

Sero Prevalence of Food allergy among Sudanese Patients in Khartoum state

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Abstract:

Background: Food allergy has critical outcomes on health and life quality, the basic data concerning Food allergy are important for health planners and care providers, but sero prevalence of food allergy in Sudanese patient has not been well studied.

Objective: The aim of this study was to detect seroprevalence of food allergy among the Sudanese in Khartoum state.

Methodology: A retrospective cross sectional data based study was conducted, 300 patients with Food allergy were included in the study from Alryan Specialized laboratory throughout the period from 2013 to 2016. The data were collected from patient medical files.

EAST (Enzyme Allergo Sorbent Test) was used for the detection of food (IgE) Using Commercial diagnostic Kits for Quantitative analysis, the assay result interpreted as KU/I

Results: Out of 300 Patients tested for food allergy 125 positive (have food allergy) and 175negative (have no food allergy).Food allergy is more common among children 75(24.3%) than in adults 52(17.3%). The most common food allergen in children is peanuts 14(4.7%), while in adults it's yeast 11(3.7%). There is a significant difference in food allergy, according to age P.value 0.005, however, there is no significant difference in food allergy according to gender p.value 0.23.

Conclusion: Screening for food allergy should be part of their routine investigations to improve health.

Key words: Food allergy, Immunoglobulin E,Sudanese patients, immunoblotting technique

INTRODUCTION

Food allergy is an abnormal response through adverse immunological reaction to certain kinds of food triggered by the body's immune system⁽¹⁾. There are several types of immune responses to food in which the body produces a specific type of antibody called immunoglobulin E (IgE). The binding of IgE to specific molecules present in a food triggers the immune response. The response may be mild or severe in rare cases.

An allergic reaction to food is a two-step process:

The first time persons are exposed to a food allergen, the immune system reacts as if the foods were harmful and makes specific IgE antibodies to that allergen. The antibodies circulate through the blood and attach to mast cells and basophils. Mast cells are found in all body tissues, especially in the areas of the body that are typical sites of allergic reactions. Those sites include the nose, throat, lungs, skin, and gastrointestinal (GI) tract. Basophils are found in the blood and also in tissues that have become inflamed due to an allergic reaction.

The next time when exposed to the same food allergen, it binds to the IgE antibodies that are attached to the mast cells

and basophils. The binding signals of the cells are to release massive amounts of chemicals such as histamine. The symptoms may include itching in mouth, swelling of lips and tongue, gastrointestinal tract symptoms such as vomiting, diarrhea or abdominal cramps and pain, hives, worsening of eczema, tightening of throat or trouble breathing and drop in blood pressure⁽²⁾ Food allergies may be a trigger for or associated with other allergic conditions such as atopic dermatitis and eosinophilic gastrointestinal diseases⁽³⁾.

Allergy and food hypersensitivities are adverse reactions to specific foods and food ingredients occurring in sensitive individuals within the general population⁽⁴⁾. The allergy that is caused by food is a hypersensitivity reaction type I and has an exaggerated immune response. Food hypersensitivities have individualistic responses⁽⁵⁾. The World Allergy Organization concluded that the appropriate term is food allergy when immunological mechanisms have been demonstrated. If IgE is involved in the reaction, the term IgE-mediated food allergy is appropriate. Non – IgE mediated immunological reactions are called either non- IgE-mediated allergy or non-IgE-mediated hypersensitivity; all other reactions should be referred to as non-allergic food hypersensitivity⁽⁶⁾. There are three types of food allergies IgE –mediated food allergy , Non IgE – mediated food allergy and mixed IgE/Non –IgE – mediated food allergies. Recent studies have found that almost 1 in 20 young children under the age of 5 years and almost 1 in 25 adults are allergic to at least one kind of food. Many studies indicated that allergy to peanut was common⁽²⁾ It is more common among children with other allergic diseases⁽⁷⁾.

The aim of the current study is to detect the prevalence and frequency of food allergy in Sudanese patients in different types of food antigens to avoid the food allergy complications for patients in our community, and to define the frequency of food allergy according to age and gender.

MATERIALS AND METHODS

This retrospective study was carried out in Alryan Specialized laboratory in Khartoum state in the period from February 2016 to may 2016. The study included data collected from patient medical file in January (2013 to 2016).

Blood samples were collected either in tubes with EDTA, heparin or citrated plasma or plain container (serum). Patients' samples were stored at 2-8°C until use. Different types of food antigens were tested; egg white, egg yolk, cow Milk, case in bovine serum albumin, wheat flour, soybean, peanut, hazel nut, almonds, oranges, apples, bananas, carrots, tomatoes, celery, onion, mutton, mustard and Cross-reactive Carbohydrate Determinants (CCD) marker. IgE antibodies reacted with some antigens known to cause food allergy to individuals were measured by immunoblotting technique (EUROLINE FOOD Middle East) from EUROIMMUN Medizinische Labordiagnostika AG.

The EUROLINE test Kit provides semi quantitative in vitro assay for measuring human IgE antibodies to food allergens in serum or plasma. The test kit contains test strips coated with parallel lines of 21 different allergen extracts. The test strips were first moistened with buffer for 5min. and then incubated in the first reaction step with patient serum for 60 min ; if samples are positive, specific antibodies of class IgE will bind to allergens. To detect bound antibodies, a second incubation is carried out using an enzyme-labeled monoclonal anti-human IgE (enzyme conjugate) catalyzing a colour reaction. The reaction was read using the digital evaluation system "EUROLINE Scan".

INTERPRETATION OF RESULTS

Then intensity of the colored bands was calculated in EAST classes of 0-6. The classes were divided into concentrations as indicated in **Table 1**. EAST and with respect to the Concentration grades identical to the well-known RAST system (Radio-Allergo-Sorbent Test) used in allergy diagnosis. **Figure 1**

Table 1. East classes

Class	Concentration (kU/l)	Result
0	<0.35	No specific antibodies detected
1	0.35-0.7	Very weak antibodies detected
2	0.7-3.5	Weak antibodies detected
3	3.5-17.5	Significant level of antibodies detected
4	17.5-50	High level of antibodies detected
5	50-100	Very high antibody titre
6	>100	Very high antibody titre

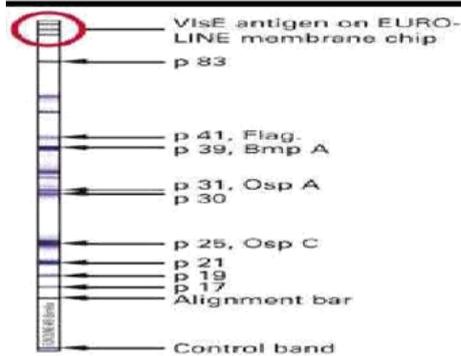


Figure 1. Sample of EUROIMMUN (EUROLINE) test strip

RESULTS

Total of 300 data result we found 125 positive (have food allergy) and 175 negative (no have food allergy) **table 2**. Food allergy is more common in children 75(24.3%) than in adult

52(17.3%). The most common food allergen among children is peanuts 14(4.7%),while in adult it's yeast 11(3.7%) **table3**. There is a significant difference in food allergy in accordance with age s p.value 0.005. Nontheless , there is no significant difference in food allergy accordance with gender p.value 0.23 **table4**.

Table 2. Frequency of food allergy in the study sample

	Frequency	Percent
+ve	125	41.7%
-ve	175	58.3%
Total	300	100%

Source: SPSS Package

Table 3. Distribution of Age in the study sample according to allergy to variety of food antigen

Antigen Type	Age		Total	Chi- Square	P-value (Test)
	Adult	Children			
Egg White	5(1.7%)	1(0.3%)	6 (2.0%)	0.102	0.005
Egg yolk	10 (3.3%)	6(2.0%)	16 (5.3%)	0.317	
Wheat flour	8(2.7%)	1(0.3%)	9 (3.0%)	0.020	
Soya bean	5(1.7%)	5(1.7%)	10 (3.3%)	1.000	
Yeast	1(0.3%)	11 (3.7%)	12 (4.0%)	0.004	
Peanut	14 (4.7%)	7(2.3%)	21 (7.0%)	0.027	
Hazelnuts	3(1.0%)	5(1.7%)	8 (2.7%)	0.480	
Apples	7(2.3%)	2(0.7%)	9 (3.0%)	0.046	
Bananas	5(1.7%)	1(0.3%)	6 (2.0%)	0.102	
Tomatoes	7(2.3%)	9(3.0%)	16 (5.3%)	0.617	
Onions	4(1.3%)	1(0.3%)	5(1.7%)	0.180	
Chicken meat	4(1.3%)	3(1.0%)	7 (2.3%)	0.705	
Total	73(24.3%)	52(17.3%)	125 (100%)		

Source: SPSS Package

Table 4. Distribution of Gender in the study sample according to allergy to variety of food antigen

Antigen Type	Gender				Total	Chi-Square	P-value
	Male		Female				
	% of positive people with food allergy symptoms						
egg white	3	(1.0%)	3	(1.0%)	6 (2.0%)	16.55	0.167
egg yolk	5	(1.7%)	11	(3.7%)	16 (5.3%)		
wheat flour	7	(2.3%)	2	(0.7%)	9 (3.0%)		
soya bean	4	(1.3%)	6	(2.0%)	10 (3.3%)		
Yeast	4	(1.3%)	8	(2.7%)	12 (4.0%)		
peanut	8	(2.7%)	13	(4.3%)	21 (7.0%)		
hazelnuts	2	(0.7%)	6	(2.0%)	8 (2.7%)		
apples	3	(1.0%)	6	(2.0%)	9 (3.0%)		
bananas	5	(1.7%)	1	(0.3%)	6 (2.0%)		
tomatoes	5	(1.7%)	11	(3.7%)	16 (5.3%)		
onions	4	(1.3%)	1	(0.3%)	5 (1.7%)		
chicken meat	3	(1.0%)	4	(1.3%)	7 (2.3%)		
Total	53	(17.7%)	72	(24.0%)	125 (100%)		

Source: SPSS Package

DISCUSSION

The prevalence of food allergy as indicated by RAST is high (41.7%), this result is also similar to the results that have been reported with Center for Disease Control (CDC) Branum et al (2008), Jackson k et al (2013) (8,9). In our study, the food antigen that tested high positive include wheat flour, Yeast, peanut, apples. Peanut is the most common food allergen among children; this result is unlike the result of Hussam et al (2015). This may be due to genetic makeup (10). Sampson et al (2004), Sicherer et al (2002) Studies have demonstrated that eight types of food account for over 90% of allergic reactions was affected individuals. These included cow milk, eggs, peanuts, tree nuts, fish, shellfish, soy, and wheat(11,12).

Food allergies are most prevalent during the first years of life, affecting about 8.9% of children younger than 10 years; this result is higher than that reported earlier by bock, SA (1987)(13). may be due sample size.

The analysis of the findings obtained in the present study revealed correlation with other Sampson HA (2004), Sicherer SH (2002) studies as in ^(11,12).

It is fortunate that individuals usually lose their allergies over time and younger children are more likely to outgrow IgE-mediated food allergy, however; food allergy can sometimes become a lifelong concern. Older children and adults will lose their hypersensitivity if the allergen can be identified and is completely eliminated from the diet despite the fact that EAST results often remain positive and do not necessarily reflect clinical reactivity. Patients who are allergic to nuts, peanut, fish and shellfish rarely lose clinical sensitivity. Since milk and wheat are important dietary components, children with milk, soy and wheat allergy can be challenged every 1-2 years, similarly children with egg allergy can be challenged every 2-3 years to determine if their allergy still exists Hefel et al 1996)⁽¹⁴⁾.

CONCLUSION

In conclusion, Food allergy is an important clinical problem of increasing Prevalence. There was high frequent of IgE related food allergies among Sudanese patient. Screening for food allergy should be part of their routine investigations to eliminate and improve health. Patients with food allergy need more specific test (gold standard method), and (DBPCFC) double-blind placebo controlled Food challenge to avoid the cross reaction of inhaled antigens.

ACKNOWLEDGMENT

We acknowledge the support of the Alryan Specialized laboratory. We would also like to thank Microbiologist Mr. Mohammed Osman M.A.Omer. Special thanks to Solima

M.A.Sabeel and Zuhail A.Altayeb for Critical revision of manuscript.

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