

Originals and Papers

Allergies In India : An Analysis of 3389 Patients Attending an Allergy Clinic in Mumbai, India

WIQAR A SHAIKH*, SHIFA WIQAR SHAIKH**

A total of 3389 consecutive patients attending the allergy clinic over a period of 5 years (2003-2007) were analysed by the same physician. Males outnumbered females ie, 53.05% *versus* 46.95%.; 89.17% of the patients were adults and 10.83% were children. More than 80% of the patients were young, below 40 years of age. Nasobronchial allergies viz, asthma, rhinitis or asthma with rhinitis formed the largest group of patients (76.9%). Total serum IgE levels were elevated in every patient (except in those with contact dermatitis). The highest levels of IgE were seen in patients with atopic dermatitis (mean 1615.47 IU/ml). The house dust mite, *D farinae*, showed the highest incidence (77.13%) of positive reactions. Positive reactions to foods (16.48%) were more than that reported in western countries, whereas positive reactions to pollen were comparatively low (8.61%). In the contact dermatitis group, nickel sulphate (38.5%) and *Parthenium hysterophorus* (36.5%) were the commonest allergens on patch testing. Penicillins, sulphonamides and non-steroidal anti-inflammatory drugs were the drugs most commonly found to cause allergic reactions in India. The incidence of atopy is estimated to be 28.96 % in a randomised survey of the Indian population.

[J Indian Med Assoc 2008; 106: 220-6]

Key words : Asthma, rhinitis, dermatitis, dust mites, *Parthenium hysterophorus*, pollen, nickel, penicillin, sulphonamides

Allergies are a common group of diseases seen all over the world. Previous studies¹⁻³ have reported the incidence of various allergies in India. However, the studies are more than a decade old. The present study was, therefore, carried out to determine the current incidence of atopy, incidence and age distribution of allergic manifestations and IgE levels and the positivity rates for different allergens on skin prick testing (SPT). This study also gives an insight into the type of allergies, which could be seen, in a "paediatric allergy clinic" in India. Of special interest were the changes in the current incidences when compared to the previous studies.

MATERIAL AND METHOD

A total of 3389 consecutive new patients attending the allergy clinic from 2003 to 2007 were included in this study. Patients who attended the clinic during this period for complaints other than allergies were excluded. The manifestations warranting inclusion were asthma, rhinitis, urticaria, angio-oedema, atopic dermatitis, contact dermatitis, insect sting allergy, allergic conjunctivitis and

drug allergy. Each patient underwent a detailed history and physical examination followed by : (1) Estimation of serum IgE levels by ELISA (normal range 0 to 50 IU/ml). Patients having contact dermatitis did not undergo IgE level estimation. (2) Allergy SPT using a battery of 90 common allergens in India. For contact dermatitis, patients underwent "patch tests" with commercially available allergens. (3) Patient having asthma underwent spirometry using a Morgan spirometer and those with rhinitis underwent peak nasal inspiratory flow rate using a Youtlen's peak inspiratory flow meter. However, spirometry and nasal flow rates have not been analysed as a part of this study. One hundred forty-two patients having atopic dermatitis were also diagnosed using Hanifin's criteria⁴.

Volunteers (n=1000) were picked up at random, off the streets of Mumbai city and 984 cases were subjected to SPT using 10 common positive allergens in India viz, house dust mite (*D farinae*), *Aspergillus fumigatus*, dog dander, cat epithelia, coconut, peanut, fish, cockroach, house fly and mosquito. No attempt was made to determine the clinical status of the volunteers. One or more positive SPT reaction was taken as the criteria to label volunteers as 'atopic'.

OBSERVATIONS AND DISCUSSION

Of the total 3389 cases, 367 (10.83%) were children up

*MD ((Gen Med), FCPS (Gen Med), Dip Asthma (UK), Allergist and Asthmologist, Allergy and Asthma Clinic, Mumbai 400 008

**MBBS, Medical Intern, Department of Medicine, TN Medical College and BYL Nair Charitable Hospital, Mumbai 400 008

Accepted March 26, 2008

to 12 years of age. Of 367, 151(41.14%) were of 6-10 years of age and the rest 216(58.86%) were >10 to 12 years. Males outnumbered females ie, 53.05% versus 46.95% (Table 1).

The overwhelming ratio in favour of adults in this study is probably, because the 'allergy clinic' is conducted by a physician (and not by a paediatrician). A sizeable section (58.86%) of the children seen, were above 10 years of age. An interesting observation is that the male : female ratio in children was almost 3:1 whereas it was almost 1:1 in adults. It is thus obvious that most male children presenting with allergic manifestations tend to grow out of their allergies during their passage through adolescence and into adulthood, whereas a large number of female children who were asymptomatic or may have had subclinical disease, tend to manifest allergic symptoms when entering adulthood. During adolescence, therefore, watch out for the female child because she may manifest allergies. It is also interesting to note that children manifest a combination of asthma with rhinitis more often than their adult counterparts. More than 80% of patients included in this study belonged to the age group below 40 years; this confirms that allergies affect mainly the younger population and particularly the most productive years of life, resulting in a huge loss to the society at large. Incidentally, only 0.6% of patients were above 60 years, which suggests that the incidence of allergies does decline with age.

Total serum IgE levels were found to be elevated in every patient included in this study (except in patients with contact dermatitis where they were not estimated). As has been reported⁵, IgE levels were found to be highest in patients with atopic dermatitis (Table 2). It is important to observe that no adverse reactions (major or minor) were encountered to SPT in any of the patients including in the study. It could be deduced that SPT is an extremely safe diagnostic tool.

Table 1 — Sexwise Distribution of Cases			
Sex	No of cases		
	Children	Adults	Total
Males	266 (72.48 %)	1532 (50.69%)	1798 (53.05%)
Females	101 (27.52 %)	1490 (49.31%)	1591 (46.95%)
Total	367 (10.83%)	3022 (89.17%)	3389 (100%)

Table 2 — Distribution of Cases with Mean IgE Levels according to Manifestations						
Manifestations	Children		Adults		Total	
	No of cases (%)	Mean IgE levels (IU/ml)	No of cases (%)	Mean IgE levels (IU/ml)	No of cases (%)	Mean IgE levels (IU/ml)
Asthma+ rhinitis	161 (43.8%)	842.95	1072 (35.5%)	679.41	1233 (36.4%)	717.41
Rhinitis	23 (6.3%)	778.69	587 (19.4%)	690.55	610 (18.0%)	684.25
Asthma	15 (4.1%)	829.69	747 (24.7%)	622.03	762 (22.5%)	626.12
Urticaria	43 (11.7%)	541.62	314 (10.4%)	517.95	357 (10.5%)	520.80
Contact dermatitis	11 (3.0%)	-	93 (3.1%)	-	104 (3.1%)	-
Conjunctivitis	6 (1.6%)	599.16	16 (0.5%)	584.79	22 (0.7%)	588.67
Conjunctivitis+ rhinitis	12 (3.3%)	642.89	40 (1.3%)	603.93	52 (1.5%)	612.92
Drug allergies	14 (3.8%)	388.47	93 (3.1%)	383.77	107 (3.2%)	384.38
Atopic dermatitis	82 (22.3%)	1859.07	60 (2.0%)	1282.56	142 (4.2%)	1615.47
Total	367 (10.83%)	-	3022 (89.17%)	-	3389 (100%)	-

The distribution pattern / percentage of various allergic disorders remain virtually unchanged in both children and adults when compared with earlier studies¹⁻³. Undoubtedly, the nasobronchial allergies viz, asthma and / or rhinitis are the commonest allergic manifestations. The incidence of atopic dermatitis reported in this study is much less than that reported from the west⁶. It is difficult to speculate the reasons for the low incidence, especially when the overall incidence of atopy in India is similar to that seen in developed countries. Expectedly, atopic dermatitis is overwhelmingly common in children (22.3%) as compared to adults (2%) (Table 2).

One hundred and seven patients seen with drug allergy had either reacted to penicillin, sulphonamides or to non-steroidal anti-inflammatory drugs (NSAIDs). Penicillin, NSAIDs and sulphonamides were the commonest drugs causing allergic reactions (Table 3). Most drug allergies (n=80) presented with skin manifestations (urticaria, angio-oedema, fixed drug rash) (Table 4).

In western studies, pollen allergens have shown a high positive percentage (up to 20%)⁷. However, the positivity rate for pollen in this study is just 8.61% which suggests that pollen allergy is less common in India (Table 5). On the other hand food allergies are probably more common

Table 3 — Distribution of Cases according to Drug Allergy (n=107)			
Drugs	No of cases		
	Children	Adults	Total
Sulphonamides	4	11	15
Penicillin	3	3	6
Non-steroidal anti-inflammatory (aspirin, ibuprofen, analgin, etc)	5	74	79
Others	2	5	7
Total	14	13	107

Table 4 — Distribution of Cases according to Manifestations of Drug Allergies			
Manifestations	No of cases		
	Children	Adults	Total
Anaphylaxis	0	5	5
Skin rash (urticaria, fixed drug rash, etc)	9	71	80
Rhinitis	2	6	8
Asthma	3	11	14
Total	14	93	107

here since the positivity rate for food allergens was found to be 16.48% as compared to 2% to 6% in western report⁸. *Parthenium hysterophorus* is the commonest positive pollen allergen (17.33%) in India (Table 6). The weed which is commonly called "Congress grass" is not native to India and was introduced here accidentally through wheat supplies from the USA in the 1960s. It found a conducive, tropical environment for its growth and has, in fact, grown and spread like wild fire throughout the country. Parthenium allergy is a common cause of asthma, rhinitis and air-borne contact dermatitis. The last mentioned is a particularly widespread condition presenting with a severely itchy dermatitis of exposed areas such as the face, neck, hands and feet and especially the face presenting a ghost like appearance. Parthenium allergy has been extensively studied in India earlier⁹⁻¹¹.

In India the incidence of insect allergy is high with an overall positivity of 53.24%. Indian allergy sufferers (50% or more) are positive to one or more of the 3 common insects viz, housefly, mosquito and cockroach.

An increase in positivity to house dust mites (*D farinae* and *D pteronyssinus*) is noted in comparison to earlier studies (55.68% to 64.04%)¹⁻³. *D farinae* (77.13%) is more common in India as compared to *D pteronyssinus* (41.32%). *D farinae* has the highest positivity rate amongst all allergens. It is important to note here that India is *D farinae* country.

Amongst the food allergens, the commonest positive allergens in the west such as milk, egg, meat and wheat have much less positivity in India. The highest positivity

Table 5 — Skin Prick Test Positive Percentage for Various Allergen Groups			
Allergen groups	Per cent positive		
	Children	Adults	Total
Pollen	8.22%	8.65%	8.61%
Fungi	20.69%	22.68%	22.46%
Insects	52.47%	53.33%	53.24%
Dust mites	63.96%	64.05%	64.04%
Dusts	37.12%	39.48%	39.23%
Danders/fabrics	21.32%	25.17%	24.75%
Foods	15.44%	16.61%	16.48%
Skin tests were performed in 3178 out of 3389 patients (2836 adults and 342 children)			

Table 6 — Skin Test Positivity Percentage for Some Individual Allergens			
Allergens	Per cent positive		
	Children	Adults	Total
Pollen :			
<i>Parthenium hysterophorus</i>	11.68%	18.02%	17.33%
<i>Cynodon dactylon</i>	14.02%	13.36%	13.42%
<i>Cocos nucifera</i>	10.34%	7.51%	7.81%
Fungi :			
<i>Alternaria tenuis</i>	25.67%	26.80%	26.69%
<i>Aspergillus fumigatus</i>	24.96%	25.07%	25.03%
Insects :			
Mosquito	57.91%	59.77%	59.55%
House fly	52.26%	49.96%	50.22%
Cockroach	46.88%	50.53%	50.11%
Dust Mites :			
<i>D Farinae</i>	74.29%	77.46%	77.13%
<i>D Petronyssinus</i>	38.42%	41.68%	41.32%
Danders :			
Cat	35.38%	42.28%	41.52%
Dog	36.77%	40.34%	39.97%
Foods :			
Peanuts	26.55%	23.69%	24.02%
Chocolate	25.18%	22.64%	22.39%
Fish	23.48%	21.26%	21.49%
Coconut	19.86%	20.17%	20.15%
Cashew nut	21.39%	19.96%	20.11%
Legumes (dals)	22.63%	18.65%	19.08%
Soya bean	19.69%	18.83%	18.90%
Lemon	13.26%	17.63%	17.16%
Milk	13.04%	12.80%	12.85%
Wheat	11.23%	11.95%	11.85%
Chicken	8.41%	7.55%	7.66%
Rice	7.22%	7.48%	7.30%
Meat	9.63%	6.98%	7.27%
Egg	6.97%	7.30%	7.27%

rates are seen with peanuts, chocolate, fish and coconut. Soya bean also has a high rate of positive reactions (18.90%) and this blows away the myth that soya milk is less allergenic than cow and buffalo milk. Some of Indian allergy sufferers (7.30%) are positive to rice. Indeed, rice has been reported to be a rare allergen in the developed countries. There has been a quantum increase in the incidence of cocoa (chocolate) allergies which is now the second commonest food allergen in India. Interestingly, the SPT positivity rates for various allergen groups, as well as for individual allergens were remarkably similar in

children and adults.

The contact dermatitis group analysed in this study revealed *Parthenium hysterophorus* (overall 36.5%, children 18.2%, adults 38.7%) and nickel sulphate (overall 38.5%, children 18.2%, adults 40.1%) as the commonest culprit allergens. Thus females wearing artificial jewellery (coated with nickel) or coin handlers have been found to suffer from nickel induced contact dermatitis in appropriate parts of the body. The 5 children presenting with contact dermatitis had varied causative factors viz, nickel (artificial jewellery), plastic/rubber slippers / shoes, detergents and vegetable / fruit juice.

The incidence of atopy in western countries has been estimated to be 20 to 30%¹²; the present study concludes that the incidence of atopy in a developing country like India is similar to that found in the west. There has been a definite increase in incidence of atopy in India from 25.3 % in 1997² to 28.96 % in 2007. Out of 984 volunteers, 285 (28.96%) showing one or more positive reactions to SPT making the incidence of 28.96%.

This study concludes that the pattern of allergic diseases in both children and adults in India and the allergens commonly seen here, are completely different from that seen in the west. Thus, we are justified in coining the term 'tropical allergy and asthma' as a new subspecialty of allergy¹³.

This study concludes that : (1) Atopy appears to be almost as common in India as it is in western countries. (2) When compared with earlier studies, the distribution pattern of various allergic disorders remains virtually unchanged in both children and adults. (3) More females manifest allergies during adolescence and adult than during their childhood. (4) Pollen allergy is less common in India and food allergy is more common. (5) The house dust mite *D farinae* has the highest positivity rate amongst allergy sufferers in India. (6) There is a quantum increase in the incidence of cocoa (chocolate) allergy in India as compared to a decade ago ; this is now the second commonest positive food allergen in this country. (7) More than 50% of allergy sufferers in India are positive to the 3 common insects, mosquito, cockroach and house fly. (8) NSAIDs and sulphonamides cause more drug allergies in India. Skin

rash is the commonest manifestation of drug allergies. (9) Nickel sulphate and *Parthenium hysterophorus* are the commonest causes of allergic contact dermatitis in India.

ACKNOWLEDGMENT

The authors are grateful to Dr Sanjay Oak, Dean, TN Medical College and Charitable Hospital, Mumbai for permitting the second author to participate in this study.

REFERENCES

- 1 Shaikh WA — Allergies and asthma in India : an analysis of 2467 patients seen over a six-year period. *Indian J Clin Pract* 1998; **8**: 23-6, 46-7.
- 2 Shaikh WA — Allergies in India : an analysis of 1619 patients attending an allergy clinic in Bombay, India. *Int Rev Allergy Clin Immunol* 1997; **3**: 101-4.
- 3 Shaikh WA — Allergies in children in India : an insight. *Paediatr Pulmonol Update* 1998; **10**: 15-9.
- 4 Hanifin JM, Rajka G — Diagnostic features of atopic dermatitis. *Acta Derm Venereol Suppl (Stockh)* 1980; **92**: 42-7.
- 5 Hamilton RG — Laboratory tests for allergic and immunodeficiency diseases. In: Adkinson NF Jr, Yunginger JW, Busse WW, editors. *Middleton's Allergy Principles and Practice*. 6th ed. Philadelphia: Mosby, 2003 : 611-30.
- 6 Bougouniewicz M, Leung DMY — Atopic dermatitis. In: Adkinson NF Jr, Yunginger JE, Busse WW, editors. *Middleton's Allergy Principles and Practice*. 6th ed. Philadelphia: Mosby, 2003: 1559-80.
- 7 Thompson PJ, Stewart GA, Samet GM — Allergens and pollutants. In: Holgate ST, Church MK, Lichtenstein LM, editors. *Allergy*. 2nd ed. London: Mosby, 2001 : 213-42.
- 8 Sampson HA — Adverse reactions to foods. In: Adkinson NF Jr, Yunginger JE, Busse WW, editors. *Middleton's Allergy Principles and Practice*. 6th ed. Philadelphia: Mosby, 2003 : 1619-44.
- 9 Lonkar A, Mitchell JC, Calnan CD — Contact dermatitis from *Parthenium hysterophorus*. *Trans St Johns Dermatol Soc* 1974; **60**: 43-53.
- 10 Lonkar A, Nagasampagi BA, Narayanan CR, Landge AB, Sawarkar DD — An antigen from *Parthenium hysterophorus* Linn. *Contact Dermatitis* 1976; **2**: 151-4.
- 11 Rao M, Prakash O, Subba Rao PV — Reaginic allergy to *Parthenium* pollen : evaluation by skin test and RAST. *Clin Allergy* 1985; **15**: 449-54.
- 12 Mutius EV, Martinez FD — Natural history, development and prevention of allergic diseases in childhood. In: Adkinson NF Jr, Yunginger JW, Busse WW, editors. *Middleton's Allergy Principles and Practice*. 6th ed. Philadelphia: Mosby, 2003: 1169-74.
- 13 Shaikh WA, editor — *Principles and Practice of Tropical Allergy and Asthma*. Mumbai: Vikas Medical Publishers, 2006.