

# ALLERGEN SENSITIVITIES OF PATIENTS WITH ALLERGIC RHINITIS PRESENTING TO THE ENT CLINIC AT UNIVERSITAS ACADEMIC HOSPITAL

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## ABSTRACT

**Aim:** The aim of the study was to review the presenting symptoms and allergen sensitivities of patients with allergic rhinitis presenting to the ear, nose and throat (ENT) clinic at Universitas Academic Hospital, Bloemfontein, South Africa.

**Methods:** The records of all patients with allergic rhinitis confirmed by skin-prick testing at the ENT clinic at Universitas Academic Hospital between 1 January 2004 and 31 January 2005 were reviewed.

**Results:** A total of 100 patients were identified. Their ages ranged between 4 and 71 years (median 25.5 years). There were 66 females and 34 males. Nasal obstruction was the most common symptom, being present in 80% of patients, followed by watery rhinorrhoea (58%), sneezing (40%), nasal itching (39%) and a postnasal drip (21%). Allergen sensitivities were: Bermuda grass (55%), maize pollen (56%), rye grass (37%), *Alternaria alternata* (mould) (25%), *Platanus acerifolia* (London plane tree) (25%), *Dermatophyoides pteronyssinus* (house-dust mite) (24%), dog epithelia (19%), cat epithelia (16%), *Lepidoglyphus destructor* (storage mite) (12%) and *Olea europaea* (olive tree) (15%). Bermuda grass sensitisation was significantly more common in patients living in urban areas compared with rural areas.

**Conclusions:** Nasal obstruction is the most common presenting symptom of allergic rhinitis. Bermuda grass, maize pollen and rye grass are the most common sensitising allergens in the Free State.

## INTRODUCTION

Allergic rhinitis is a common cause of nasal symptoms and is associated with significant morbidity.<sup>1-3</sup> The diagnosis is made based on the patient's symptoms and the results of allergen-sensitivity testing.<sup>1-3</sup>

At the ear, nose and throat (ENT) clinic at Universitas Academic Hospital, Bloemfontein, the diagnosis of

allergy is usually made by skin-prick testing (SPT), the allergens tested for being *Cynodon dactylon* (Bermuda grass), *Lolium perenne* (rye grass), *Platanus acerifolia* (London plane tree), *Olea europaea* (olive tree), *Zea mays* (maize), *Dermatophyoides pteronyssinus* (house-dust mite), *Lepidoglyphus destructor* (storage mite), *Alternaria alternata* (mould), cat epithelia and dog epithelia.

However, the relative importance of these allergens in causing allergic rhinitis in the patient population seen is unknown, the only published data from the Free State being from the paediatric allergy clinic at Universitas Academic Hospital.<sup>4,5</sup> These studies found that grass and maize pollen were the most important allergens, with a relatively low rate of house-dust mite sensitisation. Furthermore, since the majority of patients treated at the ENT clinic are adults, the allergen sensitisations of these patients may be different from those of the patients presenting to the paediatric allergy clinic.

The Free State has a large rural population, with many individuals living on farms. It is unknown if the allergen sensitivities of patients from rural areas and those living on farms is different from those of patients living in urban areas. In Finland, mites have been noted to be more important allergens than animal danders and pollens among farmers.<sup>6</sup>

Storage mites (non-pyroglyphid mites) are well recognised as rural occupational allergens<sup>9-9</sup> although storage-mite sensitisation has also been found more recently in urban populations.<sup>9-11</sup> The storage mite *L. destructor*, which has been found to be the predominant storage mite in Europe,<sup>9-12</sup> has therefore been included in our allergen test battery since November 2003.

## AIM

The aim of the study was to review the presenting symptoms and allergen sensitivities of patients with allergic rhinitis seen at the ENT clinic at Universitas Academic Hospital between 1 January 2004 and 31 January 2005 and to determine if there was any difference between the patients living in urban and rural areas. An attempt was also made to classify the patients according to the ARIA guidelines<sup>2</sup> and to determine the prevalence of other atopic conditions in these patients.

## METHODS

This was a retrospective, descriptive study. The records of all patients newly diagnosed with allergic rhinitis, based on their symptoms and SPT results, at the ENT clinic at Universitas Academic Hospital between 1 January 2004 and 31 January 2005 were reviewed and the following data extracted onto a dataform:

- Demographic details of the patients
- Presenting symptoms
- Results of SPT to the various allergens tested
- Presence of other atopic conditions
- Classification of the allergic rhinitis according to the ARIA guidelines.<sup>2</sup>

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Patients in whom atopy was diagnosed using the Immunocap RAST test were not included.

Approval to perform the study was obtained from the Ethics Committee of the Faculty of Health Sciences, University of the Free State and from the Clinical Head of Universitas Academic Hospital.

Analysis of the data was performed by the Department of Biostatistics. Results were summarised by frequencies and percentages and comparisons were done using chi-squared or Fisher's exact tests as appropriate.

## RESULTS

Of 2 913 new patients seen during the study period, 100 were diagnosed as having allergic rhinitis, based on their symptoms and SPT results. There were 34 male and 66 female patients whose ages ranged between 4 and 71 years (median 25.5 years).

Seventy-two patients lived in an urban area and 28 patients in a rural area, of whom 10 lived on a farm.

Nasal obstruction was the most common symptom, present in 80 patients. Other important symptoms were rhinorrhoea (58 patients), sneezing (40), nasal itching (39) and a postnasal drip (21). There was a significant association between the presence of rhinorrhoea, sneezing and nasal itching. Twenty-two patients presented only with nasal obstruction.

The allergen sensitivities of the patients are shown in Table I. Grass pollens and maize pollen were the most important allergens. Sensitisation to house-dust mites was present in 24% of patients.

**Table I. Allergen sensitivities (N = 100)**

Allergen	Sensitivity
<i>Cynodon dactylon</i> (Bermuda grass)	55
<i>Lolium perenne</i> (rye grass)	37
<i>Platanus acerifolia</i> (London plane tree)	25
<i>Olea europaea</i> (olive tree)	15
<i>Zea mays</i> (maize pollen)	56
<i>Dermatophagoides pteronyssinus</i>	24
<i>Lepidoglyphus destructor</i>	12
<i>Alternaria alternata</i>	25
Cat epithelia	16
Dog epithelia	19

**Table II. Number of allergens (N = 100)**

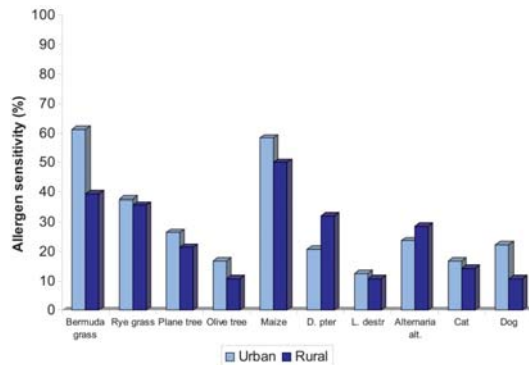
No. of allergens	Patients sensitised
1	27
2	23
3	24
≥4	26

The number of allergens to which the patients were sensitised is shown in Table II. Cat epithelia, rye grass and olive tree allergens were not associated with monosensitisation. Pollen allergens were usually multiple, with 25% of patients being sensitised to Bermuda grass, rye grass and maize pollen.

Twelve patients had asthma and 7 had eczema. Two of these patients had both asthma and eczema. Twenty-eight patients had allergic conjunctivitis.

Eighty-five patients could be classified according to the ARIA classification,<sup>2</sup> of whom 60 (74.1%) had moderate-severe persistent symptoms.

Bermuda grass was a significantly more common allergen in patients from an urban area (61.1%) as compared with those living in a rural area (39.3%) ( $p = 0.0489$ ). There was no significant difference with regard to the other allergens (Fig. 1). There was no significant difference in the symptoms and sensitising allergens between patients living in urban areas and those living on farms, but this was probably due to the small number of patients living on farms in our study population.



**Fig. 1. Allergen sensitisation in urban and rural patients.**

In patients under the age of 14 years, there was an approximately equal gender distribution (11 boys and 12 girls), while in patients 14 years and older, the male:female ratio was greater than 1:2 (23 males and 54 females). Sneezing was a significantly more common symptom in patients under the age of 14 years compared with the older group, being present in 60.9% and 33.8% of patients respectively ( $p = 0.0199$ ). There was no significant difference with regard to the other symptoms. There was also no significant difference with regard to allergen sensitisation between patients younger than 14 years and those aged 14 years and older. However, there was a tendency for house-dust mite sensitisation to be less common in patients under the age of 14, being present in 8.7% of patients under the age of 14 years and 28.6% of patients 14 years and older ( $p = 0.050$ ).

A gender-based comparison showed that females were significantly more likely to complain of a postnasal drip (5.9% of males as compared with 28.8% of females) ( $p = 0.0077$ ), with no significant difference in the other symptoms. Bermuda grass sensitisation was significantly more common among males (70.6%) as compared with females (47.0%) ( $p = 0.0245$ ), but there were no predominant allergens among females. There was no significant difference in the severity of the symptoms between male and female patients.

## DISCUSSION

Most of our adult patients were female, while among the children, there was an almost equal distribution of males and females. This is in contrast to other studies that have shown a slight male predominance.<sup>2,4</sup> A study of allergic rhinitis at a paediatric allergy clinic at our hospital also found a male predominance.<sup>4</sup> It is unclear why the majority of adult patients with allergic rhinitis presenting to our clinic were female.

The importance of grass and maize pollen as allergens in the Free State has previously been noted<sup>4,5</sup> and contrasts with the much lower rate of sensitisation to Bermuda grass noted in the Western Cape.<sup>13</sup> The pollen calendar of the grassland region of South Africa

shows two peaks – in spring, derived mainly from tree pollen, and in mid-summer, dominated mainly by grass pollen.<sup>14</sup> Because of the long grass season, grass pollen allergy symptoms may be experienced for up to 10 months of the year,<sup>14</sup> resulting in a high prevalence of persistent symptoms being caused by pollen allergens.<sup>3</sup> The relatively low rate of house-dust mite sensitisation was also found at the paediatric allergy clinic at Universitas Academic Hospital among patients with allergic rhinitis<sup>4</sup> and asthma.<sup>5</sup> This is in contrast to the relatively high incidence of house-dust mite allergy in the coastal areas of South Africa<sup>13,15</sup> and is thought to be as a result of the relatively low humidity in the region.<sup>15</sup> House-dust mites require a relative humidity of between 55% and 73% in the temperature range of 15-35°C and die from dehydration if the relative humidity is below 51%.<sup>16</sup>

In contrast to other studies,<sup>7,10,12,17,18</sup> our study did not show an association between sensitisation to *D. pteronyssinus* and *L. destructor*. Although most investigations have found a positive covariation of sensitisation to storage mites and house-dust mites, other studies have found no covariation.<sup>7,10-12,17-19</sup> Sensitisation to storage mites in house-dust-mite-allergic patients has been reported to be 60-90%.<sup>10,18,19</sup> In our study, 20.8% of patients sensitised to house-dust mite were sensitised to *L. destructor* while 41.7% of patients sensitised to *L. destructor* were sensitised to *D. pteronyssinus*. However, it should be noted that house-dust mites cross-react more strongly to *Acarus siro* and *Tyrophagus putrescentiae* than to *L. destructor*.<sup>19</sup>

Although we test for *L. destructor* at our clinic, the most important storage mite in the Free State has not been determined. *L. destructor* is the predominant storage mite in Europe, while *Blomia tropicalis* is the predominant storage mite in tropical areas such as Florida and Venezuela.<sup>8,9,11,12</sup> *B. tropicalis* has been found to produce the strongest IgE response of the storage mites among grain mill workers in Cape Town.<sup>17</sup>

Although storage mites have been shown to be important allergens, both in farmers<sup>6-9</sup> as well as in an urban population,<sup>9-11</sup> this was not the case among our patients. This may also be due to the low humidity. Storage mites require higher humidity levels for optimum living conditions than house-dust mites and are associated with damp housing conditions.<sup>10</sup>

The relatively high rate of sensitisation to moulds despite the low humidity in the Free State in patients with allergic rhinitis was also found by Mercer *et al.*<sup>4</sup> This degree of sensitisation is comparable with that found in Cape Town.<sup>13</sup>

The rate of sensitisation to animal danders was lower than that found in previous studies conducted at Universitas Academic Hospital.<sup>4,5</sup> This could be due to a difference in the patient population studied – at the time of the previous studies, Universitas Academic Hospital was an exclusively white hospital. It was not possible to determine from the clinical records whether household pets were kept by the patients concerned.

Because of the relatively low rate of sensitisation to olive tree and the fact that it was never the sensitising allergen in monosensitised patients, we do not feel that it should be included in the standard allergen test battery in the Free State. Although rye grass and cat epithelia were also not the sensitising allergen in monosensitised patients, there was a relatively high rate of sensitisation to rye grass and we feel that the results of more monosensitised patients need to be examined before recommending whether it can be

excluded from the test battery. The necessity of ascertaining sensitisation to cat epithelia for allergen avoidance purposes makes it an important part of the allergen test battery.

The fact that most of our patients had moderate-severe persistent allergic rhinitis is to be expected because of the high rate of pollen sensitisation and because these are the patients most likely to seek treatment.

## CONCLUSION

Nasal obstruction is the most common symptom in patients with allergic rhinitis in the Free State. Grass and maize pollen are the most common allergens, with Bermuda grass pollen being significantly more common in patients from urban areas. House-dust mite sensitisation is less common than in the coastal areas of South Africa.

## Declaration of conflict of interest

The authors have no conflict of interest.

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