

**ALLERGIC SENSITIZATION DUE TO *ASPERGILLUS* SPP.**Mitali Das<sup>1</sup>, Karuna S. Verma<sup>2</sup> and Sapna Rai<sup>1\*</sup><sup>1</sup>Department of Microbiology, Mata Gujri Mahila Mahavidyalaya Jabalpur.<sup>2</sup>Department of Post Graduate Studies and Research in Biological Science, Rani Durgawati University, Jabalpur-01 (M.P.) – India.Article Received on  
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**\*Corresponding Author****Dr. Sapna Rai**Department of  
Microbiology, Mata Gujri  
Mahila Mahavidyalaya  
Jabalpur.**ABSTRACT**

Allergic (atopic) diseases result from an interaction between individual susceptibility and revelation to environmental factors. Diagnosis of Fungal allergens should be done because they cause pathogenic and allergic problem to human being. In this study detection and diagnosis of offending *Aspergillus* allergens were undertaken in Jabalpur. Skin prick test is usually the first test recommended. *Aspergillus flavus* (7.45) showed maximum allergenicity with 2+ to 4+ reaction.

**KEYWORDS:** Allergy, Skin prick test, fungal flora.**INTRODUCTION**

Allergies are hypersensitivity reactions of the immune system to specific substances called allergens; the most severe form of allergy is anaphylactic shock, which is a medical emergency (Minawi, 2005). Antigens are usually proteins and are termed allergens, such proteins must be stable and resistant to proteases or that they possess cryptic structural features that are particularly provocative to the immune system (Aalberse, 2000 and Aalberse et al. 2001). In this present investigation fungal allergy determine by skin prick test.

**METHOD AND MATERIAL****Skin Prick test** (Shivpuri, 1962 and Verma et al., 2006).

Skin prick testing is usually the first test recommended when an allergy is suspected. Detection and diagnosis of the offending allergens were undertaken in collaboration with Dr. N. K. Parihars allergy clinic situated at Kanchghar Chowk Jabalpur and Dr. Sandeep Jain Consultant Jabalpur Hospital and Prasann ENT Allergy Clinic situated at Nagar Nigam road, Marhatal Jabalpur.

The skin prick was carried out on the inner forearm. The arm is coded with a marker pen for the allergens to be tested. A drop of the allergen (extract) solution is placed by each code. The skin is then pricked through the drop using the tip of a lancet. The size of the wheal varies with the average being 3-5 mm in diameter.

Eg. +ve histamine buffer sample = 5mm.

-ve phosphate buffer sample = 3mm.

Usually reactions of 2+ to 4+ were obtained to be significant.

## RESULT AND DISCUSSION

Osborne et al. 2006 reported that the most frequently occurring indoor and outdoor fungal types were *Penicillium/Aspergillus* type spores, *Cladosporium* sp., Basidiospores, and Ascospores. These four types of fungi were observed in 70% or more of the homes. In this study during Skin Prick Test, 5 *Aspergillus* allergens were tested to 161 patients. *Aspergillus flavus* (7.45%) showed maximum allergenicity with 2+ to 4+ reaction. After this allergen *Aspergillus fumigatus* and *Aspergillus tamari* showed allergenicity of 6.21% allergenicity in 2+ to 4+ reaction. Nazari et al. 2019 reported prevalence of Hypersensitivity reactions to fungal aeroallergen in patient with allergic disorders in Iran. Serum-specific IgE and skin prick tests were used in 6 and 20 studies, respectively. *Aspergillus fumigatus* and *Alternaria alternata* sensitization was the most common allergic sensitization among the patients with allergic disorders.

Verma et al. 2011 reported that prevalence of allergy was more common in the age group 20 – 40 years. Verma and Soni (1997) studied allergenicity of certain airborne fungal spore at Jabalpur city. It was observed that the percentage of fungal allergic disorders was more in males (64.38%) than females (36.62%) During these study 34 cases of patient showed positive sensitivity to fungal allergy. Out of 34 fungal allergic patients, 14 patients were allergic to *Aspergillus* spp. During this present work, among *Aspergillus* allergic patients 32.36% patients are male and 57.15% patients are Female. In *Aspergillus* allergic male patient 21-40 age group that is 23.53% are sensitive to fungal allergen. Similarly in female allergic patients 21-40 age group patients that are 32.36% of patients showed more allergenicity to fungal allergen. Chowdary et al. (2011) studied 550 patients visiting the ENT clinic with symptoms related to respiratory allergies during the period from January 2000 to September 2009. The most common age group with respiratory allergies was 37.03 yrs and the most common age group for mold sensitivity was 39.25 yrs.

Studies based on skin tests suggest that at least 3 – 10% of adults and children worldwide are affected by fungal allergy (Bush and Portnoy 2001; Gregory 1973 & Grigoreas et al.1995). Present study revealed that maximum volunteered 64.28% patients belong to adult age 20-40 years. About 23.53% patients are sensitive belong to extreme age group 41-60. The adolescent age group that is 0-20 and senior age group that is 60-80 is showing less allergenicity (7.14%) towards fungal allergen. In Australia, 27% of children had wheeze (Woolcock et al. 2001). Recent survey carried out in India shows that 20-30% of population suffers from allergic rhinitis and that 15% of them suffer from asthma alone (Chhabra et al.1998).

Denning D. et al. 2014 reported that sensitization to fungi and long term or uncontrolled fungal infection are associated with poor control of asthma, the likelihood of more severe disease and complications such as bronchiectasis and chronic pulmonary aspergillosis. Modelling suggests that >6.5 million people have severe asthma with fungal sensitizations (SAFS), up to 50% of adult asthmatics attending secondary care have fungal sensitization, and an estimated 4.8 million adults have allergic bronchopulmonary aspergillosis (ABPA). In this investigation patient are mainly suffering from three allergic disorders that are Allergic Rhinitis, Asthma and Urticaria Problem. In total allergic patient 41.17% patients are suffering from Allergic Rhinitis, 23.54% have Asthmatic problem and 35.29% allergic patients are suffered from Urticaria problem. Asthma among Greek population is re-ported to be as high as 9% (Anthracopoulos et al. 2001). Makris et al. 2010 reported that One-hundred and sixty five out of 316 patients (49.1%) stated self reported-asthma while in 63/316 (19.9%) asthma was documented with spirometry. One hundred out of 165 (60.6%) had rhinitis as first clinical manifestation while in 24/165 (14.5%) asthma symptoms appeared first; the remaining 31/165 (24.9%) reported simultaneous onset of upper and lower airways' symptoms. About 68.5% were sensitized to seasonal allergens exclusively.

**Table No 1: Skin Prick Test Showing Positivity among 161 (34 *Aspergillus* allergy Cases) Allergic Patient to Different *Aspergillus* Antigens.**

S. No.	Fungal Antigen	No. of patients showing Positive reaction				Total No of 1+ to 4+ reaction		Total No of 2+ to 4+ reaction		Total No of 3+ to 4+ reaction	
		+1	+2	+3	+4	No	%	No	%	No	%
1.	<i>Aspergillus fumigatus</i>	1	6	4	-	11	6.83	10	6.21	4	2.48
2.	<i>Aspergillus flavus</i>	2	5	6	1	14	8.69	12	7.45	7	4.34
3.	<i>Aspergillus niger</i>	2	5	3	-	10	6.21	8	4.96	3	1.86
4.	<i>Aspergillus versicolor</i>	5	3	5	1	14	8.69	9	5.59	6	3.72
5.	<i>Aspergillus tamari</i>	4	6	2	2	14	8.69	10	6.21	4	2.48

+Ve Histamine buffer Sample -5mm

- Ve Phosphate buffer Sample -3mm

s Then 5mm-3mm =2mm

Reaction	Symbol	Prick test
-	-	No. of W.F. or less then 1mm diameter.
+1	+	W.F.,2mm or More then 2mm
+2	++	W.F. 4mm or More than 4mm.
+3	+++	W,F, 4mm-6mm.
+4	++++	W.F. More than 6mm.

W =Wheal

F = Flare

**Table no. 2: Age, sex and allergic incidence among patients.**

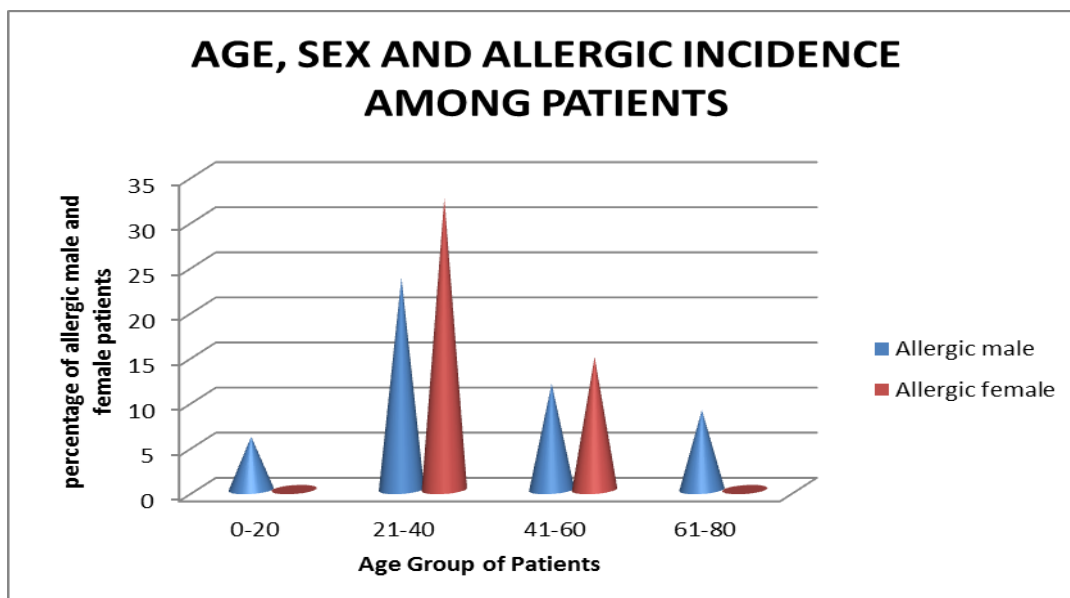
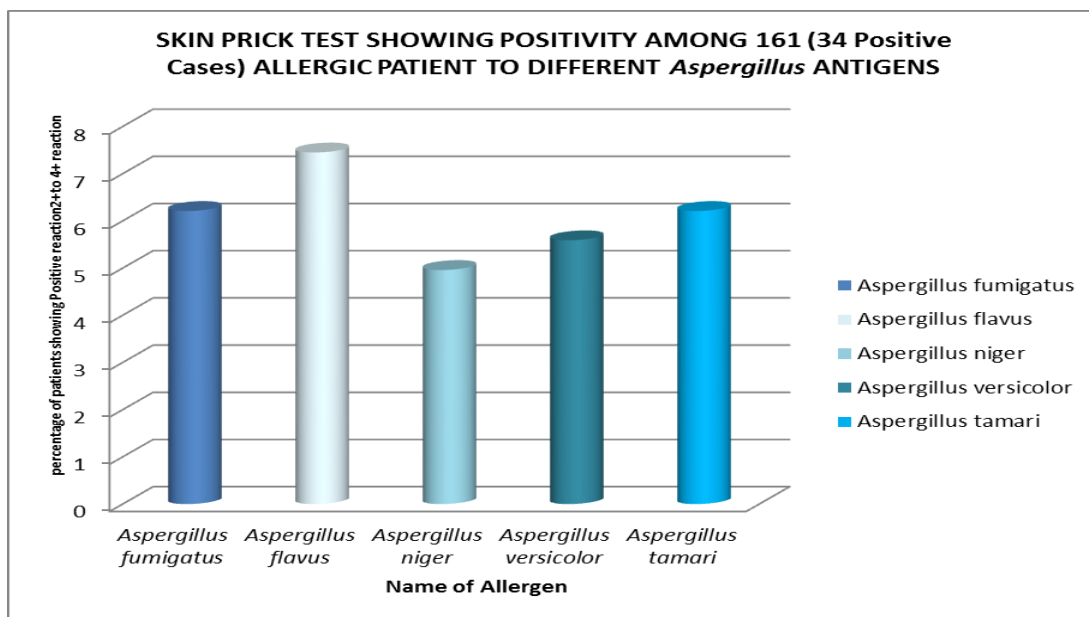
S. No.	Age groups of patients	Allergic male		Allergic female		Total no. of both sex	Percentage
		No.	%	No.	%		
1	0-20	1	5.88	0	0	1	7.15
2	21-40	3	23.53	6	32.36	9	64.28
3	41-60	1	11.76	2	14.70	3	21.42
4	61-80	1	8.83	0	0	1	7.15
	Total	6	42.85	8	57.15	14	100

**Table No – 3: Quantitative Evolution And Percentage Distribution Of Allergic Disorder.**

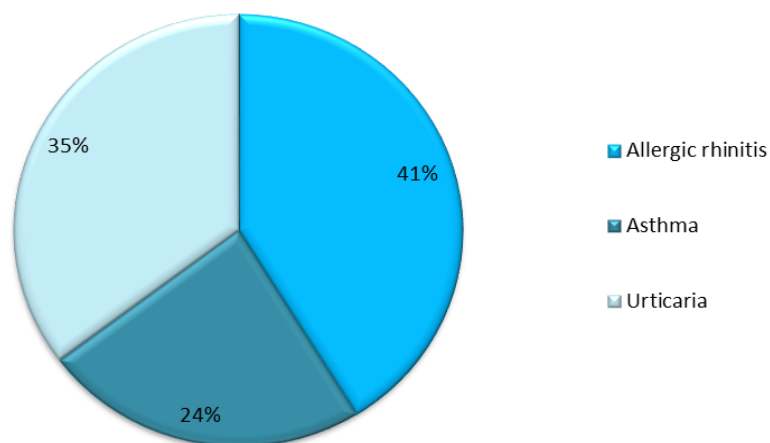
S No.	Symptoms	No. of Cases	Percentage
1.	Allergic rhinitis	14	41.17
2.	Asthma	8	23.54
3.	Urticaria	12	35.29
	Total	34	100



Fig. 1. - Skin Prick Test performed on fore arm of allergic patients



### PERCENTAGE DISTRIBUTION OF ALLERGIC DISORDER AMONG FUNGAL ALLERGIC PATIENTS



### CONCLUSION

Clinical studies of different fungal allergen were performed in the presence of doctor, thus it can be concluded that the maximum concentration of spore could be correlated with the many allergic disorders in human beings. In this present study *Aspergillus flavus* (7.45) showed maximum allergenicity. Hence such study in Jabalpur dwellings will helpful for the proper treatment of allergic patients.

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### REFERENCES

6. Aalberse R. (2000) Structural biology of allergens. *J Allergy Clin Immunol*, 106: 228-38.
7. Aalberse R.C., Akkerdaas J. and van Ree R. (2001) Cross-reactivity of IgE antibodies to allergens. *Allergy*, 56: 478-90.
8. Anthracopoulos M., Karatza A., Liolios E., Triga M., Triantou K. and Priftis K. (2001) Prevalence of asthma among schoolchildren in Patras, Greece: three surveys over 20 years. *Thorax*, 56: 569-571.

9. Bush R.K. and Portnoy J.M. (2001) The role and abatement of fungal allergens in allergic diseases. *J. Allergy. Clin. Immunol*, 107: 430-440
- Gregory P. H. (1973) The microbiology of the atmosphere. *London: Leonard Hill*.
10. Chhabra S.K, Gupta C.K., Chhabra P., and Rajpal S. (1998) Prevalence of bronchial asthma in schoolchildren in Delhi. *J Asthma*, 35: 291-6.
11. Chowdary V S., Prasanna L., Sangram V., Rani S., Kumar V.EC (2011). Role of Fungi (molds) in allergic airway disease - An Analysis in a South Indian Otolaryngology center. *Indian J Allergy Asthma Immunology*, 25(2): 67-78.
12. Denning D. W., Pashley C., Hartl D., Wardlaw A., Godet C., Giacco S. D., Delhaes L. and Sergejeva S. (2014). Fungal allergy in asthma—state of the art and research needs. *Clinical and Translational Allergy*, 4(14): 1-23.
13. Gregory P. H. (1973) The microbiology of the atmosphere. *London: Leonard Hill*.
14. Grigoreas C.H., Vourdas D., Eliftheriadis I. and Giatromonolakis N. (1995) Epidemiological study of asthma on a population of Greek adults. *Hell Allergol and Clin Anosol*, 48: 223-235.
15. Makris M., Koulouris S., Koti I., Aggelides X., Sideri K., Chliva C., Vassilatou E., and Kalogeromitros D. (2010) Temporal relationship of allergic rhinitis with asthma and other co-morbidities in a Mediterranean country: a retrospective study in a tertiary reference allergy clinic. *Allergol Immunopathol (Madr)*, 38(5): 246-253.
16. Minawi W. A.T. (2005) Prevalence of Asthma and Allergy and Their Risk Factors Among An-Najah National University Students - Nablus – Palestin. *An-Najah National University*.
17. Zeinab Nazari, Javad Ghaffari, Negar Ghaffari, Fatemeh Ahangarkani (2019) A review on hypersensitivity reactions to fungal aeroallergens in patients with allergic disorders in. *Iran Current Medical Mycology*, 5(1): 42-47.
18. Osborne M., Reponen T., Adhikari A., Cho S., Grinshpun S. A., Levin L., Bernstein D. I. and Grace LeMastersl. (2006) Specific fungal exposures, allergic sensitization, and rhinitis in infants. *Pediatr Allergy Immunol*. September, 17(6): 450–457.
19. Shivpuri, D.N. (1962). Comparative evolution of the sensitivity of common methods of diagnostic antigen tests in patients of respiratory allergy. *Indian J. Chest*, 4: 102.
20. Verma K. S. and Soni S. (1997) Allergenicity of certain airborne fungal spores. *Vasundhara International Journal of Environmental Biology*, 2: 13-16.
21. Verma K. S. Shrivastava P. and Dey M. (2011) Skin Prick Test to common airborne fungi on Poultry workers. *Indian J. Allergy asthma immunol*, 25(2): 79-83.

22. Verma, K.S, Maini, H., Shrivastava, P. and Chaturvedi, A. (2006). Evaluating dairy workers susceptibility against fungal aeroallergens using ELISA and SPT. *Int. J. Mendel*, 23(3-4): 151-161.
23. Woolcock A.J., Bastiampillai S.A., Marks G.B., and Keena V.A. (2001) The burden of asthma in Australia. *Med J*, 175: 141-145.
24. Zeinab N., Javad G., Negar G., Fatemeh A. (2019). A review on hypersensitivity reactions to fungal aeroallergens in patients with allergic disorders in Iran, *Current Medical Mycology*, 5(1): 42-47.