Research Article
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The Most Common Food Allergens in Patients with Allergy Symptoms Referred to Mofid Children's Hospital (2013-15)

Abstract

Introduction: Food allergy (FA) is heterogeneous disease, affecting multiple organs like skin, respiratory or gastrointestinal tracts, which have different forms from a local allergy to a systemic anaphylaxis. The prevalence of FA is about 4% among children in the world and the prevalence is increasing recently. Th2 and IgE-mediated reactions play an important role in this disease. In this study we determined the most common food allergens in children referred to Mofid Children's Hospital.

Materials and methods: This cross-sectional study was performed on 396 patients with skin, respiratory and gastrointestinal allergies, which were referred to Mofid Children's Hospital, 2013-15. Allergen specific IgE was measured via an immunoblotting method using AlleisaScreen® system kit and their data were collected.

Results: Of 396 patients 246 (62.1%) were male and 150 (37.9%) were female. The range of patient's age was between1-12 and the mean± SD were 4.72±2.91 years. The most common allergens were milk, wheat flour, egg white, casein and cheese mix, respectively.

Conclusion: This study showed that the order of common food allergens in this study was different from other reports; this might be due to the different food habits and /or ethnic diversities.

Keywords: Prevalence; Food allergen; Milk; Wheat flour; Egg; Sesame seeds

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Introduction

According to a definition expressed by the United States National Institutes of Allergy and Infectious Diseases (NIAID)- sponsored guidelines in 2010, food allergy is defined as ''adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food. [1] A study was performed by Gupta et al. in 2010, in which the prevalence of food allergy was about 8% .[2] And another study showed that the prevalence of food allergy is between 1-10% of a population.[3] Cow's milk allergy in children worldwide is about 1.8-7.5% that can reach up to 15-5%.[4] Food allergy may affect different organs including the skin, gastrointestinal or respiratory tracts.[5,6] Sex, race, obesity and an increase in the level of hygiene are considered to be risk factors of allergy. For example allergy affects males more than females and also is more prevalent in African race.[7] Common food allergens are different in different countries; we designed this study to find the most common food allergens among allergic children referring to Mofid Children's Hospital (2013-2015).

Materials and Methods

This cross-sectional study was performed on 396 patients, which referred to Mofid Children's Hospital in a three-year period (2013-15) All patients complained from skin, respiratory and gastrointestinal tracts allergy symptoms. Allergen specific IgE was measured via an immunoblotting method using AlleisaScreen® system kit. Test results were reported as 0-6 positive. These data were collected and analyzed via SPSS version 22 software.

Results

Of 396 patients, 245 (61.9%) were male and 150 (38.1%) were female. The range of patient's age was between 1-12 and the mean± SD were 4.72±2.91 years. Specific IgE more or equal to 2+ was considered to be positive. The most common allergens: cow's milk, wheat flour, egg white, casein and cheese mix, respectively (Table 1 & Figure 1). The numbers of patients between 1-2.99 years were 122 patients, among whom, 80 patients (65.6%) were male, and 42 (34.4%) were female. The most important allergen substances among children with allergies in this group were: cow's milk, wheat flour, walnuts, sesame and casein, respectively (Table 2 & Figure 2). The number of children with an age range from 3 to 5.99 years were 174, among which, 104 (59.8%) were male, and 70 patients (40.2%) were female. The most allergens among children with allergies were cow's milk, egg white, wheat flour, casein and cheese mix, respectively (Table 3 & Figure 3).

The number of children with age range of 6-8.99 years were 46 patients, of which, 30 (65.2%) were male, and 16 patients (34.8%) were female. The most common allergens were milk, wheat flour, egg white and hazelnut, respectively (Table 4 & Figure 4).

The number of children with an age range of 9-12 were 54 of whom, 35 (64.8%) were male, and 19 patients (35.2%) were female. The most common food allergens in this range were cow's milk, carrots, citrus mix, wheat flour, casein and cheese mix, respectively (Table 5 & Figure 5).

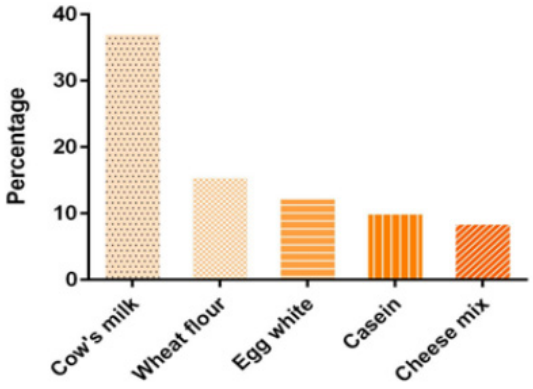

Figure 1 The most common food allergens among all patients.

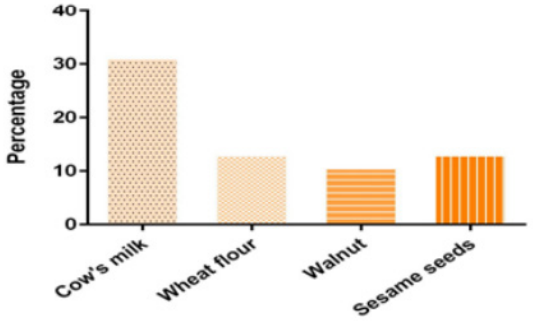

Figure 2 The most common food allergens among patients in range of 1-2.99 years old.

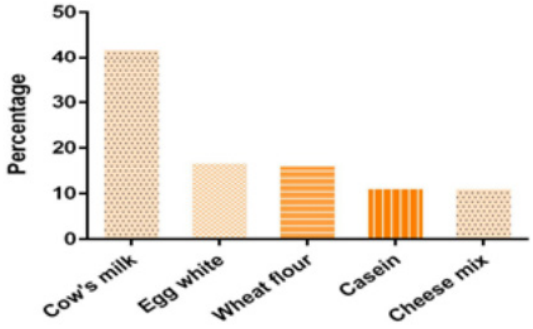

Figure 3 The most common food allergens among patients in range of 3-5.99 years old.

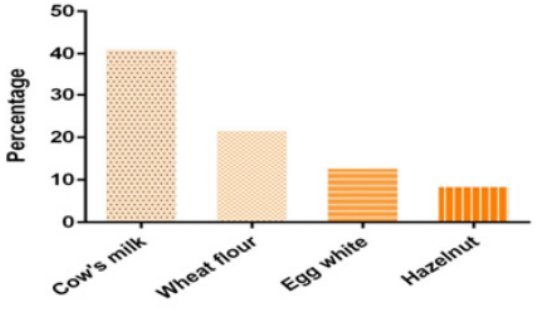

Figure 4 The most common food allergens among patients in range of 6 -8.99 years.

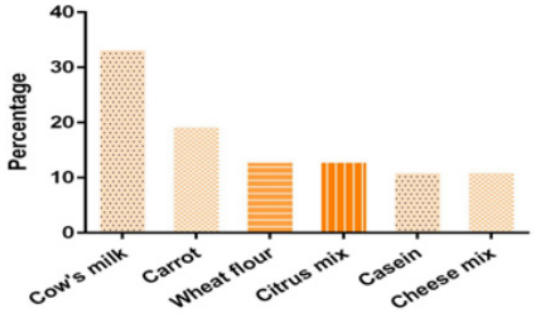

Figure 5 The most common food allergens among patients in range of 9-12 years.

Table 1 The numbers of positive specific IgE to different food allergens in total population of patients

Allergen	N	Percentage
Cow's Milk	148	37.3%
Wheat Flour	62	15.6%
Egg White	49	12.4%
Casein	40	10.1%
Cheese Mix	34	8.6%
Sesame Seeds	29	7.3%
Walnut	24	6%
Hazelnut	23	5.8%
Citrus Mix	23	5.8%
Peanut	17	4.3%
Carrot	16	4.2%
Potato	16	4.2%
Tomato	14	3.5%
Celery	14	3.5%
Egg Yolk	8	2.1%
Banana	6	1.6%
Almond	6	1.6%
Strawberry	4	1%
Soy Beans	4	1%
Fish Mix	4	1%
Shrimps	3	0.8%
Cocoa	0	0%

Table 2 The numbers of positive specific IgE to different food allergens among patients in range of 1 -2.99 years

Allergen	N	Percentage
Cow's Milk	38	31.1%
Wheat Flour	16	13%
Walnut	13	10.6%
Sesame Seeds	13	10.6%
Casein	12	9.8%
Egg White	8	6.6%
Cheese Mix	6	4.9%
Hazelnut	6	4.9%
Citrus Mix	4	3.3%
Almond	4	3.3%
Potato	3	2.4%
Peanut	3	2.4%

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Table 2 Continued...

Allergen	N	Percentage
Carrot	2	1.6%
Egg Yolk	1	0.8%
Tomato	1	0.8%
Celery	1	0.8%
Banana	1	0.8%
Strawberry	1	0.8%
Soy Beans	1	0.8%
Cocoa	0	0%
Fish Mix	0	0%
Shrimps	0	0%

Table 3 The numbers of positive specific IgE to different food allergens among patients in range of 3 -5.99 years

Allergen	N	Percentage
Cow's Milk	75	42.1%
Egg White	30	16.9%
Wheat Flour	29	16.3%
Casein	20	11.3%
Cheese Mix	20	11.3%
Sesame Seeds	9	5%
Citrus Mix	9	4.7%
Peanut	9	5.1%
Hazelnut	9	5.1%
Walnut	6	3.4%
Celery	6	3.4%
Potato	6	3.4%
Banana	5	2.8%
Egg Yolk	5	2.8%
Carrot	4	2.3%
Tomato	4	2.3%
Fish Mix	3	1.7%
Strawberry	2	1.1%
Almond	2	1.1%
Soy Beans	2	1.1%
Shrimps	1	0.6%
Cocoa	0	0%

Discussion

In this study, food allergy to 22 different food allergens were examined ,among which in total population, cow's milk, wheat flour, egg white, casein and cheese mix, were identified as the most common food allergens, respectively. Similar to previous studies, our results showed that the prevalence of food allergy is higher in males than females.[8] After cow's milk, wheat flour was identified as the second common food allergen, allergy to wheat flour increases with age until the age of 9.

Nuts such as peanuts and hazelnuts are also considered to be important allergens. About 1% of American population show reaction to peanuts.[9] Although peanuts is the most common allergen among nuts in most regions of the world, according to the results of this study, in Iranian children hazelnut is the most common allergen nuts and walnut was an important food allergen in children 1-3 years old, which considered to be in the third level after cow's milk and wheat flour, which may because of high consumption of this food stuff and also consumption of this nuts at early ages. Consistent with previous studies, tomato is an important food allergen in Iranian children, which could be due to increased use of this vegetable in the diet of these children.[9] (Tables 4 & 5).

Table 4 The numbers of positive specific IgE to different food allergens in age range of 6 -8.99 years

Allergen	N	Percentage
Cow's Milk	19	41.3%
Wheat Flour	10	21.8%
Egg White	6	13%
Hazelnut	4	8.7%
Casein	3	6.5%
Cheese Mix	3	6.5%
Carrot	3	6.5%
Potato	3	6.5%
Citrus Mix	3	6.5%
Peanut	3	6.5%
Tomato	3	6.5%
Walnut	3	6.5%
Shrimps	2	4.4%
Sesame Seeds	2	4.4%
Celery	2	4.4%
Egg Yolk	1	2.2%
Soy Beans	1	2.2%
Cocoa	0	0%
Strawberry	0	0%
Fish Mix	0	0%
Banana	0	0%
Almond	0	0%

Table 5 The numbers of positive specific IgE to different food allergens among children 12-9 years

Allergen	N	Percentage
Cow's Milk	18	33.4%
Carrot	8	14.9%
Wheat Flour	7	13%
Citrus Mix	7	13%
Casein	6	11.1%
Cheese Mix	6	11.1
Egg White	5	9.3%
Tomato	5	9.3%
Celery	5	9.3%
Sesame Seeds	5	9.3%
Potato	4	7.4%
Hazelnut	4	7.4%
Fish Mix	2	3.8%
Peanut	2	3.7%
Walnut	2	3.7%
Shrimps	2	3.8%
Egg Yolk	1	1.9%
Strawberry	1	1.9%
Cocoa	0	0%
Banana	0	0%
Almond	0	0%
Soy Beans	0	0%

In conclusion, according to this fact that some food allergens in Iranian children are different from those in the world, it is crucial to design further population-based studies with larger sample sizes in different regions of Iran.[10] Also proper education and consumption of food stuffs at the proper ages should be considered. Also, in order

to define it could be interesting to test people from other nationalities living in Iran and other Iranians who live in other countries.

Conflicts of interest

All authors declare that there is no conflicts of interest.

Acknowledgments

None.

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