

PREVALENCE OF ALLERGIC DISEASE AND RELATED ALLERGENS IN PAKISTAN IN 2007

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ABSTRACT

Objective: To identify the frequency of allergic diseases and the causative factors in patients of all the four provinces of Pakistan as well as from Rawalpindi and Islamabad.

Methodology: Secondary data for the year 2007 was analyzed. Skin prick was the method adopted for analyzing the response of the patients to allergies.

Results: The results were analyzed and it was found that allergic rhinitis (24.62%) and urticaria (24.04%) were the most common diseases. When city and province data was analyzed it was found that allergic rhinitis was the main allergic disease of Islamabad, NWFP (Khyber Pakhtunkhwa) and Sindh. Similarly urticaria was the commonest allergic disease of Rawalpindi and Baluchistan. Mixed cases of respiratory diseases were common in Punjab and NWFP (Khyber Pakhtunkhwa). Pollen, dust and Paper mulberry were the main aero allergens involved in triggering the disease beside thresher and raw cotton allergens as detected through IgE mediated skin prick test.

Conclusion: It is concluded that allergy presents with a wide variety of clinical manifestations. Allergic Rhinitis was the main disease but cases of bronchial asthma and mixed respiratory allergies were also not less. Urticaria was the main skin disease. Aeroallergens were the main causative or triggering factor for respiratory tract allergies and their role was also present in urticaria and eczema cases as compared to food allergens which were playing minimal role.

Key words: Allergic Rhinitis, Bronchial Asthma, Immunoglobulin E, Skin Prick Test, Aero Allergens.

INTRODUCTION

Many allergens present in the environment can trigger allergic response in atopics. Generally, atopics are sensitive to more than one allergen¹. The International Study of Asthma and Allergies in Childhood (ISAAC) demonstrated that large variations exist in the prevalence of asthma, allergic rhino-conjunctivitis and eczema throughout the world. Environmental factors and lifestyle are major determinants of the increase in prevalence and severity of these allergic diseases². There is accumulating evidence that both genetic and environmental factors play an important role in the etiology of allergic rhinitis and it is likely that there is a multilevel interaction between these factors³.

The International Study of Asthma and Allergies in Childhood (ISAAC) and European Community Respiratory Health Survey (ECRH)

shows a strong correlation, and these two prevalence studies show variations in the prevalence of asthma, allergic rhinitis and eczema, at the country level. These studies also try to explain the global pattern of asthma prevalence from child to adulthood^{4, 5}. UK epidemiological data reveals that there has been an inexorable rise in the prevalence of allergic disorders. In South Africa and some South East Asian countries allergic rhinitis and asthma is more prevalent in urban than rural populations. However, in most parts of Asia no reliable data is present⁶.

The role of dietary factors in the development of asthma and atopy is still controversial. It has been postulated that the decrease in vegetable consumption and a shift from animal towards vegetable fat consumption has contributed to the increase in the asthma and allergic diseases over the last decades^{7, 8}. The common food allergens causing reaction in

children are milk, egg, wheat, soy, peanuts, tree nuts, fish and shell fish. While majority of children will out grow milk, egg, wheat and soy allergy, hypersensitivity to peanuts, tree nuts, fish and shell fish is often lifelong⁹.

The allergic diseases are on the rise globally, and Pakistan is no exception. There are no studies, in the literature, showing prevalence of allergic diseases in Pakistan. This has prompted and necessitated to undertake a retrospective study of the allergy patients visiting Allergy Centre NIH, Islamabad, from all four provinces of Pakistan including patients from the twin cities of Rawalpindi and Islamabad. The aim of this study was to investigate the prevalence of various allergic disorders in all four provinces of Pakistan, including twin cities of Rawalpindi and Islamabad.

METHODOLOGY

This is a retrospective analysis of patients who were evaluated for allergies at Allergy Center NIH, Islamabad during a period of one year, 2007.

Inclusion criteria were as follows; all new cases with clinical history of allergy, patients age ten to fifty-five years and patients with positive response to skin prick test. Patients undergoing desensitization were excluded from the study. Skin prick test (SPT) indicate an IgE mediated response. All patients had skin test to aero allergens (dust, pollens, paper mulberry, thresher and raw cotton) and food allergens (beef, mutton, chicken, egg, fish and rice). Standardized allergen

extract prepared at NIH were used for allergy skin test.

The skin prick test was performed by placing drop of each allergen, and negative control on the volar surface of the forearm. Bloodless skin prick was made using sterile lancet and extra drops were adsorbed with an absorbent. For aeroallergens, response to each allergen was noted. In case of food allergens, although different antigens were used, positive response to single or multiple allergen was taken as a whole, because the patients positive to any or all of the food extracts were desensitize with mixed protein vaccine, and not individual allergen. The results were interpreted in percentages.

RESULTS

The results of the patients suffering from rhinitis, asthma, urticaria, eczema and conjunctivitis along with their skin prick test were analyzed.

1. All four Provinces including Twin Cities of Rawalpindi & Islamabad

During the year 2007, out of 41,213 patients, 27,283 (66.1%) were diagnosed with various allergic diseases. They were between ages 12 years to 55 years with 35 as median age. The male female patient ratio was 2:1 with 60% male and 30% female. A total of 1,019,911 skin prick tests were performed. Over all result of allergic diseases and skin prick test in percentages are shown in Figure 1 followed by pie charts 1 & 2.

Figure 1 A & B: Overall allergic diseases and Skin prick test results

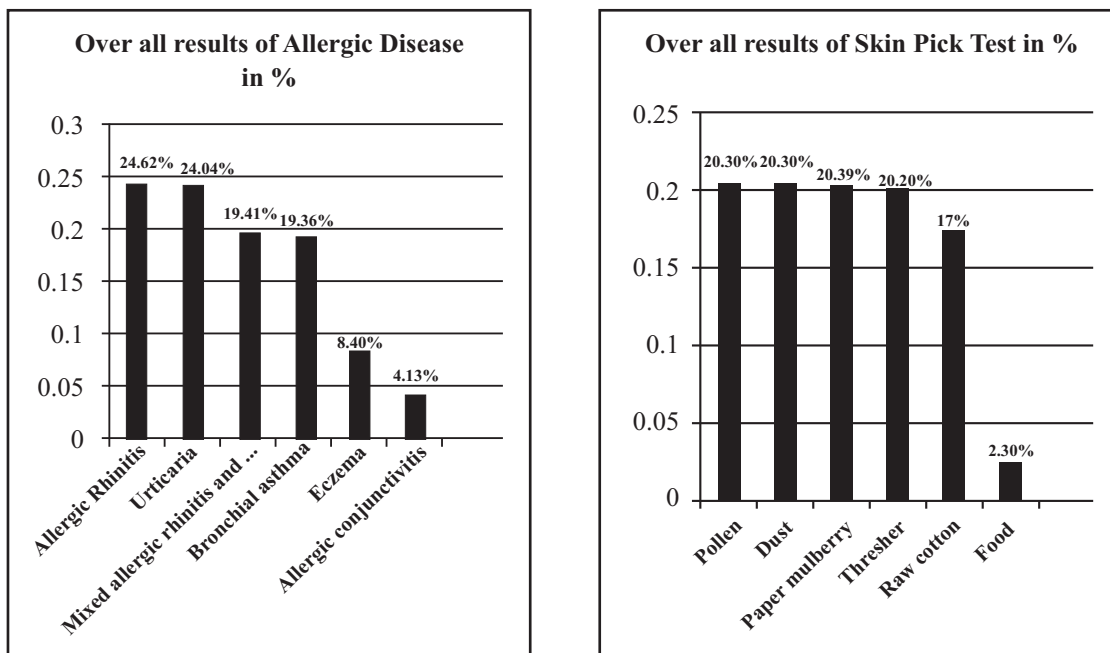


Chart 1: Number of patients in %, from 4 Provinces and Twin cities

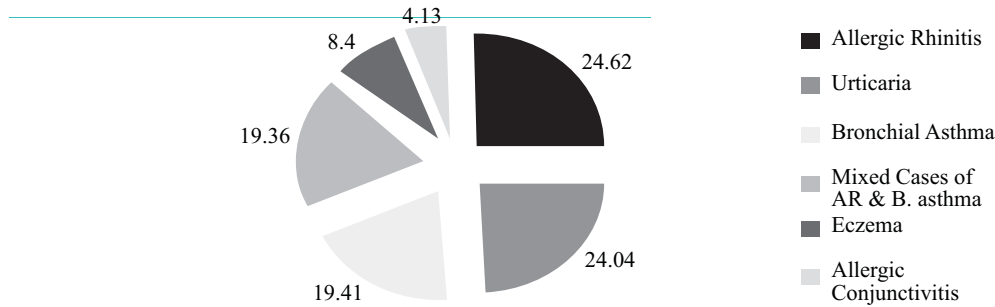
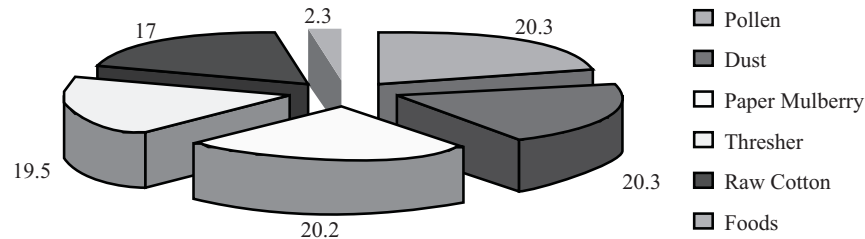


Chart 2: Skin Prick Test % results from 4 Provinces and Twin Cities



2. Results of allergic Diseases and Skin Prick Test Result

a. Islamabad

Out of 27,283 patients, 2459 patients (9%) came with different allergy symptoms and out of 1, 19,911 tests we performed, 10,507 (8.7%) were positive. The results for individual allergic disease and skin prick tests are shown in Figure 2.

b. Rawalpindi

Out of 27283 patients, 3439 (12.6%) has allergic symptoms. Total of 1,19,911 skin prick tests were performed, 14,819 (12.3%) showed positive results (wheal size greater than 2mm). The results in percentage for single disease and positive skin prick test result are shown in Figure 3.

c. Punjab

Out of 27,283 patients, 13,947 (51.1%) had various allergy symptoms. Whereas 61,088 (50.9%) skin prick tests out of 1, 19,911 showed positive results (wheal formation greater than 2mm). The results are shown in Figure 4.

d. NWFP (Khyber Pakhtunkhwa)

For NWFP (Khyber Pakhtunkhwa), 6385

patients (23.4%) out of 27,283 patients had different allergy symptoms. A total of 119,911 tests were performed, 28,766 (24%) were positive (wheal formation greater than 2mm). The results are summarized in Figure 5.

e. Sindh

Similarly, out of 27,283 patients, 770 patients (2.8%) came for evaluation of different allergies and out of 1,19,911 skin tests, 3493 (2.9%) showed positive results (wheal formation greater than 2mm).The results for individual disease and allergen are shown in Figure 6.

f. Baluchistan

Out of 27,283 patients, 283 patients (1%) came for evaluation of different allergies, and out of 1,19,911 skin tests 1238 (1%) showed positive results (wheal formation of greater than 2mm).The results for individual disease and allergen are shown in Figure 7.

The statistical analysis based on number of patents according to allergic disorder are shown in Table 1. The number of patent in Islamabad, Rawalpindi and the four provinces according to Skin Prick Test are given in Table 2 and their percentages are shown in Figure 8.

Figure 2 A & B: Allergic diseases and skin test results in Islamabad

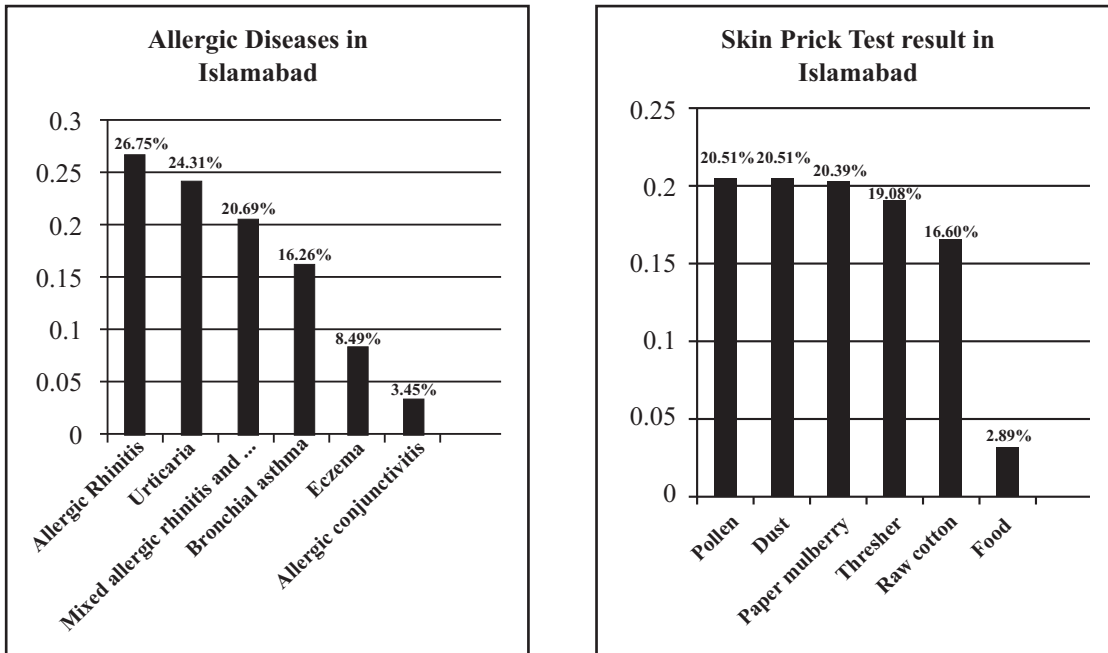


Figure 3 A & B: Allergic diseases and skin test results in Rawalpindi

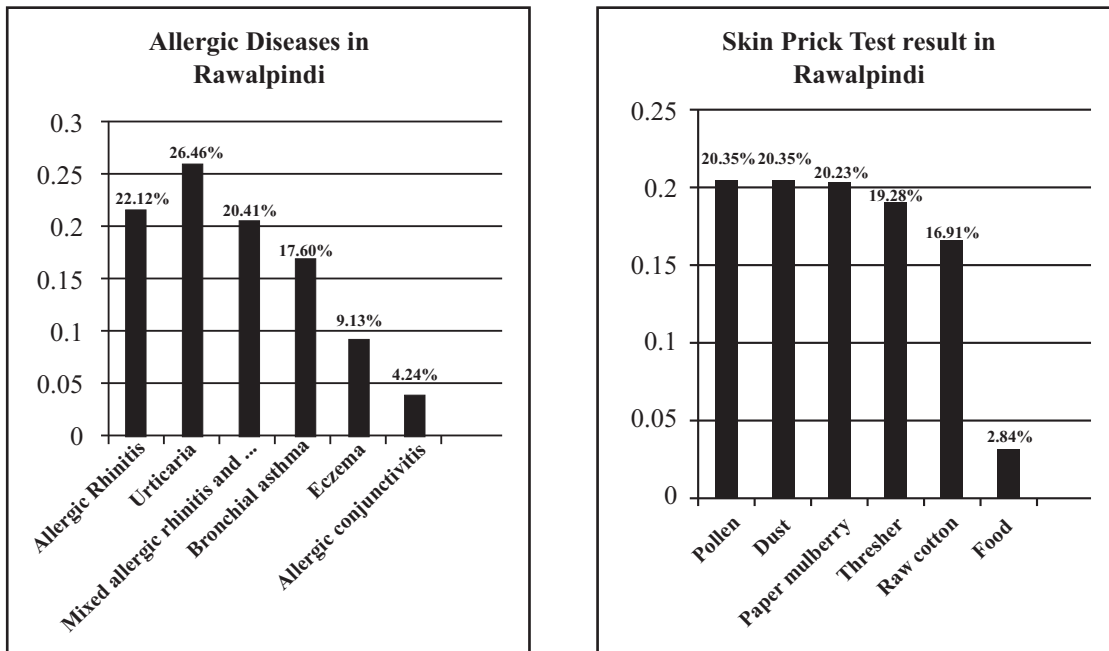


Figure 4 A & B: Allergic diseases and skin test results in Punjab

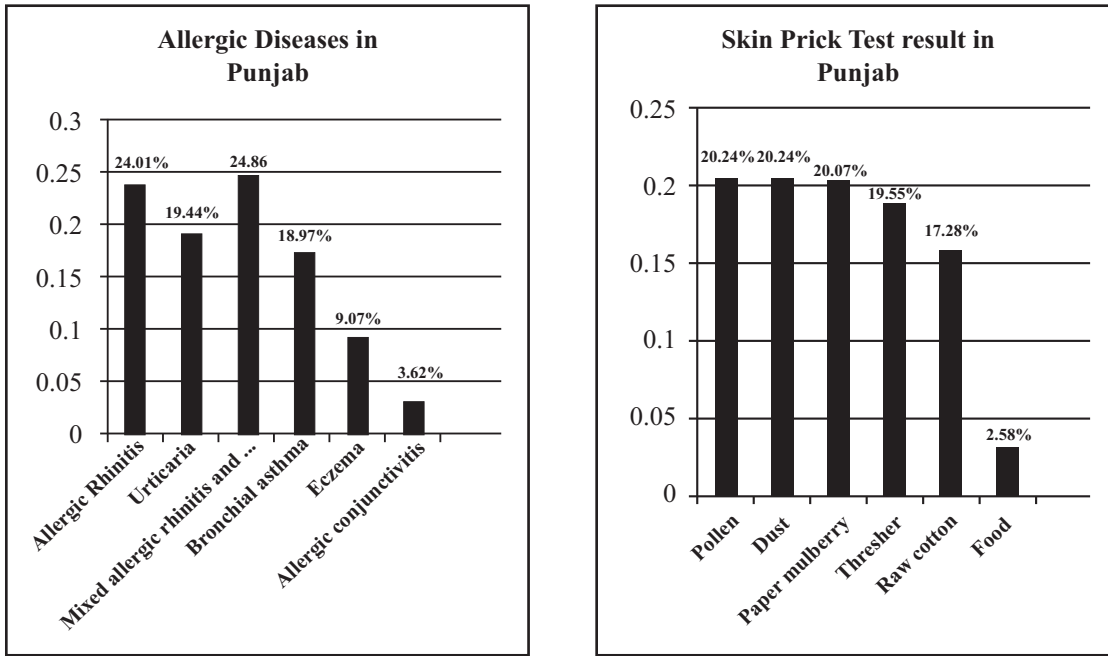


Figure 5 A & B: Allergic diseases and skin test results in NWFP (Khyber Pakhtunkhwa)

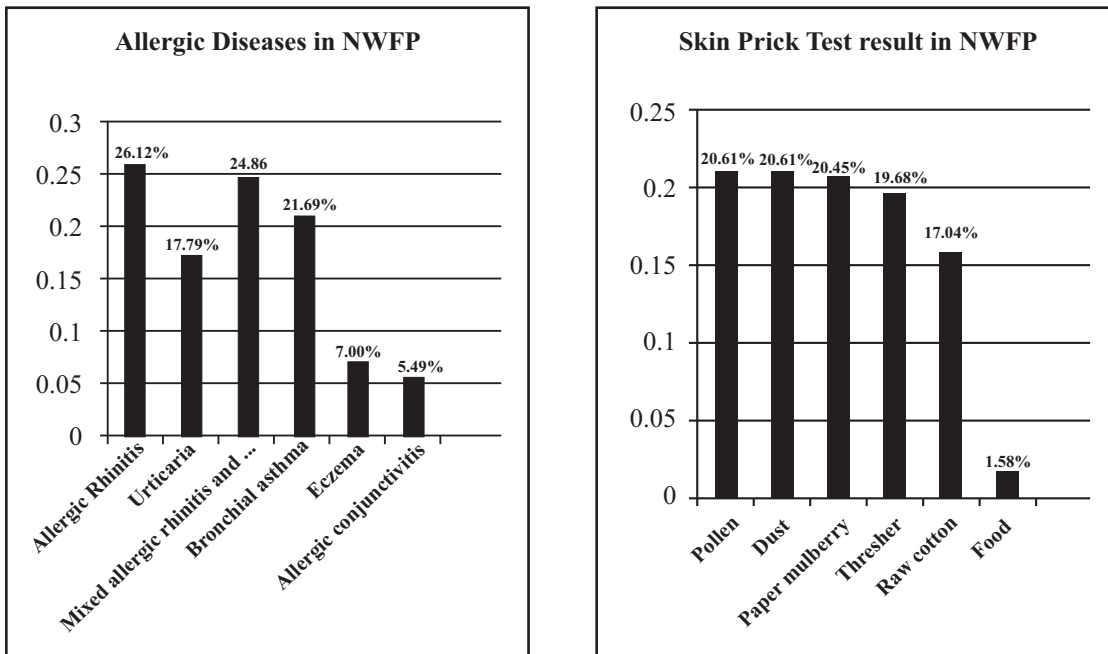


Figure 6 A & B: Allergic diseases and skin test results in Sindh

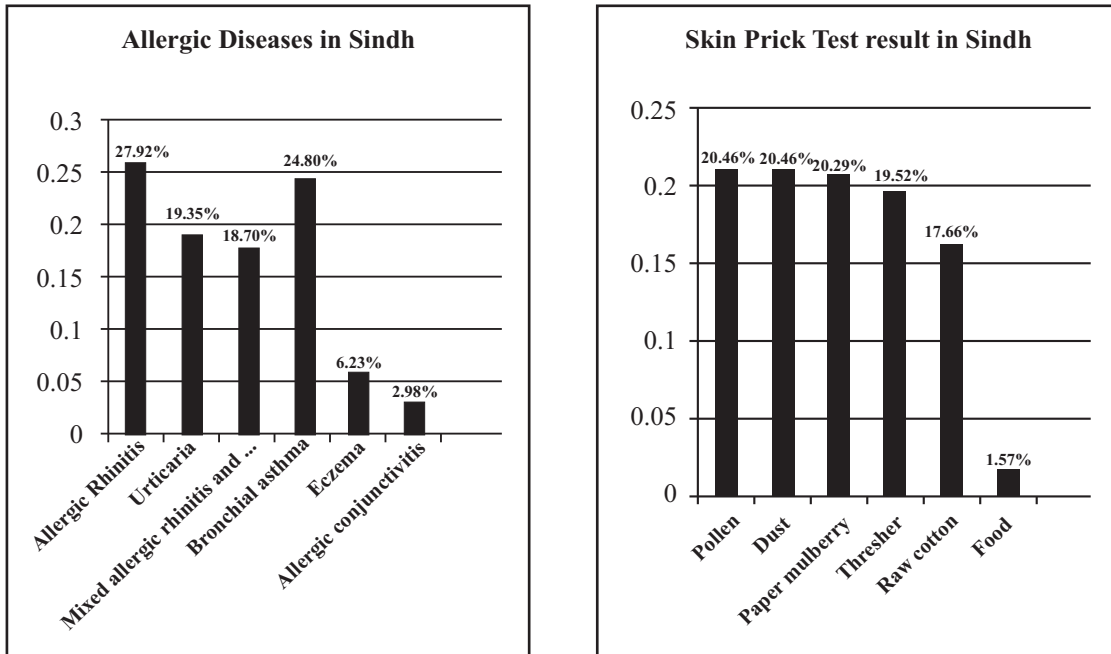


Figure 7 A & B: Allergic diseases and skin test results in Baluchistan

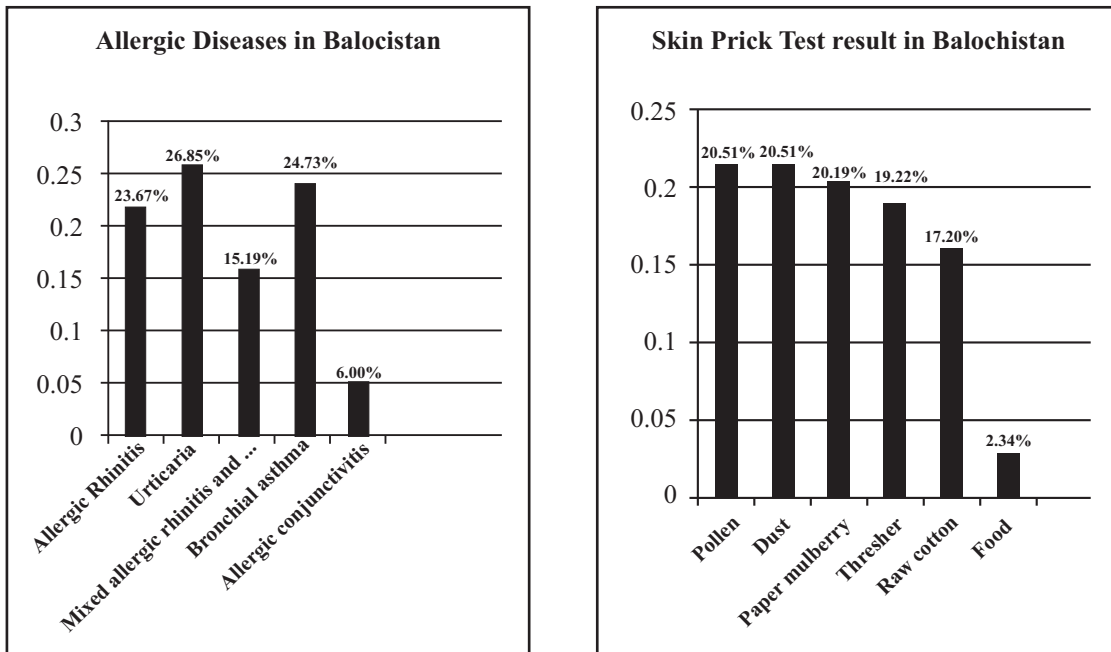


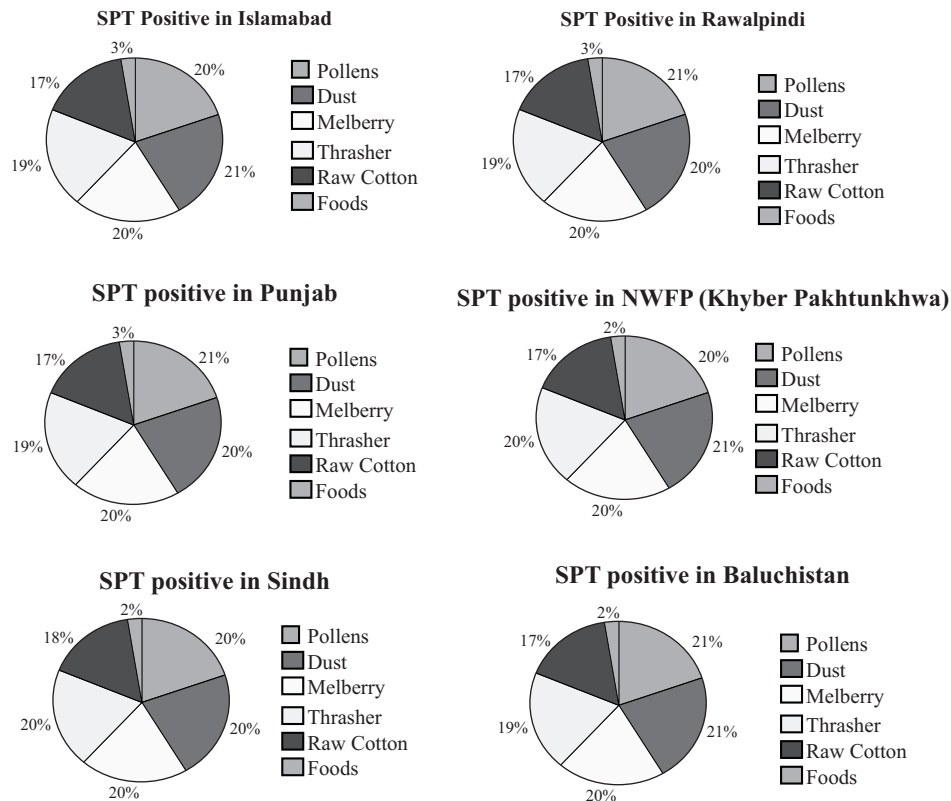
Table 1: Number of patients according to allergic disorders

	Islamabad	Rawalpindi	Punjab	NWFP	Sindh	Baluchistan
Allergic Rhinitis	658	761	3349	1668	215	67
Bronchial asthma	400	606	2446	1385	191	70
AR+ BA	509	702	2712	1136	149	76
Urticaria	598	910	3468	1398	144	43
Eczema Allergic	209	314	1266	447	48	10
Conjunctivitis	85	146	506	351	23	17
Mean	409.83	573.16	2291.16	1064.16	128.33	47.16
Standard Deviation	224.84	288.46	1178.37	542.89	77.01	28.47

Table 2: Number of patients according to skin prick test

Allergens	Islamabad	Rawalpindi	Punjab	NWFP	Sindh	Baluchistan
Pollens	2155	3017	12370	5929	715	254
Dust	2155	3017	12370	5929	715	254
Paper mulberry	2143	2998	12266	5885	709	250
Thrasher	2005	2858	11943	5664	682	238
Raw Cotton	1745	2507	10562	4903	617	213
Food	304	422	1577	456	55	29

Figure 8: Percentage of patient in Islamabad, Rawalpindi and the four provinces according to Skin Prick Test



DISCUSSION

Allergy and Asthma is a global health problem and according to W.H.O, more than 150 million people suffer from asthma. Allergic diseases are on rise and the precise cause is unknown but life style changes may have contributed to this increase^{6, 10, 11}.

Based on the percentages of allergic diseases and skin prick test, combine results (in the twin cities and four provinces of Pakistan) showed that allergic rhinitis (24.62%) was the most common allergic disease in this population. This is similar to epidemiological studies showing increase prevalence of this disease¹². Urticaria (24.04%) was the second common disease, while bronchial asthma (19.41%) and mixed cases of allergic rhinitis and asthma (19.36%) ranked third and fourth respectively, with no significant difference between the percentages of these two respiratory tract disease. These results are not surprising, as majority of patients with asthma suffers from environmental allergies. The prevalence of eczema, in this population, was low (8.40%), as compared to other allergic diseases. Nevertheless, few studies have shown increase incidence of eczema in children and adults^{6, 12, 13}. The cases of allergic conjunctivitis were only 4.13%.

Allergic rhinitis and asthma can either occur independently, or can coexist¹⁴. In atopic individuals allergies of eyes, skin or other organs can occur. In some cases the patients can correlate their skin disease symptoms to food, physical or environmental triggers. In some children the history of rash could often be traced back to infancy, and these children are at risk to develop asthma later in their life¹⁵. To investigate the causative factors for the symptoms, skin prick test records of the patients showed positive responses to most of the aero allergens. However, the number of patients with positive reactions to dust, pollen, and paper mulberry allergen was high, compared to thresher and raw cotton. The percentage of patients with positive reactions to food allergens, in urticaria and eczema cases were low (2.3%). Thus, in this group, aeroallergens were the most common trigger.

There is some controversy with regard to the role of allergy in eczema. Numerous studies have demonstrated an increased rate of sensitization to both foods and aeroallergens in patients with eczema¹⁶. On average, 50 percent of children and 35 percent of adults with eczema are sensitized to common allergens. However, these proportions vary widely^{17, 18}. Two types of dermatologic manifestations are believed to be associated with food allergies: urticaria

/anaphylaxis and food-exacerbated eczema. Food allergy (urticaria/anaphylaxis) can be evaluated either by skin prick testing or in vitro testing for food-specific IgE. Although T-cell mediated reaction has thought to play a role in the pathogenesis of eczema, both IgE mediated and non-IgE mediated hypersensitivity mechanisms has been implicated in the exacerbations of eczema. Double blind placebo control oral challenge test remain the gold standard for confirmation of food allergy. Although Atopy Patch Test (APT) has been recommended to investigate food as a causative factor for eczema, several researchers has concluded that combined SPT and APT significantly enhance the accuracy in diagnosis of specific dietary allergies in children with eczema¹⁹. We routinely perform SPT at our center for evaluation of food hypersensitivity. The positive reaction to food allergens in our population indicates sensitivity but not necessarily clinical reactivity to these allergens. Also, our data support the notion that SPT alone, although help to identify some patient with food allergy but may underestimates the number of patients with food induced eczema exacerbation. APT is labor intensive, expensive, require patient to return in 48 hours for the reading in, would make it impractical for our patient population.

The gender ratio was 2:1 with 60% male and 30% female. The increase in the number of male patients could be due to exposures to outdoor environmental triggers. The twin city data showed that number of urticaria, allergic rhinitis and mixed cases of rhinitis and asthma were the first, second and third common diseases in Rawalpindi. While in Islamabad it appeared to be reverse i.e. allergic rhinitis was the most common, urticaria was second, and mixed cases of rhinitis and asthma was third common diseases. Overcrowding, pollution, dust and indigenous vegetation seem to be additional possible factors in the causation of respiratory and other allergic disorders in Rawalpindi and Islamabad. The percentages of allergic eczema and allergic conjunctivitis were not high in either city. The skin test results showed positive response to aeroallergen in patients with respiratory, skin and ocular diseases. Patients with cutaneous symptoms also showed positive response to food allergens but it was not significant, supporting the role of aero allergens to be the primary triggers/causative factor in urticaria and eczema.

Looking at each province individually for the distribution of allergies, Punjab reported maximum number of cases (51.1%) excluding Rawalpindi. NWFP (Khyber Pakhtunkhwa) was second (23.4%). Less number of cases were reported in Sindh (2.8%) and Baluchistan (1%). The

low number of cases from Sindh and Baluchistan could be because of distance and expensive traveling to reach the Allergy Centre Islamabad.

Mixed cases of rhinitis and asthma (24.86%) and allergic rhinitis alone (24.01%) were the major allergic disorders in the province of Punjab. Again, in NWFP (Khyber Pakhtunkhwa) the mixed cases of rhinitis and asthma (21.89%) and bronchial asthma alone (26.69%) were the first and second most common allergic diseases. Allergic rhinitis was on top (27.92%) in Sindh province and bronchial asthma cases (24.80%) were second in number. In Baluchistan, urticaria (26.85%) was the primary disorder while respiratory tract diseases; bronchial asthma, allergic rhinitis and mixed cases of allergic rhinitis and bronchial asthma (24.73%, 23.67% & 15.19%) were second, third and fourth common diseases. Eczema and allergic conjunctivitis cases were low in all the provinces. Positive skin test indicates the role of aero allergens to be the main trigger in respiratory, skin and eye diseases, in all the provinces. Thus dust, pollution and indigenous vegetation seem to be the main factors in the patients of all the four provinces including the patients from the twin cities of Rawalpindi and Islamabad.

CONCLUSION

In this study majority of the patients suffered from respiratory tract allergies. The province of Punjab had the highest incidence of allergies, making over half of the allergy patients. NWFP (Khyber Pakhtunkhwa) was second, while Sindh and Baluchistan Province had fewer cases of allergy patients. It was also observed that the patients have cutaneous and ocular allergies, such as urticaria, eczemas and allergic conjunctivitis respectively. In this study not only single respiratory tract diseases was seen but mixed pattern of respiratory diseases was also observed. The atopic status of these patients was confirmed from their positive skin prick test results. Which confirm the presence of specific IgE antibodies to the allergens. Results of this study suggest that Aero allergens are the primary triggers not only for respiratory tract diseases but also for the cutaneous disease; urticaria and eczema, and ocular symptoms.

ACKNOWLEDGEMENT

We thank and acknowledge Dr. Muhammad Asghar Pasha, Allergist/Immunologist at Albany Medical College, Albany, NY, USA, as a contributor to this manuscript. He reviewed the article and made suggestions with regard to overall presentation and preparation of this article.

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