

# Perception of food allergy among mothers of allergic children in Southwestern Saudi Arabia

Youssef A. Alqahtani (1)  
 Ayed A. Shati (1)  
 Ahmad A. Alhanshani (1)  
 Bayan M. Hanif (2)  
 Eman S. Salem (2)  
 Aljohrah M. Hanif (3)  
 Ali Alsuheel Asseri (1)

(1) Department of Child Health, College of Medicine, King Khalid University, Abha, Saudi Arabia

(2) Department of Pediatrics, Abha Maternity and Children Hospital, Abha, Saudi Arabia

(3) Medical student, College of Medicine, King Khalid University, Abha, Saudi Arabia

## Corresponding author:

Dr. Youssef A. Alqahtani  
 Department of Child Health,  
 College of Medicine, King Khalid University,  
 P.O. Box 641, Abha, Saudi Arabia  
 Phone: 00966554736556  
 Email: youssef9811@hotmail.com

Received: December 2020; Accepted: January 2021; Published: February 1, 2021.

Citation: Youssef A. Alqahtani et al. Perception of food allergy among mothers of allergic children in Southwestern Saudi Arabia. World Family Medicine. 2021; 19(1): 93-101 DOI: 10.5742/MEWFM.2021.93988

## Abstract

**Background:** Food allergy (FA) is increasingly recognized with the highest prevalence in preschool children; there has been a significant increase in hospital admissions for systemic allergic diseases with anaphylaxis and food allergies. Hospital admissions for food allergy were noticed to rise from 6 to 41 per million between 1990 and 2000 worldwide. The prevalence of food allergy is increasing over time with significant geographic variations. It is estimated to affect 6% of children in the United States (USA); according to a study conducted in Makkah, by AL Mokarmah, the prevalence of FA among children attending the well-baby clinic was 22.5% and in Riyadh is 6% among children who visit the allergy clinic at King Khalid University Hospital. FA in children is usually caused by milk (2.5%), egg (1.3%), peanut (0.8%), tree nuts (0.2%), fish (0.1%), as well as shellfish (0.1%), with an overall prevalence of 6%.

**Methods:** In this cross-sectional study, a self-administered questionnaire was used in the data collection. After data were collected, they were entered in the Statistical Software IBM SPSS version 22. Descriptive and inferential statistics were obtained.

**Results:** Out of 980 mothers, 49% were suffering from food allergy, while 28.6% of their children were suffering from food allergy. Shellfish was the most common cause of food allergy (38%).

**Conclusion:** The management of FA in children is improving through the acquisition of new knowledge in diagnosis and treatment. Education of physicians and food-allergic patients about FA and its treatment is becoming recognized as an unmet need.

**Key words:** Food allergy, mother, children, knowledge, prevalence, factors

## Background

Food allergy (FA) is increasingly recognized with the highest prevalence in preschool children; there has been a significant increase in the hospital admissions for systemic allergic diseases with food allergies and anaphylaxis. The hospital admissions for food allergy rose from 6 to 41 per million between 1990 and 2000 [1-2]. FA has a great impact on the child's diet, care, and social life. Also, it is considered to be associated with parent anxiety. The death rate from FA was found to be 1 in 800,000. So, the diagnosis and consideration of FA is an important issue [3, 4]. FA among children requires good health care and specific instructions from their parents, family and school members. The correct diagnosis of FA should decrease the incidence of adverse food reactions resulting from true FA, and help to prevent the unnecessary exclusion of safe foods and should be eaten as part of a regular healthy diet [5-7].

The history-taking should help determine whether the mechanism of FA is IgE mediated or non-IgE mediated. In a study conducted in a large city in Saudi Arabia, there were 238 reported cases of anaphylaxis in a 2-year period. Food allergies are more common among children and adolescents, whereas insect and drug-induced allergies are more prevalent in adults [8]. A Turkish study reported that the most common cause of anaphylaxis in children was food [9].

There is no study that has estimated FA's prevalence among children in the southern region of Saudi Arabia. Regarding the lack of studies on this issue, this study investigates the epidemiological aspects of the commonest allergies to food among children in Aseer region of Saudi Arabia.

The main aim of this study is to find out the perception of food allergy among mothers of allergic children in Aseer region, Saudi Arabia. We also discussed some relevant variables like commonest foods for FA, factors associated with developing FA, and parents' awareness about FA.

## Methods

This is a cross-sectional study conducted at Abha Maternity and Children Hospital, in Abha, Saudi Arabia. The duration of the study was from the 1st of July 2019 to the 31st of October 2019. The sample was selected using convenience sampling. Mothers with children's age up to 15 years who visited Abha maternity and children hospital during the study duration were included in this study. A direct interview questionnaire was used in the data collection. The researchers developed the questionnaire based on the review of the literature of similar articles and with the help of experts from King Khalid University, College of Medicine. The questionnaire consists of three parts, including mothers and children demographic data, nutritional history, and mode of delivery. The second part included data regarding child history of developing food allergy, aggravating factors, signs and symptoms, and most reported food-initiated allergy among the children.

The third part included knowledge about food allergy and how the food allergic child affects family life. The questionnaire was then given to the mothers of the patients or filled in by researchers if they were illiterate. Mothers were included consecutively daily during the study period and verified by hand, then coding for computerized data entry. The mothers signed a written consent; the study was approved by the Ethical Committee of our institute.

## Data analysis

After data were collected, they were revised, coded and fed into Statistical Software IBM SPSS version 22. The given graphs were constructed using Microsoft Excel software. All statistical analysis was done using two-tailed tests and an alpha error of 0.05. A P-value less than 0.05 was considered to be statistically significant. Frequency and percent were used to describe the frequency distribution of each category for mother and child data while mean with standard deviation described numerical data. Chisquare/Monte Carlo exact test and Fishers exact test were used to test for the differences between child data and food allergy.

## Results

The study included 980 participating children and their mothers whose ages ranged from 19-52 years old with a mean age of  $35.3 \pm 7.2$  years old. Most of the mothers were Saudis (95%; 931), and university level of education was reported among 614 (62.7%). Family history of allergy was reported among 96% of the participating mothers; the most reported were food allergy (49.1%), followed by eczema (35.6%), allergic rhinitis (30.8%), and Asthma (28.1%) (Table 1).

The prevalence of food allergy (Figure 1) was detected among 280 (28.6%) children. Ages of children with a positive history of food allergy ranged from 1 to 16 years with a mean age of  $10.3 \pm 3.4$  years. Exactly 143 (51.1%) children were males. The age of the first food allergy episode was the first two years among 44.2% and above the age of 6 years among 18.6%. Exactly 55% of the children with food allergies visited the ER during the last 12 months before the study date, and 21.8% of those children had brothers with a history of food allergy. The most-reported allergy mechanism was through eating food (73.6%) and eating or smelling food (9.6%). Among 77.9% of the children, it takes minutes to hours to develop allergy signs (Table 2).

Table 3 shows feeding data of children with food allergies. Breastfeeding was reported among 23.2% of the children with a food allergy, while 56.4% had both breastfeeding and formula. Among those who had formula, it was started immediately after birth among 60.5% of them. Exactly 54.4% of children with an allergy who had formula were given the formula once daily. First solid food was given for 39.5% of those children at the age of 6 months. About 23% of those who started solid food developed food allergy.

Table 4 illustrates FA manifestations as recorded for children by their mothers. The most reported food allergy manifestations were itching (51.8%), followed by a pinpoint rash (47.9%) and eyelid and lips swelling (26.8%). As for respiratory manifestations, 37.5% had dyspnea, 36.4% had a cough, and 30.4% had no respiratory symptoms. The itching was the most reported eye manifestation (28.2%) for food allergy, followed by redness (23.9%) and lacrimation (22.5%). Abdominal pain and nausea with vomiting were reported among 17.9% of children with food allergy. Rhinorrhea was reported among 28.6% of those children, followed by sneezing (24.3%) and congestion (20.7%) as a nasal manifestation for food allergy.

Figure 2 demonstrates the most common foods causing food allergy as recorded by mothers. Shellfish was the most identified (38%), followed by egg (21%), milk (19%), peanuts (11%), and banana (8%). Considering aggravating factors of allergy as recorded by children's mothers (Figure 3), having allergy stimulant food was the most reported factor (76.8%) followed by the presence of smoker at home (33.9%), abnormal birth (29.3%), overfeeding (24.3%), and heating food (18.2%) while effort was the least reported factor (8.6%).

Considering mothers' awareness regarding food allergy (Figure 4), it was reported that 56.6% of the respondent mothers agreed that food allergy includes the activity of the immune system, while 39.8% agreed that Asthma is an inducing factor for food allergy, and 32.7% agreed that food allergy can be diagnosed by laboratory test only.

**Table 1: Personal data of screened mother, Aseer region, Saudi Arabia**

Mother personal data		No	%
Age in years	19-	220	22.4%
	30-	454	46.3%
	40+	306	31.2%
Nationality	Saudi	931	95.0%
	Non-Saudi	49	5.0%
Education	Primary	106	10.8%
	Intermediate/ secondary	260	26.5%
	University	614	62.7%
Family history of allergy	None	39	4.0%
	Food allergy	481	49.1%
	Eczema	349	35.6%
	Allergic rhinitis	302	30.8%
	Asthma	275	28.1%
	Animal allergy	179	18.3%
	Eye allergy	155	15.8%
	Insect bite allergy	127	13.0%
	Plant allergy	119	12.1%
	Drug allergy	118	12.0%
	Eyelid edema	83	8.5%
	Touching allergy	74	7.6%
	Others	44	4.5%
	Urticaria	36	3.7%

Figure 1: Prevalence of food allergy among children as recorded by their mothers, Aseer region, Saudi Arabia

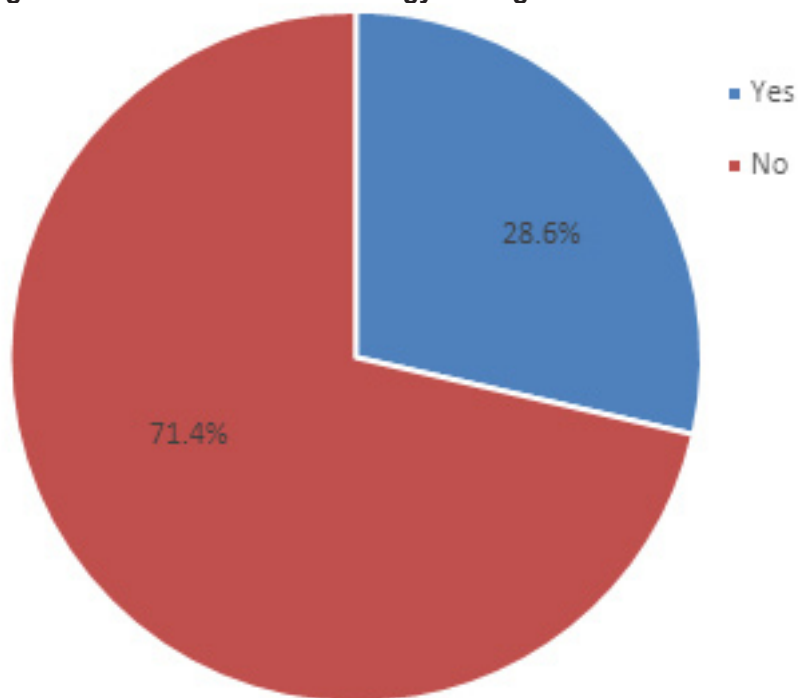


Table 2: Food allergy data for children of sampled mothers, Aseer region, Saudi Arabia

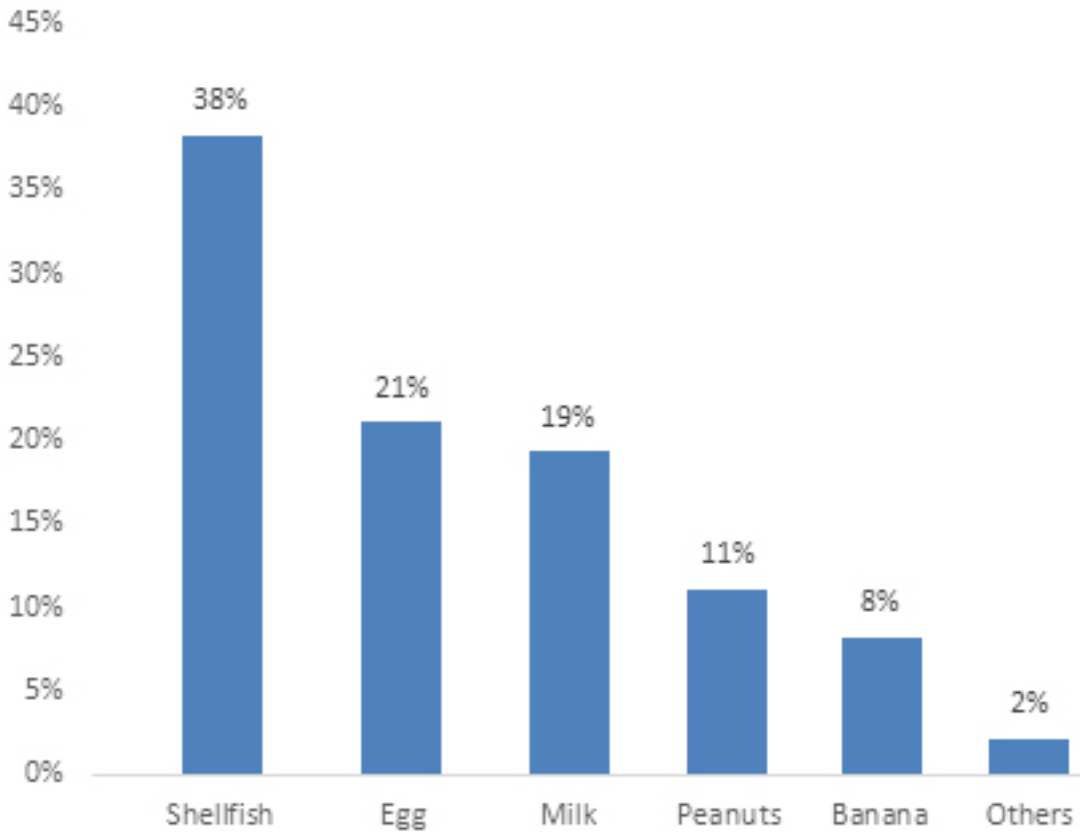
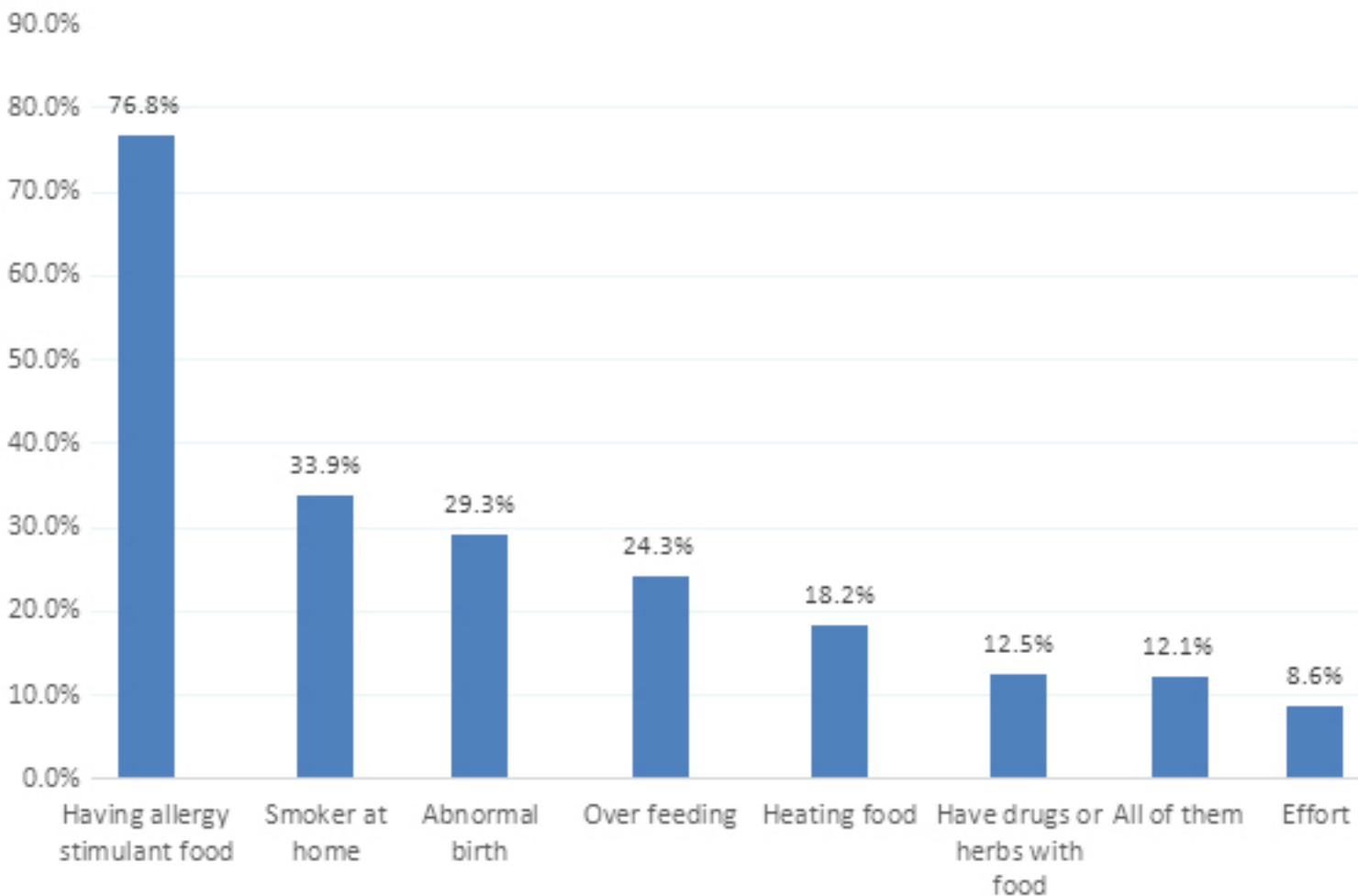
Food allergy data	No (280)	%
Age of the child in years	1-4	29.6%
	5-9	31.4%
	10-14	35.7%
	15+	3.2%
Age at first allergy in years	Before one year	13.9%
	1-2 years	40.4%
	3-6 years	27.1%
	Above six years	18.6%
Gender of child	Male	51.1%
	Female	48.9%
No of ER visits due to allergy at the last 12 months	None	45.0%
	1-2	39.6%
	3+	15.4%
Have other children with food allergy	Yes	21.8%
	No	78.2%
Mechanism of food allergy	Eating food	73.6%
	Smelling food	5.0%
	Touching food	4.6%
	Eating or smelling	9.6%
	All	7.1%
Duration till signs of allergy	Minutes to hours	77.9%
	Days	22.1%

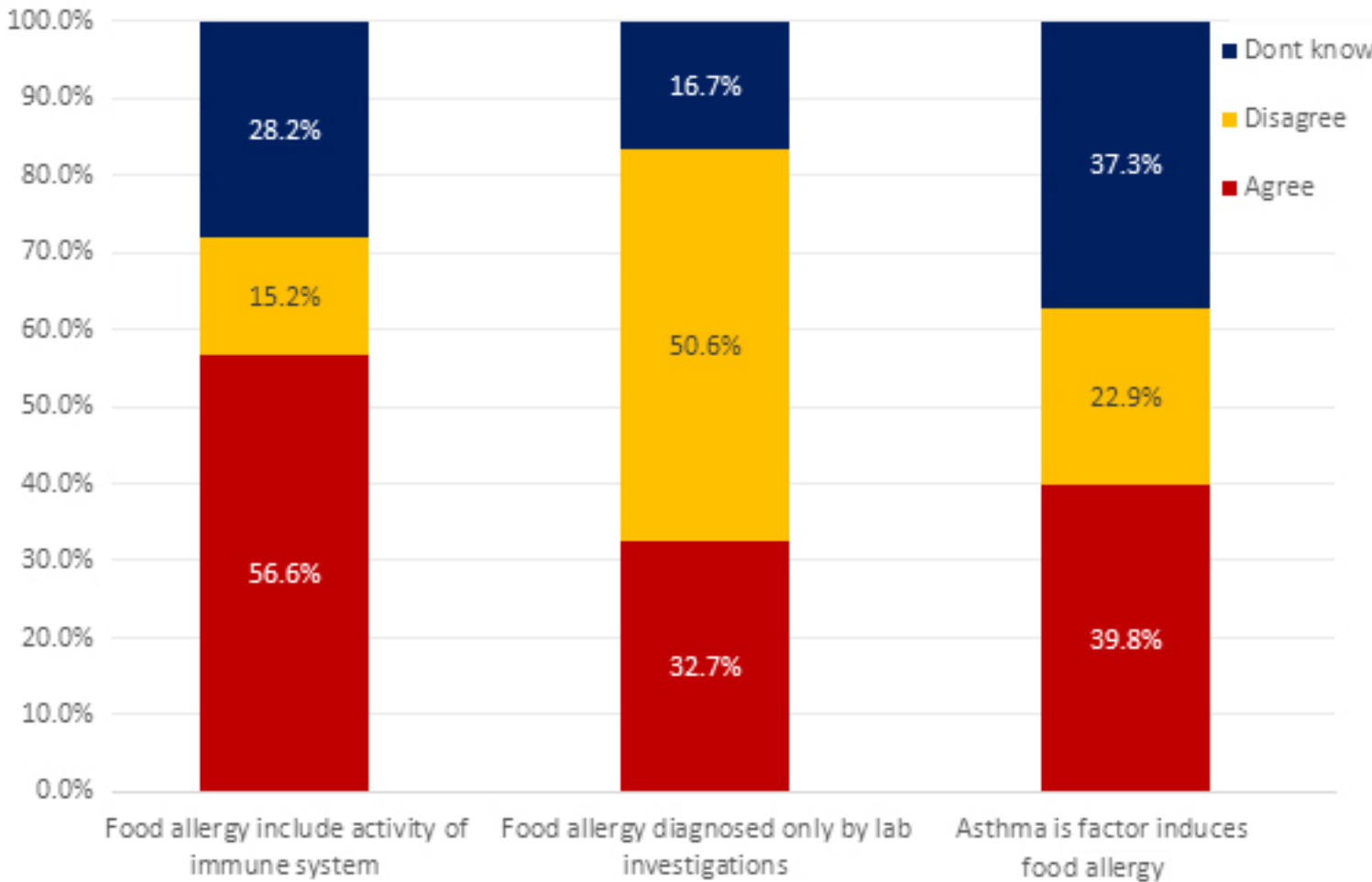
**Table 3: Feeding data of children with a food allergy, Aseer region, Saudi Arabia**

Child feeding data		No (280)	%
Child feeding	Breastfeeding	65	23.2%
	Formula	57	20.4%
	Both	158	56.4%
Child had colostrum	Yes	199	71.1%
	No	81	28.9%
First artificial feeding (n=215)	Immediately after birth	130	60.5%
	Days to months after birth	85	39.5%
No of formula feeding per day (n=215)	On need	117	54.4%
	9-12	23	10.7%
	5-8	48	22.3%
	1-5	27	12.6%
Improved after formula (n=215)	Yes	69	32.1%
	No	146	67.9%
Changed formula milk (n=215)	Yes	164	76.3%
	No	51	23.7%
Age of first solid food	4 months	61	22.1%
	6 months	109	39.5%
	8 months	55	19.9%
	1 year	33	12.0%
	After 1 year	18	6.5%
Allergy after solid food intake	Yes	64	23.1%
	No	213	76.9%

**Table 4: Food allergy manifestations as recorded for children by their mothers, Aseer region, Saudi Arabia**

Food allergy manifestations	No	%	
<b>Skin manifestations</b>	None	24	8.6%
	Itching	145	51.8%
	Dryness	36	12.9%
	Pinpoint rash	134	47.9%
	Raised circular rash	43	15.4%
	Eyelid and lips swelling	75	26.8%
	Others	3	1.1%
<b>Respiratory manifestations</b>	None	85	30.4%
	Dyspnea	105	37.5%
	Heaviness	33	11.8%
	Wheezes	54	19.3%
	Cough	102	36.4%
<b>Eye manifestations</b>	None	102	36.4%
	Lacrimation	63	22.5%
	Itching	79	28.2%
	Redness	67	23.9%
	Eyelid swelling	52	18.6%
<b>GIT manifestations</b>	None	222	79.3%
	Abdominal pain	50	17.9%
	Diarrhea	26	9.3%
	Nausea and vomiting	50	17.9%
<b>Nasal manifestations</b>	None	103	36.8%
	Rhinorrhea	80	28.6%
	Sneezing	68	24.3%
	Congestion	58	20.7%
	Itching	40	14.3%
	Others	3	1.1%

**Figure 2: Most common foods causing food allergy as recorded by mothers****Figure 3: Aggravating factors of allergy as recorded by children mothers, Aseer region, Saudi Arabia**

**Figure 4: Mothers awareness regarding food allergy, Aseer region, Saudi Arabia**

## Discussion

The main objective of this study was to find out the perception of mothers of food allergic children in the Aseer region of the KSA. The natural history of a food allergy includes information on the acquisition of the allergy, the likelihood that it will be outgrown, and its usual duration.

Nearly 8% of US children (about 5.6 million) have food allergies, with almost 40% of those children allergic to more than one food, a study conducted by researchers from Ann & Robert Lurie Children's Hospital of Chicago determined [10]. According to a study conducted in Makkah, by AL-Mokarmah, the prevalence of FA among children attending the well-baby clinic was 22.5%, and in Riyadh, it is 6% (11), among children who visit the allergy clinic at King Khalid University Hospital. In our study, we found the prevalence (28.6%) higher than the Makkah Study, which may be due to the lack of awareness and training.

One USA study reported that peanut is the leading cause of Food allergy [12], but in our study, we found fish, egg and milk are the leading source of the food allergy which is in line with other studies that stated the most common food allergens responsible for about 90% of adverse reactions of this type are the proteins of cow's milk, eggs, peanuts, tree nuts (walnuts, hazelnuts, almonds, etc.), soy,

wheat flour, fish and marine mollusks, crustaceans and cephalopods (shells, crabs, squids). Significant allergens include berries and citrus fruit, honey, sesame seeds, and many other foods and their additives [13]. According to the data from the USA and Western Europe, the leading causes of food allergy in childhood are cow's milk proteins (2.0–3.5%), eggs (1.3–3.2%), peanuts (0.6–1.3%), fish (0.4–0.6%) and tree nuts (0.2%) [14].

A study published in the BMJ stated that Asthma is also a risk factor for food allergy; in our study, 40% of the mothers agreed that Asthma is one of the risk factors of food allergy. In our study, the Family history of FA was found in 49%, and 28.6% of their children had FA, which confirms the findings of other studies that the greatest risk of developing an allergy depends on genetic factors. It has been found that the risk of allergy development in children of healthy parents ranges from 5% to 15%; when one of the parents is allergic, it increases to 40%, and if both parents are affected, it reaches 60-80%.[15].



## Conclusions and Recommendations

In conclusion, the study revealed that nearly 1 out of every four included children had a positive history of food allergy, most of them either during eating or just by smelling. The allergy attack lasts for less than 24 hours in most children with recorded history. Itching with the rash is the dominant clinical presentation of allergy among sampled children.

Fish and egg constituted more than half of the aggravating foods for the allergy attack. Health education for mothers to improve their awareness regarding allergy triggering factors, including behavior and foods, is a crucial recommendation. This can be achieved through GP staff in the PHCCs or during hospital visits. Social media can also play a significant role in improving the mother's awareness and modifying their behavior.

## References

1. Jimenez-Rodriguez TW, Garcia-Neuer M, Alenazy LA, Castells M. Anaphylaxis in the 21st century: phenotypes, endotypes, and biomarkers. *Journal of Asthma and allergy*. 2018; 11:121.
2. McWilliam V, Koplin J, Lodge C, Tang M, Dharmage S, Allen K. The prevalence of tree nut allergy: a systematic review. *Current allergy and asthma reports*. 2015 Sep 1;15(9):54.
3. Macdougall CF, Cant AJ, Colver AF. How dangerous is food allergy in childhood? The incidence of severe and fatal allergic reactions across the UK and Ireland. *Archives of disease in childhood*. 2002 Apr 1;86(4):236-9.
4. Dermott K. Clinical guidelines and evidence review for post-natal care: routine post-natal care of recently delivered women and their babies. NICE; 2006.
5. The Use of Epinephrine in the Treatment of Anaphylaxis. Position Statement from the American Academy of Allergy, Asthma & Immunology. Available online at: [www.aaaai.org/members/academy\\_statements/position\\_statements/ps26.asp](http://www.aaaai.org/members/academy_statements/position_statements/ps26.asp). Achieved at 10 December 2020.
6. Bock SA, Muñoz-Furlong A, Sampson HA. Fatalities due to anaphylactic reactions to foods. *Journal of Allergy and Clinical Immunology*. 2001 Jan 1;107(1):191-3.
7. Bock SA, Muñoz-Furlong A, Sampson HA. Further fatalities due to anaphylactic reactions to food: 2001 to 2006. *Journal of Allergy and Clinical Immunology* 2007; 119:1016-1018.
8. Damanhori NK. Food allergy among children under 12 years of mothers attending a well-baby clinic at an AL-Eskan primary health care center, Makkah Al-Mokarramah, 2013. *International Journal of Medical Science and Public Health*. 2015 May 1;4(5):700-9.
9. Boye JI. Food allergies in developing and emerging economies: need for comprehensive data on prevalence rates. *Clinical and translational allergy*. 2012 Dec 1;2(1):25.
10. Gupta RS, Warren CM, Smith BM, Blumenstock JA, Jiang J, Davis MM, Nadeau KC. The public health impact of parent-reported childhood food allergies in the United States. *Paediatrics*. 2018 Dec 1;142(6).
11. Shek LP, Lee BW. Food allergy in Asia. *Current opinion in allergy and clinical immunology*. 2006 Jun 1;6(3):197-201.
12. Iweala, O. I., Choudhary, S. K., & Commins, S. P. Food Allergy. *Current gastroenterology reports*. 2018; 20(5): 17.
13. Radlović N, Leković Z, Radlović V, Simić D, Ristić D, Vuletić B. Food allergy in children. *Srpski arhiv za celokupno lekarstvo*. 2016;144(1-2):99-103.
14. Gonzales-González VA, Díaz AM, Fernández K, Rivera MF. Prevalence of food allergens sensitization and food allergies in a group of allergic Honduran children. *Allergy, Asthma & Clinical Immunology*. 2018 Dec 1;14(1):23.
15. Bellón S, Sánchez L, González L, Moreira A, Bracamonte T, Quevedo S, Echeverría LÁ. 5th Pediatric Allergy and Asthma Meeting (PAAM).