AJAB

Asian J Agric & Biol. 2019;7(3):423-428.

Original Article

Food Allergy and its clinical symptoms among people of Soran City, Erbil, Iraq

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Received:
November 17, 2018

Accepted:
April 07, 2019

Published:
September 30, 2019

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Abstract

Food allergy is an immune mediated non-toxic adverse reaction to a certain type of foods. It is a worldwide health problem. Several recent researches highlight awareness and concern about this issue. The current study performed by randomized cross–sectional survey and the data were analysed statistically. The present finding showed that among the 248 individuals whom participated in the questionnaires, 134 were considered as allergic subjects, whereas 114 of the participants had no food allergy. Regarding gender, 63 (47.1%) of the allergic people were male and 71 (52.9%) were female. According to age, all age groups (<10 - >29) were sensitized at least to one type of foods. The most common three allergic foods were hot pepper, followed by eggs and garlic. The timing of the immune reaction is critical began within 10 minutes of exposure to the allergen to more than one hour. Furthermore, the most appeared symptoms that these individuals suffering from were redness, urticaria, vomiting and diarrhoea, which correlated significantly with type of allergen. Food allergy in Soran city was high and more people suffered from it. Young ages were more affected than adults, and redness was the main noticed symptom. Hot pepper and eggs were the most causative food allergy among the selected foods .Food allergy is a growing health concern, so more studies directed toward prevention with more effective management strategies are needed.

Keywords: Food allergy, Food allergens, Symptoms, Questionnaire

How to cite this:

Khalid KM, Shnawa BH and Abdullah SM, 2019. Food Allergy and its clinical symptoms among people of Soran City, Erbil, Iraq. Asian J. Agric. Biol. 7(3):423-428.

Introduction

Food allergy is a form of adverse reaction arising from a specific immune response that happens reproducibly on exposure to special food. It is a considerable health problem that has adverse medical, psychosocial, and economic impacts upon affected persons and families (Walkner et al., 2015). According to allergist, the term involves an IgE-mediated immune reaction or at least an immunologically mediated response. Whereas, adverse reactions to foods without immunologically mediated action are called 'intolerance' (ACAAI, 2006). Depending on various studies, food allergy affects approximately 5% of adults and 8% of children, with growing evidence of rising in prevalence (Allen and Koplin, 2016). There is no effective drugs for food allergy, and can be accompanied with life-threatening anaphylaxis (Sicherer and Sampson, 2014). About 200 persons yearly die from such suffering, and most of them are preventable (Sampson, 2003). In another study, Chafen et al. pointed that food allergy affects more

than 2% and fewer than 10% of general population (Chafen et al., 2010). There are global information suggest that food allergies are wide spreading (up to 10% affected) and increasing in prevalence in the last two to three decades. It appears to disproportionately affect persons in industrialized/ westernized countries, and is more prevalent in children compared with adults. False alarm hypothesis was proposed by many researchers for to explain the increased incidence of food allergy in developed countries confirming a potential role of dietary adverse glycation end-products resultant of meat, cheese, and oils. These glycation consequently mimic alarmins, endogenous molecules that signal tissue destruction, and stimulate pro-allergic immune responses (Smith et al., 2017) There are group of foods account for most of food allergy, such as peanut, tree nuts, fish, shellfish, egg, milk, wheat, soy, and seeds (Sicherer and Sampson, 2018).

Mucosa is the main tissue for the immune system's interaction with the external environment. It is dissimilar from the skin, which is characterized by several layers of stratified epithelium; the intestinal mucosa is lined with a layer of columnar epithelium, approximately double tons of food passes through this thin barrier yearly. Sensitization to foods stimulates by environmental influence that affecting the mucosal immune tissues which are mostly result from diet, commensal microbes, or the collaboration between them via modifying the mucosal immune system (Berin and Sampson, 2013). Several risk factors were suggested to relate with food allergy, comprising immutable risks , like sex (male in children), race/ethnicity (increased amongst Asian and black children in comparison to white children), and genetics (familial associations, HLA, and some particular genes), and risk factors that can be reduce/prevent food allergy, including atopic disease appearances (comorbid atopic dermatitis) ,high hygiene, effect of the microbiome, vitamin D shortage , dietary fat (low consuming of omega-3-polyunsaturated fatty acids), decreased ingestion of antioxidants, obesity(as an inflammatory case) ,beside time and way of exposure to nutritional antigens (Berin and Sampson, 2013; Hong et al., 2015; NASEM, 2016; Sicherer and Sampson, 2018). In addition, other lifestyle habits play a role as well.

Prescott et al. (2013) pointed out that more than half of the countries (51/89) had no food allergy prevalence information of any kind. Just 10 % (9/89) of countries had accurate data about food allergy depending on oral food challenges. Regarding Iraq there is no accurate scientific information related to this issue, so the current research was designed to investigate the occurrence of food allergy among Soran people. This is the first preliminary study to highlight the proportion of allergic people against some food in Soran city.

Material and Methods

This research was achieved by questionnaire prepared by members of this study group. The questionnaire consisted of eleven directional questions, which were focused on responders' characteristics, and response options were available regarding age, gender, level of concern, allergic symptoms and degree of relatives (parent or sibling) having one or more allergic disease (i.e. allergic rhinitis, asthma, urticaria, atopic dermatitis [eczema], food allergy). An extra space was available for others or comments of the participants. The language of the questionnaire was in English and Kurdish. The questionnaire forms were randomly delivered and after that collected. Moreover, the responses were noticed and analysed using Graph pad and SPSS. The questionnaire is shown in Appendix 1.

Results

A total of 300 questionnaire sheets were given for participating purpose, 248 of them were collected, whereas 52 questionnaire papers were not returned.

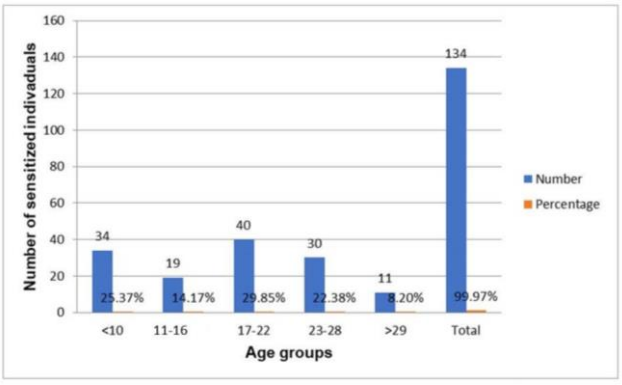

Figure 1.Age groups of the sensitized individuals

Among them, 114 had no food allergy and the remained 134 were reviewed, analysed and considered as allergic people. Regarding gender of participants, the percentage of male and females were not significantly different from each other, 63 (47.1%) of

participants were male and 71 (52.9%) were female. On the bases of age, individuals were divided into 5 age groups; as shown in Figure 1.

Out of 134 allergic people, the age of the highest number of participants who suffered from food allergy was between 17 -22 years old in percentage of 29.85%, while participants who aged over 29 years were showed as percentage of sensitivity as (8.2%). Whereas, children and infants who below 10 years were recorded as 25.37%, and this percentage was 22.38% and 14.17% for each of 23 -28 and 11 -16 age groups respectively. In question number 4, people were asked about their parents whom suffer from food allergy. In this context, only 35 (26.12%) of participants' parents had already food allergy, while parents of 99 (73.88%) of them had no any type of food allergy. Regarding the level of concern to food allergy, all responses were showed that they have sensitivity to various foods and affected with different levels, very high (27, 20.14%), high (24, 17.91%), moderate (39, 29.10%), low (34, 25.37%) and very low (10, 7.46%) as shown in Figure 2.The moderate effect being the highest.

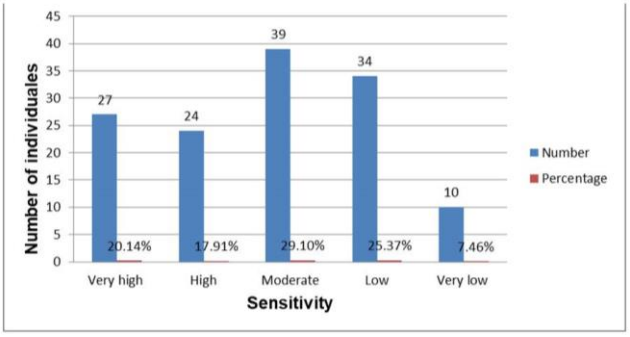

Figure 2. level of people sensitivity to food

Most of the participants were allergic, but the effect was moderately appeared on their body, only 10 individuals express very low response, while the others showed severe allergy. About the family members, 50 (37.3%) of them have other members in their family affected by food allergy. From these 50 participants, 29 of them have more than one member in their family suffered from allergy; this was the highest recorded value. In question number eight, people were asked about the time of reaction and symptoms appearance after eating a certain food. For this reason, they were grouped in five different grades on the bases of time of exposure until appearance of symptoms as in Figure 3, most sensitized participants showed hypersensitivity within ten minutes or less than this period after consuming the trigger food, whereas other group responded after more than one hour.

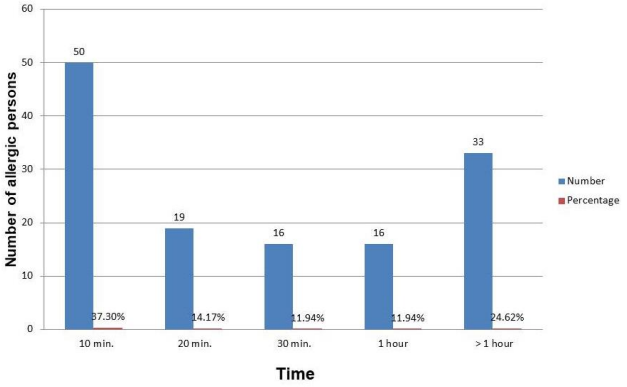

Figure 3. Time of symptoms appearance after food ingestion by allergic persons

The relation between age groups and foods were also observed. According to our result, all age groups were susceptible for most of the selected foods. However, some foods were noticed as less causative but not neglected as some other participants were sensitive by such a food. Children and infants were more allergic by egg (7) and onion (6) in comparison to other types of food as notice in Figure 4.

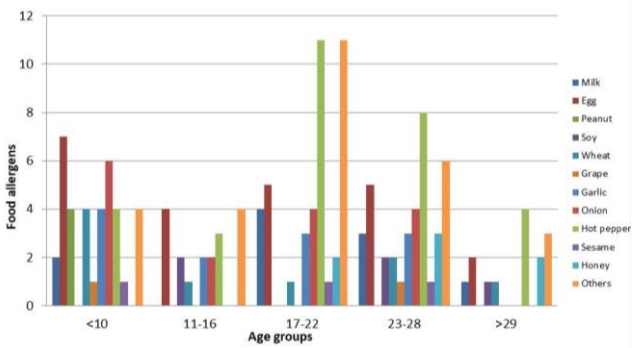

Figure 4. Relation between age groups and food allergens

P value was 0.015 < 0.05, and there is a significant difference between food types in different age groups. Symptoms were induced by all of the foods that selected in this research. The most common causative food was hot paper followed by eggs. The most appeared symptom was redness, which is expressed by 49 individuals, and the second most suffered symptom was vomiting (48 individuals), followed by diarrhoea and fever, which were 36 and 33 individuals suffered from them, respectively Figure 5.

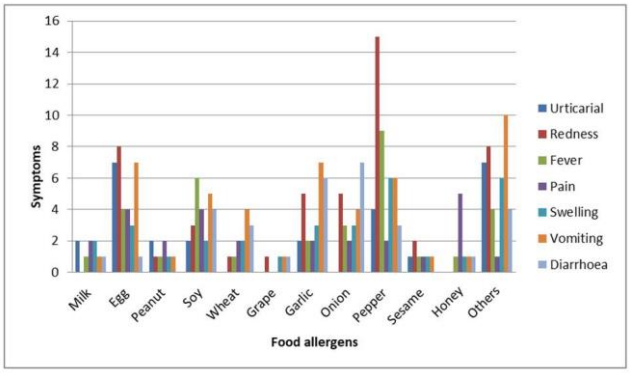

Figure 5. Relation between food allergens and symptoms represent by number of individuals

The relation between symptoms and various foods was analysed by using SPSS, normality test had showed parametric or normal distributed. Moreover, difference among means were detected, there was highly significant difference between symptoms (p value of means was 0.001 <0.05).

Discussion

Food allergy is a significant health issue worldwide, due to its ability to affects adults and children. Numerous studies have investigated the effect of food allergy on health-related quality of life (HRQL) in adults and children in various countries. Several factors were studied that could modify HRQL in food allergic patients, the most important of them are disease severity, age of the patient, peanut or soy allergy, country of origin and having allergy to two or more foods (Antolin-Amerigo et al., 2016).

After reviewing the answered questionnaires of the current study and focusing on the type of questions, eleven questions were chosen as the most effective and comprehensive aspects that related to people in Soran city. Also other sources were reviewed for more sure about types of questionnaire (Hourihane et al., 1996). The present article including 300 questionnaires forms, 248 of them were collected, but 52 of them were not returned, because some people did not respond within the appropriate time. From the collected questionnaires, 134 individuals were affected by food allergy and considered as allergic persons, while 114 of them had no allergy against any type of food. Our result conducted that more than half of the surveyed people are suffered from food allergy. All ages were affected; children younger than ten year showed high food allergy as well as the group of 17-22 years in comparison to other older groups. Another study showed that food allergy affects up to 6 to 8 % of children under the age of 3 and close to 4 % of adults (Kagen, 2003). Food allergy rates vary depending on age, local diet, and many other factors. Study in United Kingdom and North America focusing on peanut indicated that prevalence rates in children have increased, essentially doubling, and exceeds 1% in school-aged children (Sicherer and Sampson, 2018). Moreover, the current study confirmed the importance of genetic factor which consider a risk factor for food allergy because 37.3% of the sensitized participants have parents or relative suffering from allergic diseases. This finding supported by previous data which concluded that food allergy mostly develops early in life and infants of allergic parents whom have high incidence of food sensitivity (Makhija et al., 2016). Food allergy has quickly increased in prevalence, proposing an essential role of environmental factors in disease susceptibility. Several hypotheses were put to clarify the recent increase in food allergy. Among them vitamin D deficiency, raised hygiene, and dual-allergens hypothesis. The last one suggests that allergic sensitization to food happen by low dose cutaneous sensitization, while early consumption of food protein stimuli oral tolerance (Lack, 2008; Du Toit et al., 2017). Response to food allergy is achieved by IgE production, as well as recent results from in vivo studies indicate a significant role of the cytokine IL-9, which is derived from T cells and mast cells (Benede et al., 2016). On the basis of symptoms redness was the most common symptoms that people suffered from in the present study, followed by vomiting and diarrhoea. However, some other references have the same results but not as the first appeared symptom. According to Mayo Clinic website (http://www.mayoclinic.org/disease-conditions/food allergy symptoms), the main symptoms that related to such an allergy are redness, urticarial, swelling and other common symptoms. A specific aspect of this research was the level of concern and time of reaction appearance on body after consuming foods with specific protein that causes allergy. Most of the cases that reported in this study were showed hyper sensitivity, owing to their rapid immune responses, which occurred within less than 10 minutes resulting in symptoms appearance. Even some persons needed no more than 1 minute to interact with the food allergen. Tordesillas et al. (2017) pointed to the responsibility of several immunologic mechanisms for food allergic responses, like innate, adaptive, and

effector cells involvement. Moreover, Galand et al. (2016) clarified the mechanism of food allergy by the breakdown of immunologic and physiologic tolerance to an ingested nutrient, which lead to IgE-mediated immune response or non-IgE mediated reaction, like eosinophilic esophagitis, or food protein stimulated enterocolitis disease. There are several routes for sensitization to food allergens, such as gastrointestinal canal, skin, and with few occurrence the respiratory system. Recently, Caubet et al. (2014) demonstrated that the IL-4 expression in peripheral blood mononuclear cell was associated with clinical allergy to milk and peanut. More recently, the report of the national academies of sciences, Engineering and medicine recognized two objectives to overcome the problem of food allergy, firstly develop safe and efficient medication and secondly prevent onset of disease aiming to improve the lives of the affected people with food allergy (Scurlock and Jones, 2018).

Conclusion

This study performed by randomized cross sectional survey amongst sample of people from Soran city. The present finding showed that high percentage of people were suffering from food allergy, both male and female were affected. Children of 10 years old were more affected, while elders less susceptible. All symptoms were recorded, especially redness as the most appeared one. This topic still needs to be clarified in clinical attempts. For achieving reliable results, studies including a large number of patients need to be performed. Moreover, clinical measurements for food-induced allergic reactions are required to assess the ability of using allergy vaccines.

Contribution of Authors

Shnawa BH: Conceived Idea, Designed Research Methodology, Manuscript Writing, Manuscript final Reading and Approval.
Khalid KM: Data Collection, Data Interpretation, Statistical Analysis
Abdullah SHM: Data Collection, Literature Review

Disclaimer: None.
Conflict of Interest: None.
Source of Funding: None.

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