

## Food Allergy: 1.4 Peanut Allergy

Zainab Hussain

*Food Service Dietitian at SFC, THI, Pakistan*

**\*Correspondence to:** Zainab Hussain, Food Service Dietitian at Safe Food Caterers (SFC), Tabba Heart Institute (THI), Web Committee Chair, Pakistan Nutrition and Dietetic Society (PNDS), Pakistan.

### Copyright

© 2018 Zainab Hussain. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: 17 April 2018

Published: 03 May 2018

**Keywords:** *Haptens; Arginine; Histidine; Arachis Hypogaea; Epinephrine; Tree-Nut Allergy*

### Peanut Allergy

Peanut allergy, considered as one of the severe food allergy, is an immune reaction to proteins or small molecules called haptens in peanuts and the allergy is far different from that to nut or legume allergy. The allergy occurs as the immune system mistakenly identifies peanuts as a harmful invader.

Many foods share homologous proteins therefore sensitization to one food can result in positive tests or clinical reactivity to related foods developing multiple foods sensitization sometimes leading to the development of allergy symptoms.

### Prevalence of Peanut Allergy

In children approximately 90% of hypersensitivity reactions are caused by milk, peanuts, eggs, wheat and soybeans whereas, in adults, fish, shellfish, tree nuts and peanuts account for approximately 85% of allergic reaction.

Pakistan is no exception to this increasing global issue, but no studies are available in literature showing prevalence of sensitivity to various foods consumed as part of diet in Pakistan. According to a study done in Islamabad in 2016 revealed the following statistics [1]:

| Allergens              |         | Number<br>(n=812) | Percentage<br>(%) |
|------------------------|---------|-------------------|-------------------|
| Animal source proteins | Mutton  | 322               | 39.6              |
|                        | Fish    | 322               | 39.6              |
|                        | Milk    | 409               | 50.4              |
|                        | Beef    | 325               | 40.0              |
|                        | Chicken | 328               | 40.4              |
|                        | Egg     | 443               | 54.4              |
| Plant source foods     | Peanut  | 238               | 29.3              |
|                        | Rice    | 256               | 31.5              |
|                        | Soya    | 253               | 31.1              |
|                        | Corn    | 327               | 40.4              |
|                        | Wheat   | 469               | 57.8              |
|                        | Banana  | 147               | 18.1              |
|                        | Lentils | 322               | 39.6              |
| Others                 | Yeast   | 418               | 51.5              |

## Origin of Peanuts

Peanuts, taxonomically classified as *Arachis hypogaea*, from the family *Leguminosae*; also known as earthnut or groundnut, is a small plant grown mainly for its edible seeds in most tropical areas of Africa, India, Brazil, South U.S.A. and Australia, and then exported to other countries. Various types of peanuts are found which show differences in the relative amount of fatty acids contained in its oil. Groundnuts are the world's fourth largest source of fixed oil [1].

## Proteins in Peanuts

Peanuts contain good amounts of some essential amino acids like they contain high levels of arginine and histidine. The remaining amino acids are also present in substantial quantities except methionine, tryptophan and cystine which are low in quantities [2].

Moreover, Ara H1 is a seed storage protein in peanuts. It plays an important role in peanut allergic reactions. Several studies have demonstrated that the protein fraction of the cotyledon is the allergenic portion of the peanut. Ara H1 makes up 12% to 16% of the total protein in peanut extracts and is classified as a major peanut allergen because it provokes sensitization in 35% to 95% of patients with this allergy [3].

This protein is a very potent allergen and it causes a severe reaction. The symptoms can be redness or edema, itching usually around the mouth and throat, diarrhea, stomach cramps, nausea or vomiting, coronary artery spasm or even anaphylaxis.

Another aspect is that cooking methods can affect the allergenicity of peanut like roasted peanuts have higher levels of Ara H1 than fried and boiled ones [4].

## **Diagnosis of Peanut Allergy**

Diagnosis of food allergies, including peanut allergy, begins with a medical history and physical examination.

Milk allergy can be diagnosed by the person's history of allergic reactions, skin prick test (SPT), patch test and measurement of milk protein specific serum immunoglobulin E (IgE or sIgE). Confirmation of the allergy can be done by double-blind, placebo-controlled food challenges, conducted by an allergy specialist.

A skin prick test, sometimes called a puncture or scratch test, is used to check for immediate allergic reactions. This test is usually done to identify allergies to pollen, different foods etc. In adults, the test is usually done on the forearm. They sometimes tell erroneous results, telling that you are not allergic to certain food, even if you are, that is why one should not completely rely on those results [5].

## **Signs and Symptoms of Peanut Allergy**

The severity of the allergy varies from person to person, and exposure can increase sensitization. For those with a milder form of the allergy, a reaction which makes the throat feel like cotton may occur. Subjects allergic to tree nut can experience asthma, skin rashes, itchy throat, swollen eyes. The most severe reaction can lead to *anaphylaxis*.

The raw nut protein usually causes a more severe reaction than the oil, and extra roasting or processing can reduce the allergic reaction.

This allergy tends to be lifelong; studies have shown that only about 9% of children outgrow their tree nut allergy [6].

## **Treatment of Peanut Allergy**

Currently strict avoidance of the allergenic food and ready access to self-injectable epinephrine is the standard of care for food allergy. Clinical trials for peanut allergy using the anti-1gE therapy to prevent circulating 1gE from binding to effector cells are underway. Peanut allergy can be devastating as reactions range from urticaria to severe anaphylactic shock and death. The only preventive measure for peanut allergy is strict avoidance [1].

## **Maternal Hypersensitivity**

There is conflicting evidence on whether maternal diet during pregnancy has any effect on development of allergies due to a lack of good studies. A 2010 systematic review of clinical research indicated that there is insufficient evidence for whether maternal peanut exposure, or early consumption of peanuts by children, affects sensitivity for peanut allergy [7].

## **Other Similar Peanut Allergies**

### **Tree-Nut Allergy**

Walnut, pecan and hazelnut form a group of strongly cross-reactive tree nuts while hazelnut, cashew, Brazil nut, pistachio and almond are moderately cross-reactive tree nuts [8].

### **Legume Allergy**

Legumes are a family of foods including peas, beans, lentils and peanuts. Children (or adults) who are sensitive may also have skin reactions to legumes in their dried form used in craft activities e.g. collages using lentils [9].

## **Conclusion**

Peanut allergy is one of the most dangerous food allergies, and one of the least likely to be outgrown. Here, we conclude that, atopic individuals are more susceptible to having multiple foods sensitization. This study is an attempt to evaluate the gravity of food hypersensitivity in Pakistan and to better anticipate and address this rising community and health service burden. Further research is required to estimate a correlation between SPT based sensitization and development of symptomatic food allergy. Moreover, Immunotherapy treatments are being developed for tree nut allergy. Immunotherapy involves attempts to reduce or eliminate allergic sensitivity by repeated exposure. This active research concept involves swallowing small amounts of peanuts, holding a peanut product under the tongue - sublingual immunotherapy - skin patches or injections. None of these are considered ready for use in people outside of carefully conducted trials. In those with mild peanut allergies, gradually eating more and more peanuts resulted in at least some short-term benefits. Due to the amount of evidence being small and the high rate of adverse effects, this is not currently recommended as treatment. Sublingual immunotherapy involves putting gradually increasing doses of an allergy extract under a person's tongue. The extract is then either spat or swallowed. It is not currently recommended as treatment; however, it is being studied. Epicutaneous immunotherapy involves giving the allergen through a patch. Trials are ongoing [10].

---

## Bibliography

1. Muhammad Inam, Rubaba Hamid Shafique, Muhammad Irfan, *et al.* (2016). Prevalence of Multiple Foods Sensitization in Pakistani Population. *Pakistan J. Zool.*, 48(4).
2. Kholief, T. S. (1987). Chemical composition and protein properties of peanuts. *Z Ernahrungswiss*, 26(1), 56-61.
3. Van Zijverden, M., Spanhaak, S., Koppelman, S. J., Pellegrom, H. & Penninks, A. H. (1998). "Identification and partial characterization of multiple major allergens in peanut proteins". *Clinical and Experimental Allergy*, 28(6), 743-51.
4. Beyer, K., Morrow, E., Li, X. M., Bardina, L., Bannon, G. A., Burks, A. W. & Sampson, H. A. (2001). "Effects of cooking methods on peanut allergenicity". *The Journal of Allergy and Clinical Immunology*, 107(6), 1077-81.
5. (2018) Allergy skin tests. Mayo Clinic.
6. National Institutes of Health, NIAID Allergy Statistics.
7. Thompson, R. L., Miles, L. M., Lunn, J., Devereux, G., Dearman, R. J., Strid, J. & Buttriss, J. L. (2010). Peanut sensitisation and allergy: influence of early life exposure to peanuts. *British Journal of Nutrition*, 103(9).
8. Syed Muhammad Shamim. (2006). Peanut allergy: case report. *Journal of Pakistan Association of Dermatologists*, 16(3).
9. Legume allergy: Information for parents.
10. Jones, S. M., Burks, A. W. & Dupont, C. (2014). State of the art on food allergen immunotherapy: oral, sublingual, and epicutaneous. *The Journal of Allergy and Clinical Immunology*, 133(2).