

## Perceptions about food allergy among medical science students in a university in Shah Alam, Selangor, Malaysia

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**Abstract:** This study aimed to determine the perceptions and opinions of medical students about food allergy. Universal sampling was used to conduct focus group discussions. The majority of the participants 40 (67%) mentioned that the common symptoms of food allergy are: skin rashes, swollen lips, diarrhea, vomiting, broncho-spasm, redness, itchiness, difficulty in breathing, stomach ache and fever. Majority of participants mentioned that seafood is the food that can cause most food allergies 52 (87%), followed by tree nuts 25 (42%), peanuts and dairy products 19 (32%). Regarding the most allergenic food named by the participants are seafood 23 (38%); followed by milk and dairy products 5 (8%) and nuts 5 (8%). The majority of participants mentioned that food allergy can be fatal 48 (80%), a child can catch food allergy 57 (95%), and 10 of 100 people would have food allergy 31 (52%). Half of the participants 30 (50%) mentioned that it is very hard to care for children with food allergy. The majority of participants mentioned that food allergies do run in families 50 (83%), avoiding allergenic food is the best preventive methods 36 (60%) and that food allergy can be treated and will go away and 32 (53%). This study showed that in spite of sufficient knowledge among medical students about food allergy, some misconceptions still exist such as the high prevalence of food allergy and that food allergy can be treated and will go away. Therefore, there is a need for improving the continuous medical education among medical students with regard to food allergy because they are our future physicians.

**Keywords:** Perception, food allergy, medical students

### Introduction

Food and nutrition are crucial for both health and survival. Food allergy is now recognized as a worldwide problem. It is a leading cause of anaphylaxis treated in emergency departments in a number of countries (Sampson, 2004). Food allergy is defined as an adverse immune response to specific foods, typically proteins (Sicherer and Sampson, 2006). It has recently seen a dramatic increase in prevalence (Osterballe *et al.*, 2005; Gupta *et al.*, 2007). The symptoms may be severe and many reactions can occur within minutes, although it could take many hours to appear (Food Safety Authority of Ireland, 2009). Food allergy ranges from cutaneous symptoms such as atopic dermatitis, appearing several hours after ingestion of the responsible food to potentially life-threatening symptoms occurring immediately upon ingestion. The American College of Allergy, Asthma and Immunology describe signs and symptoms that involve skin rashes, hives and eczema, intestinal symptoms which include vomiting, nausea, stomach cramps, indigestion and

diarrhea, and other symptoms which include asthma, coughing or wheezing, rhinitis and anaphylaxis. Additionally, some individuals experienced allergic symptoms only if the food is eaten before a specific physical stimulus (for example, vigorous exercise) or if the individual has concomitant seasonal allergies whereby certain foods elicit oral symptoms, such as pruritis and local swelling upon ingestion (Kagan, 2003). The diagnosis of food allergy is based on clinical history and can be supported by testing, such as skin prick testing, specific IgE and oral food challenges. IgE-mediated food allergy can lead to anaphylaxis (Bohlke *et al.*, 2004). The most reliable technique for confirming the diagnosis of food allergy is the double-blind placebo controlled food challenge (DBPCFC). Studies that use the DBPCFC suggest that food allergy is relatively uncommon, affecting fewer than 2% of adults (Sampson & Metcalfe, 1991), although new laboratory approaches are proving useful for the diagnosis of IgE-mediated food allergy. The medical history continues to be the mainstay in the diagnostic process in attempting to establish whether a food-induced allergic reaction

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has occurred, which foods were involved, and what allergic mechanism was likely involved. Diet diaries can be a useful supplement to the medical history, especially in chronic disorders. Elimination diets can be implemented both for diagnostic and therapeutic purposes (Sampson, 2004).

The prevalence of food allergy in children has been estimated to be between 0.1% and 8%. Most claims of food allergy could not be confirmed by DBPCFC (Kayosaari, 1082; Bock, 1987). In the United States, food allergy affects up to 4% of the adult population and 6–8% of children (Sicherer & Sampson, 2006; Burks and Ballmer-Weber, 2006). It is estimated that 150 Americans die each year due to food allergy (Yocum *et al.*, 1999) with most death occurring among adolescents and young adults (Bock *et al.*, 2001).

Despite some countries having organizations such as the Food Allergy and Anaphylaxis Network (FAAN) which has been advocating for increased knowledge and awareness of food allergy nationally and at the community level (Food Allergy & Anaphylaxis Network, 2010; MOCHA, 2010), some misconceptions about food allergy still exist among the general public and physicians (MOCHA, 2010; Madsen, 2005; Krugman *et al.*, 2006). Food and nutrition misinformation can have harmful effects on health, well-being and economic status of people. Understanding the level of perception of university students is necessary to determine the best way to educate them about food allergies. The outcome of this study will assist in the establishing the need for development of nutrition education materials to help promote strategies that reduce the risk of allergic reaction. Individuals who have food allergies must be careful when consuming foods prepared by others; the lack of knowledge about food allergies by the general public increases the risk of an allergic reaction.

It has been well-established that families of children with food allergies have a lower quality of life (Sicherer *et al.*, 2001; Marklund *et al.*, 2007; Avery *et al.*, 2003; Bollinger *et al.*, 2006; Primeau *et al.*, 2000). Food allergy has been shown to lower general health perception, limit family activities, and have a significant emotional as well as economic impact on the parent (Sicherer *et al.*, 2001; Marklund *et al.*, 2007). Delayed diagnosis by physicians and social stigmatization by the general public may be factors leading to further difficulties which parents of children with food allergy face in dealing with the daily fear of a life-threatening reaction.

In Malaysia, the true incidence of food allergy is unknown (Gendeh *et al.*, 2000). Indisputable food allergy occurs in about 1.4% of young children and

0.3% of adults in the general population (Chandra, 1986; Chandra, 1992). Thus with the increasing prevalence of food allergy and the absence of a cure, community awareness about the signs, symptoms and treatments of allergic reactions is vital. The purpose of this study, therefore, is to determine the perception and opinion of medical students about food allergy. The outcome will assist in establishing the need for developing nutrition education materials to help promote procedures that reduce the risk of allergic food reaction.

## Methodology

This study was conducted in July of the academic year 2010 among 60 medical science students from Management and Science University (MSU), Shah Alam, Malaysia. Universal sampling was used to conduct focus group discussion. Participants were in their third semester of study. This study was approved by the ethics committee of Faculty of Health and life science (FHLS), Management and Science University (MSU). Consent was obtained from all participants before the group discussions began. Students were divided into 6 focus groups; each group consisting of 10, 9, 11, 12, 8 and 10 students respectively. The main author was the facilitator for the group discussions. The facilitator asked probing questions and directed the group discussions in which all participated in the discussion. The facilitator wrote down the conversation during the discussions. The design of the questions was adopted from a previous study conducted by Gupta *et al.* (2008). The students invited to participate and six round tables were arranged and participants were sited according their preference place. The ideal focus group discussion ranged from 8-12 participants, there were six groups because the themes already saturated that's mean there is no new them generated if we conduct more focus-group discussions. The questions used in the group discussions are shown in Table (1). The data obtained were classified into various categories and analyzed manually.

**Table 1.** Questions used in the focus group discussion

1.	What does it mean to you when you hear someone is allergic to a food?
2.	Symptoms
3.	How sick can someone with a food allergy can be? Could he/she die?
4.	Can a child catch a food allergy?
5.	Do food allergies run in families?
6.	In a group of 100 children, about how many of them do you think would have a food allergy?
7.	To what foods are people most often allergic?
8.	To what foods are you most often allergic?
9.	How hard do you think it is to care for a child with food allergy?
10.	Do you think food allergy can be treated so that it will go away?
11.	How do you handle people with food allergy?
12.	How to prevent yourself from food allergy?

## Results

This qualitative study was conducted among 60 medical science students from Management and Science University, Shah Alam, Malaysia. The majority of participants were male and Malay (Table 2).

**Table 2.** Socio-demographic characteristics of the study participants (n =60)

	Number	Percentage (%)
<b>Gender</b>		
Male	14	23
Female	46	77
<b>Race</b>		
Malay	44	73.3
Chinese	3	5
Indian	11	18.3
Others	2	3.3

### *Definition of food allergy*

The majority of participants 40 (67%) mentioned that food allergy is a disorder in which the body becomes hypersensitive to a particular food. About 33% (20) of the participants mentioned that food allergy means when a person eats a specific food, it causes discomfort.

### *Symptoms of food allergy*

The majority of participants 67% (40) mentioned that the common symptoms of food allergy are: skin rashes, swollen lips, diarrhea, vomiting, bronchospasm, redness, itchiness, difficulty in breathing, stomach ache and fever.

### *Food allergy and fatality*

The majority of participants 80% (48) mentioned that food allergy can be fatal. About 20% (12) of participants mentioned that food allergy is not fatal.

### *Food allergy among children*

Almost all participants 95% (57) mentioned that children can catch food allergy except four participants mentioned that children cannot catch food allergy.

### *Prevalence of food allergy among children*

More than half of the participants 52% (31) mentioned that 10 of 100 people would have food allergy. Seventeen percent (10) participants mentioned 50 out of 100 people would have food allergy. Fifteen percent (9)-participants mentioned 20 out of 100 people would have food allergy. Five percent (3) participants mentioned 40 out of 100 people would have food allergy. Three percent (2)-participants mentioned 30 out of 100 people would have food allergy. Three percent (2) participants mentioned 60 out of 100 people would have food

allergy. Two percent (1) participant mentioned 70 out of 100 people would have food allergy. Two percent (1) participant mentioned 80 out of 100 people would have food allergy (Table 3).

**Table 3.** Opinions of the study participants regarding the prevalence of food allergy

Prevalence of food allergy	Number	Percentage (%)
10 of 100 people would have food allergy	31	52
20 out of 100 people would have food allergy	9	15
30 out of 100 people would have food allergy	2	3
40 out of 100 people would have food allergy	3	5
50 out of 100 people would have food allergy	10	3
60 out of 100 people would have food allergy	2	17
70 out of 100 people would have food allergy	1	2
80 out of 100 people would have food allergy	1	2

### *The most common food allergy among the general population*

The majority of the study participants mentioned that seafood is the most common food that can cause food allergy to people 86% (52); followed by tree nuts and peanuts 42% (25); dairy products 32% (19); eggs 7% (4); chicken 5% (3); tomato 3% (2); fish 2% (1); spicy food 2% (1); sour food 2% (1); berries 2% (1); durians 2% (1), strawberry 2% (1) and brinjals 2% (1).

### *The most common food allergy among the study participants*

Twenty six participants (43%) reported that they have no food allergies, however 38% (23) participants are allergic to seafood; followed by milk and dairy products 8% (5), nuts 8% (5), chicken 7% (4), eggs 5% (3), fish 3% (2), spicy food 3% (2), belacan 2% (1) and ice cream soda 2% (1).

### *Food allergies run in families*

The majority of participants 83.3% (50) mentioned that food allergies do run in families, 13.3% (8) of the participants mentioned that food allergy do not run in families, 3.3% (2) of the participants mentioned that sometimes food allergies can run in families.

### *The care for a child with food allergy*

Half of the participants 50% (30) mentioned that it is very difficult to care for children with food allergy.

### *Treatment*

The majority of participants 53% (32) mentioned that they think food allergy can be treated and will go away.

### *Handling of people with food allergy*

A total of 43% (26) mentioned that they will advise patients to avoid allergic foods. Thirty percent (18) of the participants mentioned that they will give anti-histamines to their patients. Five percent (3) of the participants will advise their patients to drink a lot of water. Three percent (2) participants mentioned intravenous fluids. Three percent (2) mentioned the use of antibiotics and one of the participants (2%) mentioned the use of epinephrine.

### Prevention

The majority of the participants 60% (36) mentioned that avoiding food that is allergenic is the best way for prevention. Seven percent (4) participants mentioned practicing a healthy balanced diet. Five percent (3) participants mentioned about always checking food ingredients. Five percent (3) participants mentioned practice hand washing, 3% (2) participants mentioned cooking food well and 2% (1) avoid eating spicy food. More details are shown in Table 5.

**Table 4.** Opinions of the study participants about the common food allergy among the general population

The common food allergy	Number	Percentage (%)
Seafood	52	86
Tree nuts and peanuts	25	42
Dairy products	19	32
Eggs	4	7
Chicken	3	5
Tomato	2	3
Fish	1	2
Spicy food	1	2
Sour food	1	2
Berries	1	2
Durians	1	2
Strawberry	1	2
Brinjals	1	2

### Discussion

This study showed that only slightly more than half of the study participants had sufficient knowledge about the definition of food allergy. Similar findings were reported by Gupta *et al.* (2008) that pediatricians and family physicians were familiar with the definitions of food allergy and anaphylaxis.

In this study, the majority of participants mentioned that 10 out of 100 people would have food allergies. Similar findings were reported by Sears (1996) that despite greater awareness and recognition of food allergy by both physicians and patients, many allergists believe that the actual prevalence has risen substantially over the past decade, similar to the rise in the prevalence of other atopic conditions such as asthma and allergic rhinitis (Sears, 1996). A similar

study reported that participants tended to overestimate food allergy prevalence, which is consistent with previous literature (Bangash & Bahna, 2005).

Regarding the symptoms of food allergy, the majority of participants had sufficient knowledge about food allergy. The common symptoms of food allergy mentioned are: skin rashes, swollen lips, diarrhea, vomiting, bronchospasm, redness, itchiness, difficulty in breathing, stomach ache and fever.

The diversity of human diet is enormous, and yet relatively few foods account for the majority of food allergies around the world. Milk, egg, and peanut form the vast majority of food-induced allergic reactions in American children, whereas peanut, tree nuts, fish, and shellfish account for most of the food-induced allergic reactions in American adults. The regional dietary habits and methods of food preparation clearly play a role in the prevalence of specific food allergies in various countries around the world (Sampson, 2004). Regarding the most common foods that cause allergy among people, the majority of study participants mentioned that seafood is the most common food that can cause food allergies, followed by tree nuts and peanuts, dairy products, eggs, chicken, tomato, fish, spicy foods, sour foods, berries, durians, strawberries and brinjals. Similar finding was reported by Kagan (2003) in which the usually persist food allergies include peanut, tree nuts, fish, and shellfish. These, too are usually present in early childhood, shortly after the introduction of these foods into the usual diet.

It is interesting to look at individual foods most frequently reported as the offending agents: milk and chocolate; although cow's milk is known to be the most common food allergen in young children (Halpern *et al.*, 1973; Gerrard *et al.*, 1973; Stintzing & Zetterstrom, 1979). Chocolate has not been shown to be a common cause of allergic reactions, as confirmed by DBPCFC.

There are limitations to the study design. Selection bias is inherent as participants in the focus groups volunteered themselves and may therefore be more motivated or more knowledgeable than the average person. The participants were medical science students and therefore were not necessarily representative of all MSU students. However, even in this selected population, we found a substantial lack of knowledge and a considerable amount of misinformation.

Regarding the self reporting of food allergy among participants, majority of them are allergic to sea-food, followed by milk and dairy products, nuts, chicken, eggs, fish, spicy food, shrimp paste and ice cream soda. Similar findings were reported by

**Table 5.** Students focus-group: quotations arranged by domain

Theme	Participants quotations
<b>Definition</b>	"Food allergy is a disorder in which the body becomes hypersensitive to particular food." "Food allergy means when the person eats specific food that can cause discomfort."
<b>Symptoms of food allergy</b>	* "When someone has an allergic reaction to a food, (s)he will develop changes outside and inside the body system, for example difficulty in breathing, skin rashes, vomiting and diarrhea." (Male, Indian) **"Skin become red, swells, itchy, rashes, and if severe it may cause faint, low blood pressure, shock then death." (Female, Malay) **"The person with food allergy feels itchy skin, change in skin color and feel irritate, then the person might have redness, inflammation on the skin and if it became worst there is swelling on airway tract and make the person hard to breath." (Female, Malay)
<b>How sick can someone with food allergy can be?</b>	* "It can cause death because it can cause bronchospasm which lead to seizure and death." (Indian, Female) **"Yes because the food allergy can cause swelling of the respiratory tract and constrict it." (Female, Malay) **"The person with food allergy can die because the body tries to resist the food and cause problems like swelling of respiratory tract which cause blockage of respiratory tract." (Female, Malay) **"May be (s)he just faint for a short time but (s)he cannot die." (Female, Malay) **"Death is uncommon in this case but if the upper respiratory tract is swelling it might lead to choking and air hunger then death." (Female, Malay)
<b>Can a child catch food allergy?</b>	* "Yes, child can catch food allergy because child are more prone to food allergy due to poor digestion." (Female Indian 24 years old) **"Yes, because food allergy can happen to all ages." (Female, Malay, 23 years old) **"Yes, because children's body still cannot differentiate the food." (Female, Malay, 22 years old) **"Yes, because child have low immune system." Female, Malay, 22 years old) **"Yes, because children are not exposed to food compound." (Female, Chinese, 23 years old) **"Yes, because at child stage the body systems is not fully developed" (Female, Malay, 24years old)
<b>Do food allergies run in families?</b>	**"If the parents have allergy, it will run in other family members." (Female, Malay, 24 years old) **"Yes, because families do share the same genetic." (Male, Indian, 23 years old)
<b>How hard do you think it is to care for a child with food allergy?</b>	* "Yes, it is very difficult to care for children with food allergy because I have to take note for every single food the child consume." (Female, Chinese) **"Very hard because you are going to cook separate food for the child with food allergy from others, so have to prepare more food." (Female, Malay) **"Very hard because the children with food allergy have low immune system and very easy to get an infection." (Female, Malay) **"It is not hard to care for children with food allergy, just need to be careful when preparing food for the children with food allergy." (Female, Malay) **"It is not hard, simply identify the food that the child is allergic to, make a list of the food that cause food allergy to your child, then exclude the allergic food from the child's diet." (Male, Malay)
<b>Do you think food allergy can be treated so that it will go away?</b>	* "Yes, it can be treated because it is a genetic disease and can be treated by the genetic engineering technology." (Female, Malay, 24 years old) **"Yes, it can be treated by antibiotics." (Female, Malay, 24 years old) **"The food allergy cannot be treated but just can prevent the development of food allergy symptoms." (Female, Malay) **"No medication so far available to treat food allergy." (Male, Malay, 23 years old) **"I think it cannot be treated fully, a person should know how to prevent the food which they are allergic to and if the allergy became worst it is better to seek help from a doctor." (Female, Indian, 21 years old)
<b>How do you treat people with food allergy?</b>	"Advise the patient to avoid the allergic food and drink a lot of water to ease up the allergy." (Male, Malay)
<b>How to prevent yourself from food allergy?</b>	**"Do not eat anything you never eat before." (Female, Malay) **"Do not eat any food that cause allergy." (Female, Malay) **"Take good care of hygiene, wash hands, and maintain food safety." (Female, Malay) **"In order to prevent yourself from allergy eat healthy balanced food and always drink milk." (Female, Malay) **"Less stressful life, healthy activity (exercise) and stay away from the allergic food." **"Take anti-histamine with you all the time." (Male, Malay)

Lyons and Forde (2004) that 14.8% of participants indicated an allergy to one or more foods. Shrimp paste or 'belacan' as it is called in Bahasa Malaysia is a popular food ingredient in Malaysia. Traditionally, 'belacan' is used as a food enhancer in countless Malaysian dishes. In addition, it could also be mixed with chillies, lime and some other ingredients as a dipping condiment known as 'sambal belacan' that is well-liked by Malaysians. 'Belacan' is used in Malaysian cooking and common among all races and increases appetite. As mentioned by the study participants, 'belacan' can cause food allergy. A previous study reported that 'belacan' can cause food allergy if eaten too much (Leong *et al.*, 2009).

Regarding the treatment of food allergy, our study participants had sufficient knowledge where the majority of them mentioned that avoiding allergenic food is the best way for prevention. A similar finding reported by Kagan (2003) was that the

only available therapy for food allergy is avoidance and self-treatment with auto-injectable epinephrine. The only proven therapy remains the elimination of the offending allergen, although as outlined below, a number of promising therapeutic modalities are on the horizon. Patients, their caregivers, or both must be educated about food allergen avoidance (i.e.: reading food labels, avoiding high-risk situations (e.g., buffets), early recognition of allergic symptoms, and early management of an anaphylactic reaction) (Sampson, 1999). Regarding treatment, the majority of participants mentioned that they think food allergy can be treated and will go away. That demonstrates that these study participants had poor knowledge about treatment. This may be due to these participants were still in the pre-clinical phase of their medical studies. According to the Food and Drug Administration (2008), there is no cure for food allergies; early recognition and avoidance of food

allergens are the only methods of prevention.

Patients with food allergy and asthma or have a history of previous severe reaction or reactions to peanuts, nuts, seeds, or seafood should be given a self-injectable epinephrine in addition to a written emergency plan for the treatment of an accidental ingestion (Sampson, 2003; Shimamoto & Bock, 2002; Simons *et al.*, 2001; Simons *et al.*, 2002). Unfortunately, most individuals experiencing fatal food induced allergic reactions did not have injectable epinephrine available at the time of their reaction (Bock, 2001) and even more disturbing, most patients with food allergy treated in emergency departments in the United States are not given any prescriptions for epinephrine (e.g.: EpiPen) or referred to an allergist for evaluation (Clark, 2004). Pathogenic related proteins are generated by plants in response to various pathogens (e.g.: viruses, molds, and parasites) and environmental stresses and consequently can be present in variable quantities within the same fruit or vegetable species (Breiteneder & Ebner, 2000). Antihistamines might partially relieve symptoms of oral allergy syndrome (Bindslev-Jensen *et al.*, 1991) and IgE-mediated skin symptoms but do not block systemic reactions.

The majority of participants 83% (50) mentioned that food allergies do run in families. A positive family history for atopy has proved to be an important risk factor for the development of atopic diseases in their offspring (Bousquet & Michel, 1995; Ctoner & Kjellman, 1990; Odeham & Bjerksen, 1995; Bergmann *et al.*, 1990). Atopic parents can be regarded as the phenotype of a genetic disposition for atopy in the child (Marsh *et al.*, 1981).

## Conclusion

This study showed that in spite of sufficient knowledge of the medical students about food allergy, some significant misconceptions still exist such as the high prevalence of food allergy and that food allergy can be treated. Therefore, there is a real need for improvement in continuous medical education among medical students with regard to the diagnosis, management and treatment of food allergy.

## Recommendation

The Malaysian guidelines for the diagnosis, management and treatment of food allergies should be established, including practice parameters for anaphylaxis. Regular and continuous professional development (CPD) of health care practitioners about food allergy should be instituted, not only among physicians but also nurses, community health workers

and front line health care workers who are in daily contact with the public. A Malaysian website with information on food allergy would be most useful to further provide an up-to-date information, aimed both to the public and the health care professionals, similar to what the FAAN organization is providing. There is also a need for improvement in continuous medical education among medical students with regard to food allergy because they are our future physicians.

## Competing interests

The authors declare that they have no competing interests.

## Acknowledgements

We would like to thank the study participants for their kind participation in this study.

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