

## Food Allergy Experience and Perception of Parents in Tabuk City, Kingdom of Saudi Arabia

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### ABSTRACT

**Background:** Food allergy is a significant public health problem with variable presentations. The aim of this study is to describe food allergy perceptions of parents in Tabuk City and to explore their previous experience with the problem among their children.

**Methods:** A total of 485 parents (48.9% fathers and 51.1% mothers) responded to an anonymous self-administered questionnaire that requested information about their knowledge, perceptions and experiences of food allergy. Data was analyzed using the "Statistical Package for Social Science (SPSS Inc., Chicago, IL.), version 20. The Chi-square test was used for determining the relation between the different categorical variables.

**Results:** The estimated prevalence of food allergy among children was 17.5%. Almost all parents (96.1%) were aware of food allergy. The most familiar allergenic foods were fish (48.5%), beans (36.1%), egg (30.3%) and milk (27.0%). The most frequent symptoms were itching (77%), swelling (36%), and alterations in breathing (21%). More than half of all participants (53.6%) know that food allergy can be life threatening.

**Conclusion:** Our results show that food allergy is a common health problem in Tabuk City. Educational programs are highly recommended to draw the attention of the parents towards methods of prevention and options for management.

**Keywords:** Food Allergy, Parents, Child, Perception.

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### INTRODUCTION

The National Institute of Allergy and Infectious Diseases (NIAID) Expert Panel defined food allergy as "an adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food."<sup>1</sup> It is an important public health problem with variable effects on general health and quality of life. The most common allergenic foods reported in the literature are cow's milk and dairy products, hen's egg, peanuts, nuts, gluten-containing cereals (e.g., wheat, rye, barley), sesame, soybeans, mustard, fish, crustaceans and shellfish.<sup>2,3</sup> The intensity of the allergic response differs with different types of food. For example, egg, milk, peanut, tree nuts, fish, shellfish, wheat, and soy are responsible for the most significant food allergies in the United States.<sup>4</sup> Common symptoms in children are urticaria, gastrointestinal distress, and failure to thrive. In its most severe form, the immunological response can lead to anaphylaxis and death. The prevalence of food allergy varies between countries. In the United States, a self-reported prevalence reached 9.1% whereas physician diagnosed prevalence reached 5.3%.<sup>5,6</sup> In a

meta-analysis of 51 studies, self-reported allergy to milk, egg, peanut, and seafood ranged from 3% to 35%.<sup>7</sup> The self-reported prevalence is usually higher than the physician diagnosed prevalence because many adverse food reactions, like food intolerances, food poisoning and enzyme deficiencies, are misdiagnosed as allergy. The diagnosis of food allergy depends on typical history, physical examination, and certain investigations that include food-specific IgE antibodies and a supervised oral food challenges. The gold standard for the diagnosis is the double-blind placebo-controlled oral food challenge.<sup>8</sup> However, this method is expensive and time-consuming. Management depends on avoidance of the allergenic food and treatment of the allergic reactions; however, scientists claim that prolonged avoidance of the allergenic food is not protective and might be a risk factor for the development of atopic reactions in the future.<sup>9</sup> Natural resolution during childhood is possible, especially for milk, egg, wheat, and soy, whereas allergies to peanut, tree nuts, fish, and shellfish are persistent.<sup>10</sup>

There is a paucity of data regarding the prevalence of food allergy in the Middle East, including Saudi Arabia.<sup>11</sup> On the other hand, the level of perception and the experiences of food allergy among the community need further investigation. The aim of the current study is to describe food allergy perceptions of parents in Tabuk City and to evaluate their previous experience with the problem as it relates to their children.

**METHODS**

We conducted this cross-sectional study in Tabuk City, Saudi Arabia. Six primary schools were selected by simple randomization. Pupils included both male and female children. All pupils were given a questionnaire to be filled out by one of their parents and returned to the investigators the following day. A total of 485 parents participated in our study, with a response rate of about 54%.

The parental questionnaire was an anonymous self-administered survey to gather information about the parent's gender, age, education level, knowledge of food allergy, number children with food allergy, type of food to which the child is allergic, management of child's food allergy, and previous experience with food allergy by a close relative.

Data collected with the questionnaire was entered into Microsoft Excel format and then analyzed using the "Statistical Package for Social Science version 20 (SPSS Inc., Chicago, IL.). The Chi-square test was used for determining the relation between the different categorical variables. A p-value < 0.05 was considered as statistically significant.

The research was approved by the local Research Committee of the Faculty of Medicine, University of Tabuk. Official letters were sent to the Ministry of Education in Tabuk City. Permission letters were distributed to the selected primary schools. Parents of the pupils were asked to give their written consents before participation in the study.

**RESULTS**

Table 1 shows general characteristics of the sample. Fathers: Mothers ratio was almost 1:1. The majority of the parents were young adults (25-40 years old). Only 39.8% were university graduates. The most frequent allergenic foods were fish (48.5%), beans (36.1%), egg (30.3%) and milk (27.0%). (Table 2)

Table 3 shows the symptoms of food allergy in children as described by the parents of the study group. The most frequent symptoms were itching (77%), swelling (36%), and alterations in breathing (21%).

Table 4 shows that the major source of information about food allergy was the internet (38.8%). Other sources included books or magazines (26.8%), academic curriculum (26.6%), and previous experience (21.4%).

Table 5 presents the parents' knowledge and perception of food allergy. The estimated prevalence of food allergy among children was 17.5%. Almost all parents (96.1%) believe that food can cause food allergy. More than half of all participants (53.6%) believe that food allergy can be life-threatening, and less than half (47.2%) believe that their child will be safe by avoiding the allergenic food.

**Table 1: General Characteristics of the Sample**

Character		n (%)
Parental gender	Male (Father)	237 (48.9%)
	Female (Mother)	248 (51.1%)
Parental age (y)	< 25	17 (3.5%)
	25-40	354 (73.0%)
	> 40	114 (23.5%)
Educational level	Illiterate	19 (3.9%)
	Non-graduate	273 (56.3%)
	Graduate	193 (39.8%)

**Table 2: Types of food that cause food allergy**

Type of food	Frequency	%
Milk	131	27.0
Beans	175	36.1
Fish	235	48.5
Banana	82	16.9
Egg	147	30.3
Chicken	22	4.5
Strawberry	13	2.7
Eggplant	15	3.1
Chocolate	25	4.4

**Table 3: Symptoms of food allergy mentioned by the parents**

Symptom	Father n= 237	Mother n= 248	Total n= 485	P value
Itching	178 (75%)	195 (79%)	373 (77%)	0.357
Swelling	65 (27%)	105 (42%)	170 (35%)	0.001*
Breathing	51 (22%)	49 (20%)	100 (21%)	0.558
Abdominal pain	25 (11%)	31 (13%)	56 (12%)	0.501
Nausea	27 (11%)	28 (11%)	55 (11%)	0.972

**Table 4: Sources of information about food allergy**

TYPE OF FOOD	FREQUENCY	%
Academic curriculum	129	26.6
Books or magazines	130	26.8
Internet	188	38.8
Educational lectures	69	14.2
Previous experience	104	21.4
Doctor or Health staff	17	3.5

**Table 5: Parent's knowledge and perception of food allergy**

KNOWLEDGE/ PERCEPTION	FREQUENCY (%)
I believe that food can cause allergy	466 (96.1)
At least one of my children has food allergy	85 (17.5)
At least one of my close relatives has food allergy	168 (34.6)
Food allergy can be life threatening	260 (53.6)
Avoiding allergenic food is enough to protect from food allergy	229 (47.2)
The problem of food allergy can be solved with drug therapy	254 (52.4)
I will take my child to a hospital if he develops food allergy	401 (82.7)

**DISCUSSION**

The participation of fathers and mothers in this study was almost equal. Their educational attainment was variable with more than one-third were university graduates, and only 4% were not educated. Our findings showed that the estimated prevalence of food allergy among children was about 17.5%, and the most frequent allergenic food was the fish, followed by beans, egg, and milk. The explanation for this high prevalence is unknown. Further studies are highly recommended to determine the possible causes and risk factors for food allergy in this region. A similar prevalence of specific IgE antibodies to different food allergens was reported in an old study conducted about two decades ago in adult Saudi patients.<sup>12</sup> The researchers found prominent reactions to peanut, egg white and cow's milk.<sup>12</sup>

A recent review from the United States reported that cow's milk, peanut, and tree nuts are the most common allergens in children, whereas shellfish, fruits, and vegetables are the most common allergens in adults.<sup>13</sup> Regarding symptoms of food allergy in our study, itching was mentioned as the cardinal symptom followed by alterations in breathing. It is worth noting that, although changes in breathing do not necessarily indicate food allergy, this symptom is very serious since it may indicate the development of upper respiratory tract obstruction or even circulatory failure, which may eventually lead to death.

Fortunately, the majority of the parents declared that they will take their child immediately to a hospital when they suspect the food allergy. Waiting for the symptoms to disappear is a known practice of some of the parents, but this is most probably done when the symptoms are mild and can be ignored. The current treatment for food allergy relies on treatment of symptoms in addition to avoidance of the causative allergen.

It is interesting that the web-based health education is the major source of information about food allergy for the parents. This can be explained by the fact that the use of smart phones by the Saudi population is very high. Therefore, the web-based health education is a valuable tool for disseminating knowledge and educating the community about many medical problems, including food allergy. The contribution of the academic curriculum and self-reading of books and magazines in health education are also very important. The educational lectures do not represent an important

source for this issue, most probably because the attendance for this activity is generally limited.

Previous experience with food allergy was mentioned by 21% of the parents, and this is not far from the estimated prevalence (17.5%) among the children. Recent studies reported lower prevalence in other countries like the United States.<sup>5,6</sup> Our higher prevalence could be due to the misinterpretation of food intolerance as a food allergy. This could result in higher estimation of the prevalence. It is worth noting that the best method for diagnosing food allergy is the double-blind placebo-controlled oral food challenge.<sup>8</sup> However, this is not practical in this study.

**CONCLUSION**

Our results should be seen in the light of certain limitations. One of the major limitations is the recall bias. Another limitation is the lack of an objective method for confirmation of food allergy. However, the study showed that food allergy is a common health problem in Tabuk City. Educational programs are highly recommended to draw attention of the parents towards the possible methods of prevention and management.

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