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RESEARCH

Allergic rhinitis in medical students at the University of the Free State

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Background: Allergic rhinitis, the most common form of chronic rhinitis, can adversely affect quality of life. The prevalence of allergic rhinitis in adolescents in South Africa has been estimated to be 38.5%, but there is a paucity of data from African countries on allergic rhinitis.
Aim: The aim of this study was to determine the prevalence of allergic rhinitis in medical students in the Faculty of Health Science at the University of the Free State (UFS). Information was acquired on the effects that the condition had on participants with regard to symptoms, quality of life, disease management and treatment.
Methods: A cross-sectional study design was used. A self-administered anonymous questionnaire was distributed to all medical students registered with the Faculty of Health Sciences at UFS in 2016. The estimated population was 706 students.
Results: The response rate was 62.6%. The prevalence of allergic rhinitis was 39.1%. The most common symptoms were rhinorrhoea (64.8%), repeated sneezing (64.3%) and nasal obstruction (58.5%). Symptoms were at their worst during August to October. Antihistamines had been used by 82.4% of participants to treat their symptoms in the previous 12 months, while 28.8% had used an intranasal steroid spray.
Conclusion: The prevalence of allergic rhinitis in medical students at UFS was 39.1%. Rhinorrhoea, sneezing and nasal obstruction were the most frequent and bothersome symptoms.

Keywords: allergic rhinitis, medical students, prevalence, quality of life

Introduction

Allergic rhinitis, an IgE-mediated inflammation of the nasal mucosa, is the most common form of chronic rhinitis.[1] The prevalence of allergic rhinitis in adolescents in South Africa has been estimated to be 38.5%,[2] but there is a paucity of data from African countries on allergic rhinitis.

Allergic rhinitis can adversely affect quality of life.[3] A study on the concerns of patients with allergic rhinitis in the primary care setting in South Africa found that the symptoms affected sleep in 76.6% of sufferers and that 85.2% felt miserable due to their allergic rhinitis.[4] Allergic rhinitis has also been shown to affect learning in schoolchildren,[5] but there are few studies on the effect of allergic rhinitis in university students.

Aim and objectives

The aim of this study was to determine the prevalence of allergic rhinitis in medical students at the University of the Free State (UFS). Secondary objectives were to determine the most common symptoms associated with allergic rhinitis, the impact thereof on the students' quality of life, past and current treatments used, and compliance, as well as students' preferred treatment.

Methods

Study design and population

This was a cross-sectional study, conducted between September 25, 2016 and November 5, 2016. The study population included all medical students registered at the Faculty of Health Sciences, UFS, in 2016. The estimated target population size was 706 students and included all first- to fifth-year medical students as well as failed first-year students in the Learning Development Programme. Students who were absent on the day the questionnaires were distributed, as well as those who refused to participate, were excluded.

Measurement

A self-administered, anonymous questionnaire was compiled based on similar published studies on patients with allergic rhinitis and was available in both English and Afrikaans. Demographic information was collected for all participants. A screening question was used to identify participants with chronic rhinitis, with participants who reported having nasal allergies, sinusitis, allergic rhinitis, or hay fever being considered as having allergic rhinitis and completing the remainder of the questionnaire.

Data pertaining to the participants' allergic rhinitis included:

(1) Diagnosis: age at diagnosis; skin-prick test and/or blood test done; known allergens; presence of asthma and eczema.
(2) Symptoms: frequency and severity; when and where symptoms occurred; triggers.
(3) Quality of life: academic classes missed; impact on academic performance, outdoor/indoor activities, sleep and emotional state.

(4) Treatment: frequency of doctor's visits; past and current medication use; compliance with and preferred form of treatment.

Arrangements were made with the relevant lecturers of the first- to third-year students and group leaders of the fourth- and fifth-year students to use approximately 20 to 30 min of class time to ensure sufficient time for distribution, completion and collection of questionnaires.

Pilot study

A pilot study was conducted with 16 undergraduate students from the Department of Optometry in the School of Allied Health Professions, UFS, to test whether the questionnaire was user-friendly. Eight students from the English first- and third-year classes and eight students from the first- and third-year Afrikaans classes were randomly selected to complete the questionnaire in their language of choice. Feedback obtained from the pilot study was used to amend the questionnaire to be more user-friendly. The data gathered were not included in the main study.

Data analysis

The Department of Biostatistics, Faculty of Health Sciences, UFS, analysed the data using SAS® Version 9.3 (SAS Institute, Cary, NC, USA). Data from the questionnaires were entered on an Excel® spreadsheet (Microsoft Corp, Redmond, WA, USA) and screened by the student researchers for discrepancies and outliers. Results were summarised by frequencies and percentages (categorical variables) and means, standard deviations or percentiles (numerical variables).

Ethical considerations

The protocol was approved by the Health Sciences Research Ethics Committee, UFS (HSREC-S 27/2016). Permission to conduct the study was obtained from the Head of the School of Medicine, Dean of the Faculty of Health Sciences, Dean of Students Affairs, and Vice Rector of Research. The questionnaire was anonymous and participants could withdraw from the study at any time. Completion and handing in of the questionnaire was considered as consent.

Results

Of the 706 questionnaires distributed, 442 questionnaires were completed and collected (response rate 62.6%). The highest response rates were seen for the first-year (82.2%), second-year (73.9%) and third-year students (80.0%). Lower response rates were seen for the fourth-year (48.5%) and fifth-year students (32.5%) while no questionnaires were completed by the 27 students in the LDP programme. Most of the 442 participants were female (53.9%, *n* = 238) while 204 (46.1%) were male. Ages ranged between 16 and 38 years (median 21 years).

Diagnosis

Of the 442 participants, 173 (39.1%) indicated that they suffered from nasal allergies (*n* = 86, 19.5%), allergic rhinitis (*n* = 53, 12.0%), sinusitis (*n* = 89, 20.1%) and/or hay fever (*n* = 98, 22.2%).

Just over half of the 173 affected participants were female (50.9%, *n* = 88) and 85 (49.1%) were male. Ages ranged between 18 and 31 years (median 21 years). The median age at diagnosis was 11 years for the 57 participants who knew this information. Most of the participants were first diagnosed by a general practitioner (61.1%, 99/162), 13.0% (*n* = 22) were diagnosed by an otorhinolaryngologist while 1.9% (*n* = 3) self-diagnosed. A current (*n* = 21) or previous history (*n* = 31) of asthma was present in 32.9% (52/158), while 17.4% (*n* = 28) had a history of eczema.

Although 86 (53.4%) of 161 participants stated that they knew what they were allergic to, only 40 (24.8%) had had the allergy confirmed by skin-prick testing (14.3%, *n* = 23) and/or a blood test (13.7%, *n* = 22). The most commonly reported allergens were pollen (48.8%, *n* = 42), dust (45.3%, *n* = 39), cats (34.9%, *n* = 30), grass (23.3%, *n* = 20) and dogs (11.6%, *n* = 10).

Symptoms

Symptoms occurred throughout the year in 36.0% (58/161) of participants. They were reported to be the worst during August to October (Figure 1). Symptoms were worse when outdoors in 39.1% (*n* = 63) of participants and worse when indoors in 11.8% (*n* = 19) of participants.

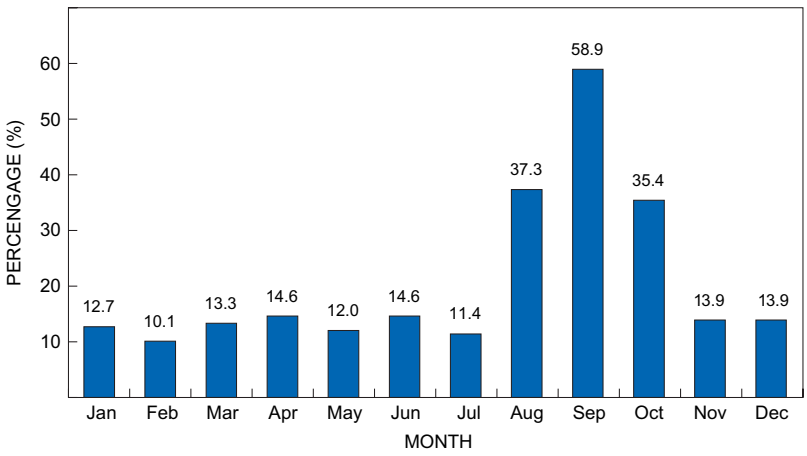

Figure 1: Months reported by students as being when their allergic rhinitis symptoms are worst (***n*** = 158).

Table 1: Frequency of symptoms associated with allergic rhinitis during the worst one-month period (%)

Symptom	Every day	Most days a week	A few days a week	A few days a month	Less than that	Never	Not sure
Repeated sneezing (*n* = 157)	12.7	20.4	31.2	16.6	9.6	8.9	0.6
Watery or tearing eyes (*n* = 158)	10.1	21.5	18.4	19.0	17.1	12.0	1.9
Runny nose (*n* = 159)	17.6	25.8	21.4	21.4	6.3	5.7	1.9
Cough (*n* = 158)	1.9	8.2	8.9	24.7	15.8	36.1	4.4
Headache (*n* = 157)	8.9	7.0	16.6	18.5	17.8	24.8	6.4
Red or itching eyes (*n* = 157)	6.4	12.7	19.1	19.8	24.2	14.7	3.2
Nasal obstruction (*n* = 159)	17.6	20.8	20.1	18.9	9.4	10.1	3.1
Nasal itching (*n* = 158)	13.3	14.6	22.8	23.4	14.6	8.9	2.5
Post-nasal drip (*n* = 157)	15.3	12.1	14.7	19.1	15.3	17.8	5.7
Itching throat (*n* = 156)	6.4	7.7	15.4	20.5	20.5	25.0	4.5

Table 2: The extent to which the symptoms are bothersome (%)

Symptom	Extremely bothersome	Moderately bothersome	Slightly bothersome	Not bothersome	Not sure
Repeated sneezing (*n* = 155)	26.5	28.4	25.8	17.4	1.9
Watery or tearing eyes (*n* = 156)	18.6	28.9	26.9	21.2	4.5
Runny nose (*n* = 154)	38.3	31.2	19.5	8.4	2.6
Cough (*n* = 154)	3.9	17.5	25.3	44.2	9.1
Headache (*n* = 154)	24.0	18.2	13.6	35.1	9.1
Red or itching eyes (*n* = 156)	25.0	25.0	22.4	22.4	5.1
Nasal obstruction (*n* = 156)	32.1	32.1	16.7	14.7	4.5
Nasal itching (*n* = 154)	22.7	27.9	27.9	17.5	3.9
Post-nasal drip (*n* = 154)	25.3	26.6	19.5	23.4	5.2
Itching throat (*n* = 153)	16.3	22.9	22.9	32.0	5.9

Table 3: Stimuli that trigger or worsen symptoms of allergic rhinitis (*n* = 158)

Stimulus	*n* (%)
Dust	124 (78.5)
Change in weather	96 (60.8)
Colds	74 (46.8)
Air-conditioning	70 (44.3)
Cats	69 (43.7)
Grass	62 (39.2)
Perfume	52 (32.9)
Tobacco smoke	50 (31.7)
Dogs	36 (22.8)
Pollution	35 (22.2)
Exercise or physical activity	22 (13.9)
Chemicals	15 (9.5)
Spicy food	11 (7.0)
Stress	17 (10.8)
Emotions	14 (8.6)
Alcohol	8 (5.1)
Dust mites	1 (0.6)
Feathers	1 (0.6)
Milk	1 (0.6)

Symptoms that were present for at least a few days of the week were a runny nose (64.8%), repeated sneezing (64.3%) and nasal obstruction (58.5%) (Table 1). These were also the most bothersome symptoms (Table 2).

Dust (78.5%), change in weather (60.8%), colds (46.8%), air-conditioning (44.3%) and cats (43.7%) were the most common stimuli to trigger or worsen symptoms (Table 3).

Quality of life

In the past year, only 10.2% (16/157) of the participants reported missing classes due to allergic rhinitis. The number of days missed varied between 2 and 15 days. A third (30.7%, 46/150) of the participants reported that their symptoms interfered with their academic performance. Over half (53.8%, 84/156) stated that their symptoms had little to no impact on their daily life while 10.3% (*n* = 16) reported a severe and 34.0% a moderate impact. Interference with sleep was not a prominent feature among participants (Table 4).

The ability to have or play with pets was affected a lot or to some extent in 39.5% of participants, while participation in outdoor activities or sport was affected to a similar extent in 32.5% of participants (Table 5).

Table 4: Effect of symptoms of rhinitis on sleep

Frequency	Difficulty getting to sleep (n = 155)	Waking up during the night (n = 154)	Lack of a good night's sleep (n = 154)
	n (%)	n (%)	n (%)
Not bothered	78 (50.3)	90 (58.4)	82 (53.3)
Slightly bothered	36 (23.2)	25 (16.2)	27 (17.5)
Moderately bothered	12 (7.7)	16 (10.4)	18 (11.7)
Very bothered	15 (9.7)	9 (5.8)	12 (7.8)
Extremely bothered	7 (4.5)	8 (5.2)	10 (6.5)
Not sure	7 (4.5)	6 (3.9)	5 (3.2)

Table 5: Extent to which the symptoms of rhinitis limit the activities of the participants (n = 157) (%)

Factor	A lot	Some	Only a little	Not at all	Not sure
Doing well in class	9.6	19.1	15.3	43.3	12.7
Having or playing with pets	16.6	22.9	17.2	31.9	11.5
Outdoor activities or sports	15.9	16.6	24.2	33.8	9.6
Indoor activities, like reading	7.6	10.8	15.9	56.7	8.9

Most participants reported frequently (39.4%, 61/155) or sometimes (36.8%, n = 57) feeling tired, while 19.5% (30/154) frequently and 33.8% (n = 52) sometimes felt miserable as a result of their nasal symptoms.

Past and current treatment

A third of the participants (28.9%, 45/156) reported having consulted a doctor for their nasal symptoms in the past 12 months while 55 (35.3%) had consulted a pharmacist. Antihistamines were the drugs most commonly used by the 125 participants who had used medication for their nasal symptoms in the previous 12 months, being used by 103 (82.4%) participants. This was a second-generation antihistamine in the case of 43 (34.3%) participants, a first-generation antihistamine in 35 (28.0%) participants, combination flu medication containing a first-generation antihistamine in the case of 27 (21.6%), and for 15 (12.0%) participants the type of antihistamine used was not specified. Fifteen (12.0%) participants had used more than one type of antihistamine. Only 36 (28.8%) participants had used an intranasal steroid spray in the previous year, while 11 (8.8%) had used an intranasal decongestant. Oral steroids had been used by six (4.8%) participants, while a further two (1.6%) had used a combination steroid/first-generation antihistamine formulation. Eight (6.4%) had used a herbal treatment in the past year. Intranasal saline either as drops, a spray or irrigation had been used by six (4.8%) participants.

Forty-five patients were on treatment for their nasal symptoms, with 21 (46.7%) using a second-generation antihistamine, one (2.2%) a first-generation, and seven (15.6%) an unspecified antihistamine. Sixteen (35.6%) were using an intranasal corticosteroid spray. Five (11.1%) participants were using a combination flu medication. Nasal saline was being used by four (8.9%) participants, intranasal decongestants by three (6.7%) participants, oral steroids by two participants (4.4%), and herbal treatment by two (4.4%) participants.

Of the participants (40.9%, 18/44) who reported non-compliance with their current treatment, 72.2% (n = 13) only used their treatment when symptomatic while six (33.3%) stopped using their treatment when they felt better. Forgetting to use the treatment was reported as the reason for non-compliance by three (16.7%) participants. None of the participants reported not liking the treatment, being unable to afford the treatment or worry about side effects as the reason for non-compliance. Most of the participants preferred treatment for their symptoms in the form of tablets (71.1%, 108/152) or nasal sprays (44.7%, n = 68). Less than 4% preferred injections and syrups.

Discussion

We found a prevalence rate of allergic rhinitis of 39.1%, similar to that previously found in a study of South African adolescents.[2] The self-reported prevalence of allergic rhinitis in the USA has been estimated to be between 10% and 30% in adults and 40% in children.[6] The prevalence of allergic rhinitis in the university population of Bangkok was reported to be between 57.4% and 61.9%, as compared with the prevalence in the general population of 44.2%.[7]

Although most participants felt that their rhinitis was allergic in nature, a minority had had their allergy confirmed by allergy tests. The most commonly reported allergens were pollen, dust, cats and grass. Grass pollens have previously been shown to be the most common allergen in patients with allergic rhinitis in the Free State.[8,9]

Many participants had symptoms present throughout the year, but they were at their worst between August and October. This is in keeping with other studies which also found that patients report their symptoms to be at their worst in spring.[6,10] However, despite this study being conducted during this time of the year, most participants with rhinitis were not using any treatment. This is probably due to the mild nature of the symptoms in participants in this study, with over half the participants reporting that their symptoms did not interfere with daily activities.

Rhinorrhoea, nasal obstruction and repeated sneezing were the most common and most bothersome symptoms. These were also the symptoms that were most frequent in a study on the concerns of patients with allergic rhinitis in South Africa.[4] Nasal obstruction is frequently reported as being the most bothersome symptom of allergic rhinitis.[6] Dust, change in weather, colds, air-conditioning and cats were the most common triggers of symptoms. Nasal hyper-reactivity to physical and chemical stimuli is a frequent finding in all forms of rhinitis,[11] and these non-specific triggers have also been found in other studies on allergic rhinitis.[4,6] Only 25% of participants had an allergy diagnostic test performed. This is much less than in surveys of patients with allergic rhinitis in the USA, Latin America and the Asia Pacific, where 41 to 57% of patients had either a skin-prick test or blood test performed.[6]

Although only 10.2% of participants had missed classes as a result of their nasal symptoms, almost one-third felt that their symptoms interfered with academic performance. A study on

medical students in Thailand did not find allergic rhinitis to impact on academic performance, despite it adversely affecting quality of life.[7] Sleep disturbance was not a prominent complaint, in contrast with the findings of other studies.

Intranasal corticosteroids are the drug of choice for the treatment of allergic rhinitis,[1,12] but antihistamines were the drugs most frequently used to treat allergic rhinitis. Despite first-generation antihistamines not being recommended for the treatment of allergic rhinitis,[12] they were frequently used by participants, often as combination flu medications. Participants preferred using their treatment in the form of tablets, similar to other studies.[4,10] More than a third of participants had consulted a pharmacist regarding their symptoms, highlighting the need to educate pharmacists regarding the diagnosis and appropriate treatment of allergic rhinitis.

The use of treatment only when symptomatic was the most common reason for non-compliance with treatment. This was also the most common reason for non-compliance in a study on the concerns of patients with allergic rhinitis in South Africa.[4] However, the latter study also found that almost a quarter of the patients did not adhere to their treatment because they were unable to afford it,[4] similar to the findings of a study on allergic rhinitis in Europe.[13]

There is a paucity of data from African countries on the effect of allergic rhinitis on quality of life. This study highlights the fact that allergic rhinitis is a common condition with a significant impact on quality of life. Despite intranasal corticosteroids being the treatment of choice for allergic rhinitis, antihistamines were the most commonly used treatment, highlighting the need for further education of doctors and pharmacists regarding the appropriate treatment for allergic rhinitis.

Study limitations

Due to the 'fees-must-fall' protest that occurred during the time period of the study, it was not possible to distribute the questionnaire to all students. Despite this, the response rate was 62.6%.

Although we assumed that the participants had allergic rhinitis, we did not confirm that they indeed had allergic rhinitis as only a minority had had the allergy confirmed with allergy tests and we did not perform clinical examinations or allergy tests on the participants. It is possible that participants had another cause of their chronic rhinitis, although allergic rhinitis is the most common cause of chronic rhinitis.[1]

Compared with other studies on the impact of allergic rhinitis on quality of life, this study had a much smaller sample size. Further research should be directed at determining the impact of allergic rhinitis on quality of life and the treatment of allergic rhinitis in the general population.

Conclusions

We found that the prevalence of allergic rhinitis in medical students at the University of the Free State to be 39.1%. Rhinorrhoea, sneezing and nasal obstruction were the most frequent and bothersome symptoms.

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