

Prevalence of food allergy in allergic patients of Jabalpur

Mitali Das¹, Karuna Verma²

¹Assistant Professor, Mata Gujri Mahila Mahavidyalaya (Autonomous), Jabalpur, M.P.

²Retired Professor, Post Graduate studies and research in Biological sciences, Rani Durgawati Vishwavidyalaya Jabalpur, M.P.

Abstract: Food allergy is an adverse response to a particular food antigen, normally harmless to the healthy people, which is mediated by immunological mechanisms and arises in a person susceptible to that specific allergen. A skin prick test used to check the immediate allergic reactions to different allergens at once. The Information from allergy tests may facilitate doctors to develop an allergy treatment plan that includes allergen avoidance or immunotherapy. During allergy skin tests, patient skin is exposed to suspected allergens and is then observed for signs of an allergic reaction. In the present investigation 15 food allergens were tested on allergic patients, where Peanuts showed maximum allergenicity with +3 to +4 reactions. Some other allergens such as Lemon, Kabuli Chana, Cashew nut and Mustard showed maximum allergenicity with +2 to +4 reactions.

Key words: food allergy, skin prick test, peanut allergy.

INTRODUCTION

Food allergy is an abnormal response to a food triggered by the body's immune system. The binding of IgE to specific molecules present in a food triggers the immune response. The response may be mild or in rare cases it can be associated with the severe and life threatening reaction called anaphylaxis. A food allergy occurs when the immune system responds to a harmless food as if it were a threat. Food allergy is very common worldwide and is becoming a major public health problem. Although precise epidemiological data are lacking, it is clear that the prevalence of Food Allergy has increased significantly in the last two decades in Western countries, where rates of up to 10% have been documented among preschool children. It is estimated that over 220 million people worldwide suffer from Food Allergy [1, 2, 4, 7, 9 & 12].

Food allergy in India is quite common due to allergic ingredient of food dishes. Food protein triggering the allergic response is termed as food allergen that cause

food allergy. Present investigation has been focused on prevalence of common food allergen and it is based on clinical survey.

MATERIALS AND METHODS

Skin Prick test (Shivpuri, 1974)

Skin prick testing (Shivpuri, 1974) is usually the first test recommended when an allergy is suspected [11]. This test measures specific IgE antibody attached to cells in the skin important in allergies called "mast" cells.

Detection and diagnosis of the offending allergens were undertaken in collaboration with Dr. Sandeep Jain Consultant Jabalpur Hospital and Prasann ENT and Allergy Clinic situated at Nagar Nigam road, Marhatal Jabalpur.

The skin prick test is usually carried out on the inner forearm, as 3 or 4 or up to about 25 allergens can be tested. 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

Food allergies are immune-mediated allergic adverse reactions that occur after exposure to specific foods. The most commonly recognized food allergies are immunoglobulin E (IgE)-mediated reactions (eg, urticaria, angioedema, anaphylaxis) that result from exposure to milk, egg, peanut, tree nuts, shellfish, fish, wheat, or soy (Mehta 2018)[8]. In this present investigation, patients are mainly suffering from three allergic disorders that are allergic rhinitis, urticaria and

asthma. In total number of patients, 50% of patients are suffering from allergic rhinitis, 45% patients are suffering from urticaria and only 5% patients have asthma problem. Turnbull et al. 2015 estimated that, one-fifth of the population believes that they have adverse reactions to food and the true IgE-mediated food allergy varies, but in some countries it may be as prevalent as 4-7% of preschool children. The most common food allergens are cow's milk, egg, peanut, tree nuts, soy, shellfish and finned fish. Reactions vary from urticaria to anaphylaxis and death [15].(Fig 2)

Recent studies reporting on a nationally representative, population-based survey (the National Health and Nutrition Examination Survey, NHANES), found the prevalence of self-reported food allergy in children to be 6.53% from 2007-2010. The most common childhood food allergies reported were to milk (1.94% of children surveyed), peanut (1.16%), and shellfish (0.87%). Another United States population-based study reported a slightly higher estimate of childhood food allergy prevalence (8%) (Savage; 2015) [10]. Present study revealed that maximum volunteered belongs to adult age 21-40 years about 55% patient, about 25% patients reported from extreme age group that is 41-60 years but the less 20% patients are from adolescent. Soller et al. 2012 also reported that, the overall rate of food allergy was estimated at 6.7% in Canada (7.1% for children and 6.6% for adults) in a population-based self-report study using random digit telephone sampling and adjusting for non-response, with cow's milk, peanut, and tree nut allergy being the most common allergens among children [14].(Fig 2)

All 15 food allergens were tested in present work and all were obtained from All Cure Pharma Pvt. Ltd. Bahadurgarh, Haryana. Total 15 food allergens were tested on 100 allergic patients. Detection and diagnosis of the offending allergens were undertaken in collaboration with Dr. Sandeep Jain Consultant, Jabalpur Hospital and Prasann ENT and Allergy Clinic, situated at Nagar Nigam road, Marhatal Jabalpur.

Out of 15 food allergen Peanut (75%) showed maximum allergenicity with +3 to +4 reaction. After peanut food allergen Lemon showed second maximum allergenicity of 45% in +1to+4 reactions while Kabulichana (15%) , Cashew nut (15%) and Mustard (12%) in +2 to+4 reaction. Iweala et al. 2018 reported that peanut/tree nut allergies appear to more

commonly persist into adulthood. Adults can develop new IgE-mediated food allergies; the most common is oral allergy syndrome. Peanut and tree nut allergies are frequently studied together as they coexist in up to 30 to 40% of patients (Skolnick et al. 2001) [13]. Davoren and Peake (2005) reported cashew appears to be at least as significant an allergen as composed to peanut and cashew allergy is associated with a high risk of anaphylaxis. The protein concentration in Peanut is 424 µg /50µl, in the Kabulichana 422 µg /50µl, and in the Lemon 150 µg /50µl [3]. (Fig 3,5,6)

Food allergy has been estimated to affect nearly 2 to 5% of adults (Iweala et al. 2018) [6]. During this present work, among food allergic patients 40.9% patients are male and 59.09% patients are Female. In food allergic male patient 21-40 age group that is 24.25% are sensitive to food allergen. Similarly in female allergic patients 21-40 age group patients that are 30.3% of patients showed more allergenicity to fungal allergen. In a population-based survey study of 40 443 US adults, an estimated 10.8% were food allergic at the time of the survey, whereas nearly 19% of adults believed that they were food allergic. Nearly half of food-allergic adults had at least 1 adult-onset food allergy, and 38% reported at least 1 food allergy-related emergency department visit in their lifetime (Gupta et al.2019) [5]. (Fig 4)

CONCLUSION

Food allergies are now a major public health concern in emerging nations due to their rising incidence and the urbanized lifestyle. The everyday lives of allergic patients and their families are profoundly affected by food allergies as well. Present data suggest that food allergy affects rising number of children and adults of Jabalpur city and Peanut allergy was the most common in adults. Food allergy sufferers should study labels and steer clear of the foods to which they are sensitive. Food labels must state the source of any significant food allergens utilized in their production, according to the legislation.

ACKNOWLEDGEMENT

This work was supported by Department of Microbiology, Mata Gujri Mahila Mahavidyalaya (Autonomous) Jabalpur; Madhya Pradesh; India. Authors would also like to thank Department of Microbiology and the Official Principal Dr. Sangeeta

Jhamb and Dr. Sandeep Jain Consultant Jabalpur Hospital.

REFERENCE

- Berin, M.C.; Sampson, H.A. Food Allergy: An Enigmatic Epidemic. *Trends Immunol.*, 34, 390–397, 2013.
- Comberiati, P.; Costagliola, G.; Sofia D’Elios, S.; Peroni, D. - Prevention of food allergy: The significance of early introduction. *Medicina* 55, 323, 2019.
- Davoren, M., Peake, J. and Dis, A. - Cashew nut allergy is associated with a high risk of anaphylaxis. *Arch. Dis. Child.* 90, 1084–1085, 2005.
- Dunlop, J.H.; Keet, C.A. Epidemiology of food allergy. *Immunol. Allergy Clin. Immunol.*, 38, 13–25, 2018.
- Gupta R. S., Warren C. M, Smith B. M., Jiang J., Blumenstock J. A, Davis M. M., Schleimer R. P., and Nadeau K. C., - Prevalence and Severity of Food Allergies Among US Adults. *JAMA Netw Open*; 2(1): e185630, Jan. 2019.
- Iweala O. I, Choudhary S. K., and. Commins S. P - Food Allergy. *Curr Gastroenterol Rep.* ; 20(5): 17; 1-11, 2018.
- Massimo De Martinis, Maria Maddalena Sirufo, Mariano Suppa and Lia Ginaldi New Perspectives in Food Allergy. *Int. J. Mol. Sci.*, 21, 1474, 2020.
- Mehta R., Allergy and Asthma: Food Allergies. *FP Essent*; 472:16-19, Sep 2018.
- Osborne, N.J.; Koplin, J.J.; Martin, P.E.; Gurrin, L.C.; Lowe, A.J.; Matheson, M.C.; Ponsonby, A.L.; Wake, M.; Tang, M.L.; Dharmage, S.C. - Prevalence of challenge-proven IgE-mediated food allergy using population-based sampling and predetermined challenge criteria in infants. *J. Allergy Clin. Immunol.*, 127, 668–676, 2011.
- Savage J., and Johns C. B., - Food Allergy: Epidemiology and Natural History. *Immunol Allergy Clin North Am.*; 35(1): 45–59, February 2015.
- Shivpuri D.N. - Fungal spores-their role in respiratory allergy. *Adv. Pollen Spores Res.* 1: 78-128,1974.
- Sicherer, S.H.; Sampson, H.A. - Food allergy: A review and update on epidemiology,

pathogenesis, diagnosis, prevention, and management. *J. Allergy Clin. Immunol.*, 141, 41–58, 2018.

- Skolnick HS, Conover-Walker MK, Koerner CB, Sampson HA, Burks W, Wood R. A. -The natural history of peanut allergy. *J Allergy Clin Immunol.*; 107:367–76, 2001.
- Soller L, Ben-Shoshan M, Harrington DW, - Overall prevalence of self-reported food allergy in Canada. *J Allergy Clin Immunol.* 130(4):986–988, Oct; 2012.
- Turnbull J. L., Adams H. N., Gorard D. A - Review article: the diagnosis and management of food allergy and food intolerances. *Aliment Pharmacol Ther*; 41(1):3-25, Jan(2015).

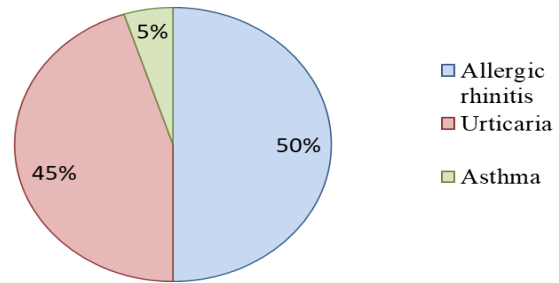


Fig 1: Percentage Distribution of Allergic Disorder

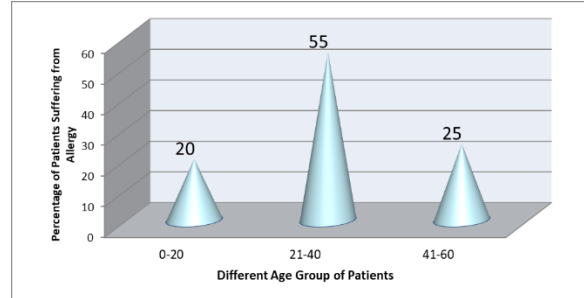


Fig 2: Incidence of allergic disorders among Patients of Different Age Groups

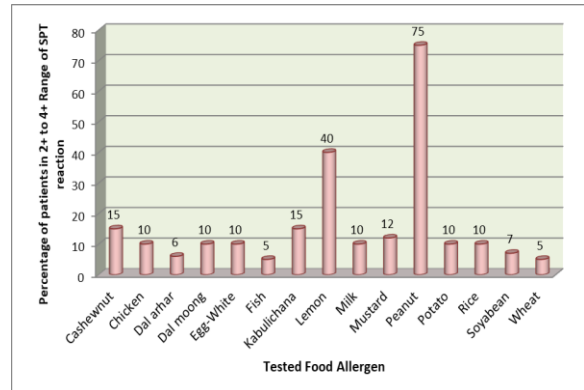


Fig 3: Percentage of Patients showing Positive Reaction during Skin Prick Test

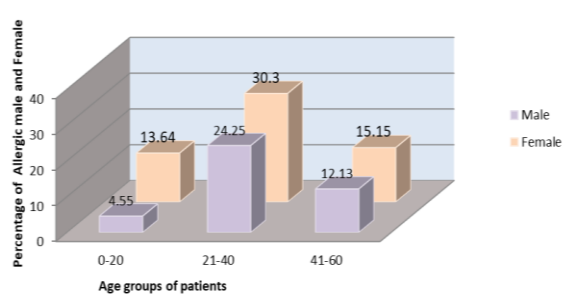


Fig4: Correlation between Age, Sex and Allergic Incidence Among patients



Fig 5: Skin prick test performed in allergic clinic



Fig 6: Skin prick test showing positive and negative reaction