9% of those who had good knowledge were medical officers, while 57.1% of those with good knowledge had practiced for 1–10 years. None of these had significant *P* values. However, 45.7% of those with good knowledge were between 20 and 30 years

**Table 3a: General characteristics of subject and knowledge of allergic rhinitis**

Parameter	Knowledge of allergic rhinitis by respondents						
	Knowledge of definition (%)			Knowledge of symptoms of allergic rhinitis (%)			
	Correct	Incorrect	Don't know	Poor	Fair	Good	
Rank	Consultant	6 (22.2)	5 (16.7)	0	1 (16.7)	4 (20.0)	6 (16.7)
	SMO	6 (22.2)	7 (23.3)	2 (40.0)	1 (16.7)	7 (35.0)	7 (19.4)
	MO	11 (40.7)	15 (50.0)	2 (40.0)	3 (50.0)	8 (40.0)	17 (47.2)
	HO/NYSC	3 (11.1)	1 (3.3)	0	0	0	4 (11.1)
	Registrar	1 (3.7)	0	0	0	1 (5.0)	0
	Senior registrar	0	2 (6.7)	1 (20.0)	1 (16.7)	0	2 (5.6)
	$\chi^2$	0.537		0.745			
Years of practices	1-10 years	13 (48.1)	14 (45.2)	2 (40.0)	0	9 (42.9)	20 (55.6)
	11-20 years	4 (14.8)	2 (6.5)	0	1 (16.7)	1 (4.8)	4 (11.1)
	21-30 years	5 (18.5)	5 (16.1)	3 (60.0)	1 (16.7)	5 (23.8)	7 (19.4)
	31-40 years	5 (18.5)	9 (29.0)	0	4 (66.7)	6 (28.6)	4 (11.1)
	41-50 years	0	1 (3.2)	0	0	0	1 (2.9)
	51-60 years	0	0	0	0	0	0
	$\chi^2$	0.366		0.093			
Age of respondents	20-30 years	8 (29.6)	10 (32.3)	1 (20.0)	0	2 (9.5)	17 (47.2)
	31-40 years	7 (25.9)	5 (16.1)	1 (20.0)	0	8 (38.1)	5 (13.9)
	41-50 years	3 (11.1)	1 (3.2)	1 (20.0)	1 (16.7)	0	4 (11.1)
	51-60 years	4 (14.8)	8 (25.8)	1 (20.0)	3 (50.0)	6 (28.6)	4 (11.1)
	61-70 years	3 (11.1)	7 (22.6)	0	1 (16.7)	5 (23.8)	4 (11.1)
	71-80 years	2 (7.4)	0	1 (20.0)	1 (16.7)	0	2 (5.6)
	$\chi^2$	0.420		0.010			
Sex	Male	21 (77.8)	20 (64.5)	4 (80.0)	6 (100.0)	16 (76.2)	23 (63.9)
	Female	6 (22.2)	11 (35.5)	1 (20.0)	0	5 (23.8)	13 (36.1)
	$\chi^2$	0.487		0.129			
Size of practice	Private hospital	2 (7.4)	4 (12.9)	1 (20.0)	0	1 (4.8)	6 (10.9)
	Private medical centre	24 (88.9)	23 (74.2)	3 (60.0)	5 (83.3)	17 (81.0)	28 (50.9)
	Private clinic	1 (3.7)	4 (12.9)	1 (20.0)	1 (16.7)	3 (14.3)	21 (38.2)
		$\chi^2$	0.503		0.640		

SMO: Senior Medical Officer, MO: Medical Officer, HO/NYSC: House Officer/National Youth Service Corp



with a significant  $P$  value ( $P = 0.021$ ). Nearly 71.4% of those who had good knowledge of comorbidities were male, and 74.3% were from private medical centres. None of them have a positive association on the knowledge of comorbidity.

In terms of knowledge of treatment, 30% of that had good knowledge of treatment were senior medical officers, while 27.3% each of those who had practiced from 1 to 10 years, 21–30 years and 31–40 years, respectively, had good knowledge of treatment. However, none of these had a positive association with the knowledge of treatment. In terms of knowledge of treatment and age of respondents, 36.4% each belong to the age group 31–40 and 61–70 years ( $P = 0.045$ ). This shows a positive association between age and knowledge of treatment. In terms of sex and treatment, 81.8% of those who had good knowledge were male, while 72.7% of those who had good knowledge of treatment were from private medical centres and none of these was significant [Table 3b].

## DISCUSSION

In this study, there was a predominance of the male sex. Furthermore, there were some consultants that were not

experts in allergy or its related field. However, the majority of the respondents were medical officers (46.0%) of the total. Majority of the respondents were in the early years of their practice, with those still within 10 years of practice being in majority. One of the respondents was between 41 and 50 years of practice. In line with the above, in terms of age of respondents, the majority of the respondents were in the younger age group 20–30 years, followed by 31–40 years and 51–60 years. This pattern of distribution may suggest early retirement of the respondents or that the older physicians are more into hospital administration rather than active medical practice. Furthermore, expectedly those in medical centres were majority (79.4%). This is the most common arrangement among individual general practitioners.

In this study, all the interviewed respondents agreed that they know what allergic rhinitis means. However, a more detailed evaluation of knowledge of various aspects of allergic rhinitis, did not show a corresponding excellent objective knowledge assessment. For instance, when asked to write down the definition or meaning of allergic rhinitis, majority of the respondents could not correctly define allergic rhinitis. In terms of symptoms, majority

**Table 3b: General characteristics of subject and knowledge of allergic rhinitis**

Parameter	Knowledge of allergic rhinitis by respondents									
	Knowledge of differential diagnosis			Knowledge of co-morbidity			Knowledge of treatment			
	Poor	Fair	Good	Poor	Fair	Good	Poor	Fair	Good	
Rank	Consultant	4 (40.0)	4 (28.6)	0	2 (11.1)	2 (20.0)	7 (20.6)	6 (16.7)	3 (18.8)	2 (20.0)
	SMO	2 (20.0)	6 (42.9)	7 (20.0)	6 (33.3)	3 (30.0)	6 (17.6)	8 (22.2)	4 (25.0)	3 (30.0)
	MO	3 (30.0)	3 (21.4)	22 (62.9)	7 (38.9)	3 (30.0)	18 (52.9)	18 (50.0)	8 (50.0)	2 (20.0)
	HO/NYSC	1 (10.0)	1 (7.1)	2 (5.7)	0	2 (200.0)	2 (5.9)	3 (8.3)	1 (6.3)	0
	Registrar	0	0	1 (2.9)	1 (5.6)	0	0	0	0	1 (10.0)
	Senior registrar	0	0	3 (8.6)	2 (11.1)	0	1 (2.9)	1 (2.9)	0	2 (20.0)
	$\chi^2$	0.228		0.288		0.130				
Years of practices	1-10 years	3 (27.3)	3 (21.4)	23 (60.5)	4 (22.2)	5 (50.0)	20 (57.1)	15 (41.7)	11 (68.8)	3 (27.3)
	11-20 years	2 (18.2)	1 (7.1)	3 (7.9)	2 (11.1)	1 (10.0)	3 (8.6)	2 (5.6)	2 (12.5)	2 (18.2)
	21-30 years	3 (27.3)	2 (14.3)	8 (21.1)	5 (27.8)	3 (30.0)	5 (14.3)	8 (22.2)	2 (12.5)	3 (27.3)
	31-40 years	3 (27.3)	7 (50.0)	4 (10.5)	7 (38.9)	1 (10.0)	6 (17.1)	10 (27.8)	1 (6.3)	3 (27.3)
	41-50 years	0	1 (7.1)	0	0	0	1 (2.9)	1 (2.8)	0	0
	51-60 years	0	0	0	0	0	0	0	0	0
	$\chi^2$	0.074		0.531		0.371				
Age of respondents	20-30 years	1 (9.1)	3 (21.4)	15 (39.5)	1 (5.6)	2 (20.0)	16 (45.7)	12 (33.3)	6 (37.5)	1 (9.1)
	31-40 years	2 (18.2)	1 (7.1)	10 (26.3)	4 (22.2)	2 (20.0)	7 (20.0)	3 (8.3)	6 (37.5)	4 (36.4)
	41-50 years	2 (18.2)	0	3 (7.9)	1 (5.6)	2 (20.0)	2 (5.7)	3 (8.3)	2 (12.5)	0
	51-60 years	2 (18.2)	5 (35.7)	6 (15.8)	7 (38.9)	3 (30.0)	3 (8.6)	10 (27.8)	1 (6.3)	2 (18.2)
	61-70 years	2 (18.2)	4 (28.6)	4 (10.5)	5 (27.8)	1 (10.0)	4 (11.4)	6 (16.7)	0	4 (36.4)
	71-80 years	2 (18.2)	1 (7.1)	0	0	0	3 (8.6)	2 (5.6)	1 (6.3)	0
	$\chi^2$	0.204		0.021		0.045				
Sex	Male	8 (72.7)	10 (71.4)	27 (71.1)	13 (72.2)	7 (70.0)	25 (71.4)	26 (72.2)	10 (62.5)	9 (81.8)
	Female	3 (27.3)	4 (28.6)	11 (28.9)	5 (27.8)	3 (30.0)	10 (28.6)	10 (27.8)	6 (37.5)	2 (18.2)
	$\chi^2$	0.987		0.828		0.656				
Size of practice	Private hospital	0	2 (14.3)	5 (13.2)	3 (16.7)	0	4 (11.4)	4 (11.1)	1 (6.3)	2 (18.2)
	Private medical centre	10 (90.9)	11 (78.6)	29 (76.3)	14 (77.8)	10 (100.0)	26 (74.3)	30 (83.3)	12 (75)	8 (72.7)
	Private clinic	1 (9.1)	1 (7.1)	4 (10.5)	1 (5.6)	0	5 (14.3)	2 (5.6)	3 (18.8)	1 (9.1)
	$\chi^2$	0.639		0.478		0.649				

SMO: Senior Medical Officer, MO: Medical Officer, HO/NYSC: House Officer/National Youth Service Corp

had good knowledge while only 7 respondents had very good knowledge. When disease conditions that could mimic allergic rhinitis were considered, majority of the respondents were able to distinguish them from allergic rhinitis. In terms of possible co-morbidities of asthma and allergic rhinitis, majority did not exhibit good knowledge. In this study, the objective assessment of symptoms was the poor majority of respondents could not state the correct, guideline-recommended treatment of allergic rhinitis. The knowledge of physicians concerning the differential diagnosis of allergic rhinitis was good. Despite this good knowledge of differentials, the knowledge of treatment modalities by respondents was poor. A similar trend has been demonstrated by other workers.<sup>17,18</sup> In the study, primary doctors showed a low level of information concerning the systemic nature of the allergic disease. There was a marked significant improvement after an update programme. They concluded that physicians needed post-graduate training programme in the index study, the possible determinant of knowledge among physicians were mainly age and years of graduation. The pattern was such that the younger doctors were more conversant with the symptoms and treatment of allergic rhinitis. So also was the years of practice. Those recently graduated were more knowledgeable in both the symptoms and treatment of allergic rhinitis. Only a few of the younger ones and the recently trained could mention the use of intranasal spray corticosteroids and antihistamine in recent protocols used in the management of allergic rhinitis. These two factors were the only ones with significant *P* values in the group Chi-square test. This pattern is also similar to that reported by other workers;<sup>19,20</sup> although, it was an assessment of all the allergic diseases. This trend reminds us of the need for frequent post-graduate training programmes for practitioners to improve on their knowledge of allergic conditions. This is even more so with the older ones who may not have had such recent training programme in their medical school days.

## CONCLUSIONS

The general practitioners play a very important role in the management of allergic rhinitis in our practice locale. The index study reveal that the general practitioners although had good knowledge about the symptoms and differential diagnosis of allergic rhinitis, their knowledge concerning co-morbidities and standard management protocol is poor. There is lack of knowledge concerning the proper use of medication in patients with allergic rhinitis, especially among the older practitioners. There is, therefore, need for regular post-graduate update training for general

practitioners to ensure adherence to standard management protocols.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Corren J. The impact of allergic rhinitis on bronchial asthma. *J Allergy Clin Immunol* 1998;101:S352-6.
2. Corren J. Allergic rhinitis and asthma: How important is the link? *J Allergy Clin Immunol* 1997;99:S781-6.
3. Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens WJ, Togias A, *et al*. Allergic rhinitis and its impact on asthma (ARIA) 2008 update (in Collaboration with the World Health Organization, GA(2)LEN and allerGen). *Allergy* 2008;63(Suppl 86):8-160.
4. Guerra S, Sherrill DL, Martinez FD, Barbee RA. Rhinitis as an independent risk factor for adult-onset asthma. *J Allergy Clin Immunol* 2002;109:419-25.
5. Greisner WA 3<sup>rd</sup>, Settipane RJ, Settipane GA. Co-existence of asthma and allergic rhinitis: A 23-year follow-up study of college students. *Allergy Asthma Proc* 1998;19:185-8.
6. Leynaert B, Bousquet J, Neukirch C, Liard R, Neukirch F. Perennial rhinitis: An independent risk factor for asthma in nonatopic subjects: Results from the European Community Respiratory Health Survey. *J Allergy Clin Immunol* 1999;104:301-4.
7. Rowe-Jones JM. The link between the nose and lung, perennial rhinitis and asthma – Is it the same disease? *Allergy* 1997;52:20-8.
8. Townley RG, Kiboneka A. Allergic rhinitis: Relationship to asthma: Similarities, differences, and interactions. *Ann Allergy Asthma Immunol* 1998;80:137-9.
9. Vignola AM, Chaney P, Godard P, Bousquet J. Relationships between rhinitis and asthma. *Allergy* 1998;53:833-9.
10. Gergen PJ, Turkeltaub PC. The association of individual allergen reactivity with respiratory disease in a national sample: Data from the Second National Health and Nutrition Examination Survey, 1976-80 (NHANES II). *J Allergy Clin Immunol* 1992;90:579-88.
11. The Columbia Encyclopedia. 6<sup>th</sup> ed. 2005 Columbia University Press, Benin, City, Nigeria, Archived 25 April 2007 at the Wayback Machine. Available from: [https://wikivisually.com/wiki/Benin\\_City](https://wikivisually.com/wiki/Benin_City). [Last retrieved on 2007 Feb 18].
12. Falade AG, Olawuyi F, Osinusi K, Onadoko BO. Prevalence and severity of symptoms of asthma, allergic rhino-conjunctivitis and atopic eczema in secondary school children in Ibadan, Nigeria. *East Afr Med J* 1998;75:695-8.
13. Falade AG, Olawuyi JF, Osinusi K, Onadoko BO. Prevalence and severity of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema in 6- to 7-year-old Nigerian primary school children: The international study of asthma and allergies in childhood. *Med Princ Pract* 2004;13:20-5.
14. Braun-Fahrlander C, Wuethrich B, Gassner M, Grize L, Sennhauser FH, Varonier HS, *et al*. Validation of a rhinitis symptom questionnaire (ISAAC core questions) in a population of Swiss school children visiting the school health services. SCARPOL-team. Swiss study on childhood allergy and respiratory symptom with respect to air pollution and climate. International study of asthma and allergies in childhood. *Pediatr Allergy Immunol* 1997;8:75-82.
15. Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, *et al*. International study of asthma and allergies in childhood (ISAAC): Rationale and methods. *Eur Respir J* 1995;8:483-91.
16. GINA Pocket Guide for Asthma Management and Prevention NIH

- Publication. Revised Edition; 2002; 6-7. Available from: <http://www.ginasthma.com>. [Last accessed on 2005 Nov 18].
17. Yilmaz O, Reisli I, Tahan F, Orhan F, Boz AB, Yuksel H, *et al*. Influence of education on primary care physicians' knowledge on childhood allergy as a systemic disease and the atopic march. *Allergol Immunopathol (Madr)* 2011;39:73-8.
  18. Kalpaklioglu AF, Kalkan IK, Akcay A, Reisli I, Can D, Uzuner N, *et al*. (Un)Awareness of allergy. *World Allergy Organ J* 2011;4:170-8.
  19. Almutawa FN, Al-Mutairy G, Al-Arada N, Kamel MI. Perception of primary care physicians about guidelines of bronchial asthma. *AJME* 2014;50:17-24.
  20. Wang DY. Management of allergic rhinitis in general practitioners. *Asia Pac Allergy* 2012;2:233-6.