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Determining Peanut Food Allergy among Allergic Patients in Basrah Governorate

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Annotation: Background: Peanut allergy affects 1% - 4.5% of children. with the potential for severe reactions. Method: The current study was conducted on 90 human venous blood samples, which included 74 blood samples from allergic individuals and 16 samples were collected for healthy people as control samples, we Evaluation specific IgE for peanut antigen in all sera samples depending on ELISA assay. Also in this study were prepared antigen and Electrophoresis for protein Peanuts. Result: The results of the electrophoresis showed eight proteins in crud peanut antigens. the indirect ELISA test based on the IgE of peanut antigens in patients show that the females had the highest (29.73%) compared with males, also the fourth age group (49) recorded the highest rate (6.76%) compared to the other age groups, with a significant difference between them ($p< 0.05$). Conclusion: The current study concluded that the percentage of people at risk of food allergy to peanuts allergens was increased in Basrah province.

Keywords: peanut, food allergy, allergic patients.

1. Introduction

Peanut allergy affects 1% - 4.5% of humans. with the possibility of dangerous reactions (Shaker *et al.*,2019). Eight food sources trigger over 90% of food allergies, peanut is one of the most allergenic (Zhou *et al*., 2013). To now determined thirteen types of peanut allergens (Ara h1 -13). these allergens come from seven protein families. the molecular weight of the allergens range from 5 to 17 kDa, Except Ara h1 150 kDa and Ara h3 (360–380 kDa for that the major peanut allergens that are most widely are Ara h1, Ara h2 and Ara h3 (Zhou *et al*., 2013Peanut allergy is characterized by anaphylactic reactions and a high rate of reactions (Taylor *et al.,* 2002). Generally, peanut allergy diagnosis of begins according to a medical history and a physical examination of patients, followed by a prick skin test, a fluoro enzyme- immunoassay and oral food challenges (Scurlock and Burks 2004).

2. Materials and methods:

Blood samples

The current study was conducted on 90 human venous blood samples, which included 74 blood samples from allergic individuals, males, and females, in different age groups, living in separate places in Basra Governorate. Also, 16 samples were collected for healthy people as control samples. The samples were collected after the specialist doctor conducted a clinical examination. It included a questionnaire form to collect the required information during blood draws from people. The form included the person's number, residence, gender, age, and medical condition in case he suffers from an allergic disease.

preparation Peanuts antigen

Peanuts were prepared antigen as previously reported by L'Hocine and Pitre (2016). And the Protein concentration was determined according to Bradford *et al.* (1976). Also, we calculated the concentration of protein by using a standard curve.

Protein concentration = (OD. / Sloop) * volume

Electrophoresis for peanut antigen:

Protein Electrophoresis was prepared according to the method described by Hames, (1985).and the Staining of protein in the native gel was carried out according to the method described by Chang *et al.* (1991).

Estimation Specific IgE for peanut antigen:

Evaluation specific IgE for peanut antigen in all sera depends on ELISA assay according to (Voller *et al.*, 1979) .

Statistical Analysis:

The data were statistically analyzed using the (SPSS) program. The percentages of qualitative data were calculated by using the chi-square test (X^2) at the probability level (0.05).

3. Results

Diagnosis of the prepared antigen:

The results of the electrophoresis shown in Figure (1) for the prepared protein antigen under study showed the appearance of eight protein bundles whose molecular weights ranged from 6.5-29 kDa.

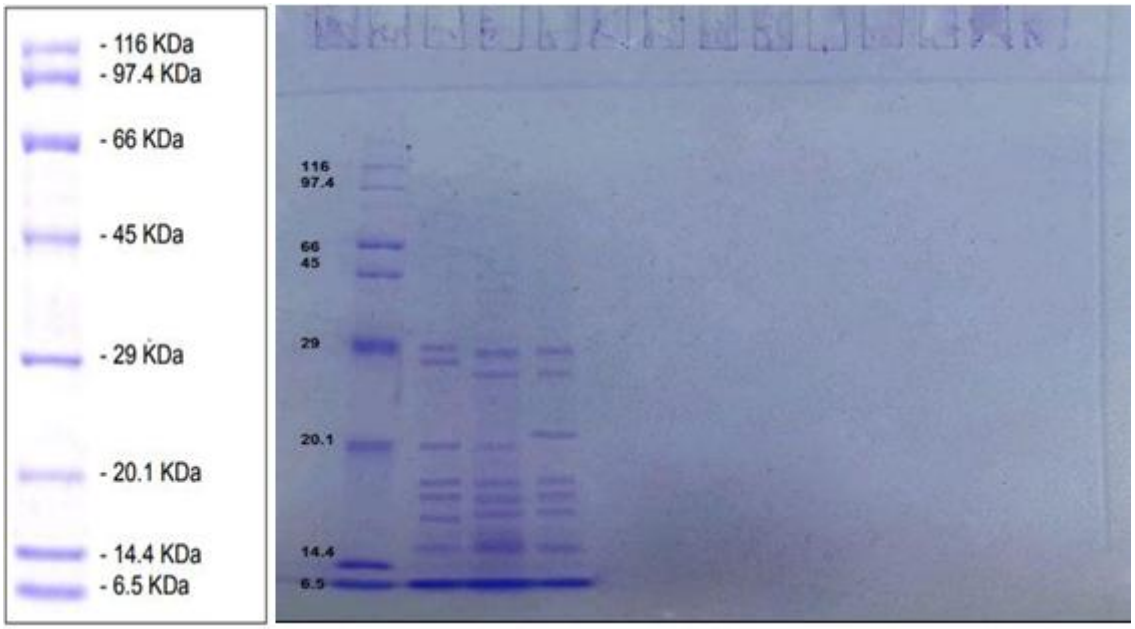

Figure (1) Electrophoresis of the prepared antigen

Peanut antigen-specific IgE test by gender and age group:

The results of the indirect ELISA test based on the IgE of peanut antigens in patients' sera shown in Table (1) showed that the percentage of females had the highest concentration of IgE antigen-specific to peanuts (29.73%) compared with males, and it was found that there was a significant difference in the percentage of prevalence of type E immunoglobulin in both males and females at a probability level ($p < 0.05$). The fourth age group (49) recorded the highest percentage (6.76%) compared to the other age groups, with a significant difference between them at the level of probability ($p< 0.05$).

Table (1): Peanut antigen-specific IgE test by gender age groups

Gender	Patients People N	specific IgE for peanut antigens	
		Allergic People	Non Allergic People
		N (%)	N (%)
Male	22	5 (6.76)	17 (22.97)
Female	22	22 (29.73)	30 (40.54)
Total (%)	74	27 (36.49)	47 (63.51)
Age Groups (Years)			
≥ 28	15	7 (6449)	8 (18401)
29 -38	21	7 (6449)	14 (10462)
39-48	11	8 (18401)	5 (9472)
≤ 49	25	5 (9479)	20 (27481)
Total (%)	74	27 (19446)	47 (91421)

Quantitative Antibody Levels in Patients and Healthy people:

The results of this study in table 2 recorded an increase in the concentration of T. IgE antibody in patients at a rate 76.67% compared to healthy people samples

Table (2): Quantitative antibody concentration

Level T. IgE IU/cm3	Patients People N 74		Healthy People N 16	
	N	%	N	%
T. IgE <150	2	2422	19	17470

T. IgE ≥ 150	96	79497	8	8
Total (%)	68 (188)			

Relationship of IgE antibody to peanut food allergy:

The current study showed that 36.49% of the study samples were allergic to peanuts out of a total of 74 samples, and the percentage of females had the highest concentration of IgE antigen-specific to peanuts (29.73%) compared to males Table (3):.

Table (3): Relationship of IgE antibody to peanut food allergy

Level T. IgE IU/cm3	Allergic People		Non Allergic People	
	N	%	N	%
T. IgE <150	-	-	11	144.86
T. IgE ≥ 150	27	36.49	36	48.65
Total (%)	74(188)			

4. Discussion:

Electrophoresis for peanut antigen:

This method is mainly used to determine the presence or absence of an allergen or to determine the change in the protein pattern after treatment (Taheri-Kafrani *et al.*, 2009). The results of the current study showed the emergence of eight bundles with molecular weights ranging from 6.5-29. kDa. Peanuts contain eight known allergens, and among these allergens, Ara h1, Ara h2, Ara h3, and Ara h6 are three of the main allergens that can provoke the immune system and produce specialized antibodies against them (Pansare *et al.*, 2010; Koppelman *et al.*, 2010).

Relationship of IgE antibody to peanut food allergy:

The majority of food allergens are soluble in water, such as glycoproteins, whose molecular weight ranges from 10–70 kDa (Ebo, 2001) and are characterized by the ability to stimulate the immune system, especially in people with a genetic predisposition. In the production of IgE antibodies, it is the association with those specific IgE antibodies that leads to causing an allergic reaction (Aalberse, 2000).Several studies in the Middle East have found the prevalence of food allergies. A study conducted in the United Arab Emirates showed that the most common food allergens are seafood and nuts (Irani and Maalouly 2015). In their study in Iraq, Erbil Governorate, they observed that the highest prevalence of food allergy to peanuts was (18.42%) in allergic patients, and it was 12.35% in allergic females to peanuts, and it was higher compared to males. Kaya and his group concluded in their 2013 study that peanuts are the most common food allergen mediated by IgE. Also, Raisan *et al*., (2019) studied for other food allergens and showed at overall Seropositivity against kiwifruit allergens was (72.9%). and the study by AL-Mayah *et al*.,(2017) showed that processing shrimp by heating lead to an increase in allergenicity and antigenicity of shrimp antigen. Loh *et al.* (2018) mentioned that allergen-specific immunoglobulin E (sIgE) is important in determining the prevalence of food allergies, as they observed through the study a more than 10% increase in food allergy rates in both the West and developing countries. as they observed increased levels of IgE in patients sensitive to different antigens and that the IgE antibody plays a major role in recognizing antigens, as it is responsible for the occurrence of the attack and the emergence of the disease. Symptoms: Most studies agree that food allergy rates are increasing (Sicherer and Sampson, 2018). The study by Namork *et al.* (2011) also showed an elevated concentration of IgE-specific antibodies against the peanut antigen. In Iraq, some studies have been conducted on food allergies, such as the study of Raisan and Abdulla(2811) 4

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