

PREVALENCE AND KNOWLEDGE OF FOOD ALLERGY AMONG FIFTH SEMESTER MEDICAL STUDENTS IN UDAYANA UNIVERSITY, DENPASAR, BALI

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This research was mainly done to find out the prevalence and knowledge of food allergic reaction among fifth semester Faculty of Medicine students of Udayana University. Food allergy is defined as an adverse immunologic response to food protein that leads to variety of clinical symptoms. Food allergy has emerged as an important public health problem based on its increasing prevalence, which has become the background for this research. Fifth semester medical students of Udayana University was chosen as the subject on whom this research was conducted. The method of observational descriptive study with the cross-sectional approach was carried out to find out the prevalence as well as the knowledge they have regarding food allergic reaction. Total sampling technique was used followed by questionnaire distribution and finally data collection and analysis were carried out. As for the results, in terms of prevalence 23.5% which is 23 students out of 115 students seems to have experienced food allergic reaction. As for knowledge, the cross-sectional result of allergic experience and knowledge showed 16.5% seems to have good knowledge over 23.5%. The results showed that, the aim of this research was achieved where students do have good knowledge about food allergic reaction and are capable in educating their patients in the future. This research hopefully would create an urge among students to take precaution regarding the emerging of food allergic reaction cases.

Keywords: prevalence, knowledge, food allergic reaction, students, research

INTRODUCTION

The reason this topic of prevalence and knowledge of food allergy chosen because of its epidemiologic factor. Reason being that in an electronic US household survey (n = 38,480) in 2009-2010 and estimated that 8% of children have food allergy, 2.4% have multiple food allergies, and approximately 3% experience severe reactions. In another survey, 9667 subjects from 10 Canadian provinces were surveyed for self-reported food allergy and found an overall rate of 8%. When they excluded adults reporting unlikely allergies and adjusted for non-responders, the final estimates were 6.7% in the overall population, with 7.1% of children and 6.6% of adults reporting food allergy. This shows the serious presence of this specific reaction.⁹ The reason this reaction is said to be serious is because food allergy accounts for about 35–50 percent of emergency room visits for anaphylaxis and causes about 30,000 episodes of anaphylaxis and 100–200 deaths per year in the United States. Severe, life-threatening reactions occur mostly in adolescents and young adults.

Hence, food allergy has emerged as an important public health problem based on its increasing prevalence, persistence throughout life for those who are sensitized to the foods

most likely to cause severe reaction, the potential for fatal reactions, and lack of preventive treatment other than food avoidance. Meanwhile, the reason I chose to conduct this research among fifth semester medical students of Udayana University was because a lot of individual tend to suffer from food allergic reactions and medical students aren't an exception. However, the important factor that makes them highlighted was their position as medical student where they should be able to identify the reaction as food allergic. These informations were evaluated by understanding their knowledge regarding food allergy. Thus, that was the reason this research conducted.

However, it was a must to have some understanding regarding food allergy as it mattered in order to conduct this research. Food allergy is commonly defined as an adverse immunologic response to a food protein that leads to a range of clinical symptoms. The allergens responsible for more than 85% of food allergy are: milk, egg, peanut, tree nuts, shellfish, fish, wheat, sesame seed and soy.¹¹ Apart from food allergens, epidemiologic risk factors of food allergy include sex, obesity, antioxidants, hygiene, vitamin D, and genetics.²

At the end of this research, a few benefits were obtained. One of it was that, the prevalence of food allergy can be obtained which will show the height of commonness of people suffering from food allergic reaction. Next, the knowledge of students regarding food allergy was understood as it important to know how educated people understands the reaction and by that, it will be easy to set a strategy in the future in educating everyone regarding food allergy. Besides that, this research will create an urge among students to enhance their understanding and knowledge on food allergy which will help them in handling patients in the future.

In the case of design of research, this study was an observational descriptive study using cross-sectional approach to determine prevalence and knowledge of food allergy among fifth semester medical students of Udayana University, Denpasar, Bali. Cross-sectional study is a type of research that the measurement and observation of the variables is done only once, at one time. As for the location, this research was conducted at the Faculty of Medicine of Udayana University, Denpasar, Bali between the period of February 2015 till Mei 2015. This duration includes compilation and submission of proposal, application for permission to carry out the research, preparation of instrument and device essential for research, collecting data, analyse data, preparations of research report, consultation and revision and finally presentation of the research end results. Besides that, the target population of this study was the university students in Denpasar, Bali. The sampled population of this study will be fifth semester Faculty Of Medicine students of Udayana University, Denpasar. Meanwhile, the sample of this study were students chosen from the sampled population. On top of that, this whole investigation was carried on campus students especially those who are currently pursuing medicine in fifth semester medicine faculty of Udayana University, Denpasar. The inclusion criteria's for this investigation were the participants selected from both genders, stable mental status, and joins the study willingly. There were no exclusion criteria included in this investigation since the subjects were selected upon being fitted into the inclusion criteria.

METHOD

Sample collection technique used was total sampling technique. Total sampling is a sampling method in which the determination of the sample by using all the existing population until a predetermined time limit. This method was chosen because this research aims to describe the fact regarding prevalence and knowledge of food allergy among fifth semester medical students of Udayana University, Denpasar, Bali.

Food allergy is an adverse immunologic response to food protein. Now, it can be defined in two terms, which are mild, moderate to severe and anaphylaxis. Mild symptoms include reddening, itching, urticaria, angioedema, rhino-conjunctivitis, cough, irritable throat, nausea, vomiting, abdominal pain, and diarrhoea. Meanwhile, moderate to severe symptoms include wheezing, stridor and dyspnea. As for the worst scenario, the reaction can turn into anaphylaxis (acute allergic reaction) and the symptoms includes tachycardia, hypotension and cardiopulmonary collapse

In terms of gender, the prevalence of food allergy tends to differ accordingly. Gender can be classified into male and female. In the case of age of participants, the variance is not very much difference and options were given in 5 which are 19 years old, 20 years old, 21 years old, 22 years old and 23 years old.

In terms of age of subjects when allergic occurred in terms of the history of reaction, prevalence rate is higher among childhood and this research is done among medical students who are in adulthood. Prevalence rate is measured based on 4 ranges of age category which are 0-12 months, 1-12 years old, 13-19 years old and 20-40 years old.

When it comes to allergens, there are multiple food allergens that can actually cause food allergic reaction. Among the foods that can cause food allergic reaction are seafood such as fish, prawn, shellfish and crustaceans. Apart from seafoods, foods like peanut, milk, egg, wheat and soy can cause allergic reactions. The frequency of each of these food will be determined upon the answer given by respondents.

Food allergic reaction can also occur due to genetic factor. In this research, this factor is also taken into account where in the questionnaire, respondents whom suffer from

food allergic reaction were asked regarding their family history related to food allergic reaction.

In terms of having any family history of food allergic reaction. And if they did mention yes on having family history of food allergic reaction, they were asked to mention on the family member that is suffering from this reaction.

The evaluation of respondent's knowledge level upon food allergic reactions which is evaluated and given scores upon their answers in the questionnaire and were categorised into 3 domains which are: poor (score <50%), sufficient (score 50%-70%) and good (score >70%).

RESULTS

This research was conducted in the Faculty of Medicine of Udayana University of Bali. The research was conducted by distributing questionnaires to the target population whom are fifth semester medical students of Udayana University. Document of their informed consent were attached as well. The distribution of questionnaires was done once permission to conduct this research was granted by higher authority. Once the questionnaires were filled up, they were collected back to be tabulated using SPSS for analysis purpose. A total of 115 questionnaires were distributed. The samples were divided according to its variables which are dependent variable, independent variable and confounding variable. From these variables, needed information were gathered. Upon those gathered information, table below of characteristic of respondents were created. Table 1 below shows the details.

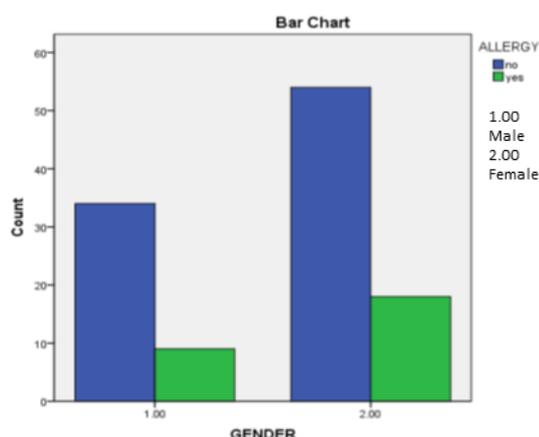
Table 1 Characteristic of the respondents, Fifth semester Faculty of Medicine students of Udayana University

Content	Frequency	Percentage (%)
Age:		
19 years old	2	
20 years old	15	1.7
21 years old	84	
22 years old	10	13.0
23 years old	4	
		73.0
		8.7
		3.5
Gender :		
Male	43	37.4

Female	72	62.6
Food Allergy :		
Yes	27	23.5
No	88	76.5
Since :		
0-12 months	1	3.7
1-12 years old	15	55.6
13-19 years old	11	40.7
Manifestation :		
Mild symptoms	21	77.8
Mild to moderate symptoms	6	22.2
0	0	0
Anaphylactic		
Triggering food :		
Seafood	17	63.0
Peanuts	0	0
Milk	0	0
Egg	0	0
Wheat	0	0
Soy	0	0
Others	1	3.7
More than 1 of above	9	33.3
Immediate action:		
-Wait until the reaction disappears on its own	4	14.8
-Stop consuming food that causes the reaction	10	37.0
8	29.6	
-Take anti allergic medication	2	7.4
-Immediate visit to hospital	3	11.1
-More than 1 action mentioned above		
Medication		
- Yes	15	55.6
- No	12	44.4
What medication	12	80.0
- Antihistamine	0	0
- Decongestant	2	13.3
- Corticosteroid	0	0
- Epinephrine	1	6.7
- Others		

In the total of 115 students, majority were in the age group of 21 years old which was up to 73.0%. About 62.6% of them were females while 37.4% of them are males. In terms of experiencing allergic reactions, 76.6% answered no while 23.5% answered yes. Among those who answered yes, 18 of them were female, which is 67% and 9 were male which is 33%. Bar chart 1 below shows a detailed information.

Graph 1: Experiencing Allergic Reaction based on Gender Classification



Among them, 55.6% were experiencing allergic reaction since childhood aged between 1-12 years old, followed by 40.7% since teenage aged between 13-19 years old and 3.7% since baby. Table 3 below shows a detailed information.

Table 3: Age when experiencing food allergic reaction

Age when experiencing reaction	Frequency	Percentage
Since: 0-12 months	1	3.7
1-12 years old	15	55.6
13-19 years old	11	40.7
Total	27	100.0

In terms of symptoms suffered as an allergic reaction, 77.6% in total of 27 respondents which is 21 in frequency were suffering from mild symptoms which if further divided into few options, urticarial seems to be the peak choice. This is then followed by 22.4% in total of 27 respondents, which is 6 in frequency were suffering from mild to moderate symptoms, in which angioedema and shortness of breathing seems to be symptoms in specific. Most of them, chose more than one symptom mentioned in each category, thus table below shows the frequency of each symptom chosen among those 27 respondents. Table 4 shows detailed information.

Table 4: Table of clinical manifestation

Symptoms	Frequency	Percentage
Mild		
-Urticaria	21	100.0
-Dry cough	2	9.5
-Irritable throat	4	19.0
-Nausea and vomiting	7	33.3
-Stomach ache	3	14.3
-Diarrhoea	3	14.3
Mild to moderate		
-Angioedema	4	66.7
-Shortness of breathing	3	50.0
-Stridor	0	0
Mild symptoms total	21	77.6
Mild to moderate symptoms total	6	22.4

And their immediate action to such reactions are varies accordingly as 14.8% of them chose to wait until the symptoms disappears on its own. Followed by, 37.0% of them would immediately stop the triggering food that causes the reaction, while 29.6% of them chose to take in medication stop the reaction and 7.4% of them chose to immediately visit hospital for treatment. Lastly, 11.1% chose more than one action mentioned above which is mostly stop consuming the triggering food that causes the reaction and take in medication to stop the reaction. In this case, they were asked to mention on what kind medicine they used to take whenever experiencing this reaction and respondent mentioned antihistamine as the medicine they would take to stop the allergic reaction. Table 5 below shows a detailed information.

Table 5: Immediate action when experiencing food allergic reaction

Immediate Action	Frequency	Percentage
Wait until the reactions disappear but still continuous eating the food that causes reaction	4	14.8
Stop consuming food that causes the reaction	10	37.0
Take anti allergic medication	8	29.6
Immediate visit to hospital	2	7.4
More than 1 action mentioned above	3	11.1

The type of food that causes the allergic reaction were seafood as majority chose that option, which is 63.0% .One of the food that was mentioned in the 'others' category was chicken meanwhile, 9 of them chose more than 1 triggering food type which were seafood, egg, milk and peanut in combination. Table 6 below shows a detailed information.

Table 6: Triggering food that causes food allergic reaction

Triggering Food	Frequency	Percentage
Seafood	17	63.0
Peanut	0	0
Milk	0	0
Egg	0	0
Wheat	0	0
Soy	0	0
Others	1	3.7
More than one food mentioned above	9	33.3

A total of 15 of the samples, which is 55.6%, chose on going to doctor to cure the allergic reaction. And their medicine of choice was antihistamine which was prescribed by the

doctor by majority which is 80.0%, followed by 13.3% chose corticosteroid and 6.7% which is 1 in frequency chose others and mentioned that the respondent was required to let the reaction supresses on its own. Table 7 below shows a detailed information.

Table 7: Medication prescribed when experiencing food allergic reaction

Medication	Frequency	Percentage
Antihistamine	12	80.0
Decongestant	0	0
Corticosteroid	2	13.3
Epinephrine	0	0
Others	1	6.7

When it comes to family history, 55.6% of them answered yes which is 15 of them out of 27 and their answer varies on who in their family has food allergic problem. Table 8 shows a detailed information.

Table 8: Presence of Family History among those who suffers from allergic reaction

Family History	Frequency	Percentage
Yes	15	55.6
No	12	44.4

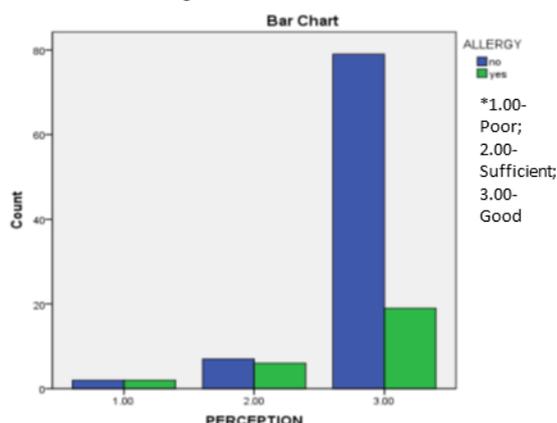
Next in line were the questions to evaluate their knowledge on food allergy and it was evaluated to the scale of <50% is poor, 50-70% sufficient and >70% is good as per operational definition mentioned earlier in the proposal. The questions asked in the questionnaire to evaluate their knowledge are the type hypersensitivity does food allergy falls in, causes of food allergic reaction, clinical manifestation food allergic reaction, diagnostic method of food allergy, treatment of food allergic reaction and lastly, fatal possibility for food allergic reaction. Based on this, about 98 of the respondents, which is 85.2% seems to have good knowledge, followed by 13 of the respondents, which is 11.3% with sufficient knowledge and 4 of the respondents, which is 3.6% with poor knowledge. In the cross tabulation of allergy and knowledge, a number of 19 of respondents

out of 27 respondents that said yes to having allergic reaction has good knowledge on food allergy which is 16.5% over 23.5%. Meanwhile, 79 respondents out of 88 respondents that answered no on having allergic reactions has good knowledge on food allergy which is 68.7% out of 76.5%. Table 9 and bar chart 2 below shows a detailed information.

Table 9: Knowledge about food allergic reaction

Knowledge	Frequency	Percentage
Good	98	85.2
Sufficient	13	11.3
Poor	4	3.5
Total	115	100.0

Graph 2: Allergic experience and knowledge about food allergic reaction



DISCUSSION

According to research conducted, food allergic reaction is common among male than female due to certain habits like dining away from home as most male tend to do so.^{1,9} However, in the research conducted in Udayana University, female tend to suffer more than male, this was due to the number of respondents as the amount of female respondent is higher than male.

According a research conducted in US, it was found that food allergic reaction was more frequent in younger children (1-5 years, 3.4%) than in older children (1.8%) and adults (1.1% to 1.3%) which actually fits the frame to the research conducted in Udayana

University reason being that students actually experienced allergic reaction when they were young.^{1,9} The reason children suffer from food allergic reaction might be due to genetic factor as since born, they were breast feed by their mother and besides that, if any of their family member suffers from this reaction, the possibilities for them to suffer is very high.

Although food allergy can arise to any food, the allergens responsible for more than 85% of food allergy are: milk, egg, peanut, tree nuts, shellfish, fish, wheat, sesame seed and soy. And this was proven in the research conducted on Faculty of Medicine fifth semester students of Udayana University where majority respondents answered that seafood was the major cause of triggering for their allergic reaction. Besides that, in a population-based study on peanut, tree nut, fish, shellfish, and sesame allergy prevalence in Canada, it is mentioned that peanut and tree nut account for the majority of severe reactions, but fish, shellfish, and sesame are also reported to cause severe reactions, especially in Asia and parts of Europe, which actually stands as a prove to the result obtained from this research. The reason seafood tends to be common in causing food allergic reaction is because seafood is a dietary staple among people in Asia, to be specific in Bali, Indonesia.⁵

It was found that in the case of prevalence of food allergy, family history plays a role and in majority, the reaction was triggered since childhood. Besides that, seafood plays a main role as well in triggering allergic reaction in most of the samples. Although food allergy can arise to any food, the allergens responsible for more than 85% of food allergy are: milk, egg, peanut, tree nuts, shellfish, fish, wheat, sesame seed and soy. And this was proven in the research conducted on Faculty of Medicine fifth semester students of Udayana University where majority number of samples shows that seafood was the major cause of triggering for their allergic reaction.

In terms of treating this reaction, initially there weren't any treatment, beyond avoidance of the responsible food(s). Meanwhile, anti-histamines known as H1 blockers, are prescribed to relieve mild allergy symptoms, although they cannot control a severe reaction. Medications in this class include diphenhydramine and cetirizine. In the case of accidental exposure, the treatment of

choice is epinephrine (adrenaline) administered by intramuscular injection into the lateral thigh 11. And this statement was proven through this research where all the samples were suffering from mild reaction of food allergy and the drug of choice prescribed by doctors were antihistamine and in one case, the respondent were to stop consuming the specific triggering allergen and wait until the reaction subsides on its own. Apart from food allergens, genetic factor plays a role in causing food allergy.^{1,9} And this is proven as quite a number of them seems to have family history as they chose either their grandparents, parents, siblings or their other relatives when they were asked to answer question related to family history of food allergic reaction.

In the cross tabulation of allergy and knowledge, a number of 19 of respondents out of 27 respondents that said yes to having allergic reaction has good knowledge on food allergy which is 16.5% over 23.5%. Meanwhile, 79 respondents out of 88 respondents that answered no on having allergic reactions has good knowledge on food allergy which is 68.7% out of 76.5%. This shows that regardless of experiencing allergic reaction or not, fifth semester students of Udayana University seem to have good knowledge of food allergic reaction which is up to 85.2%. This shows that the awareness of food allergic reactions among medical students is present and that, in future they will be capable of identifying and treating patients with such reactions. Most importantly, they will be able to educate patients and the society regarding this reaction and might be able to avoid fatality due to this reaction. Since medical students who ought to be doctors in the future are the best medium to pass on information regarding food allergic reaction, this research stands to prove that those students are capable to do so.

CONCLUSION

Based on this research, it is observed that there is presence of food allergic reaction as 23.5% of them agreed on experiencing food allergy. For the questions to evaluate their knowledge on food allergy about 85.2% seems to have good knowledge. In a nutshell, it can be concluded that awareness about food allergic reaction by those who suffers from it and by those who hasn't are in a good angle and this has to be maintained for better future. The aim of this research was to know the

epidemiology and knowledge about food allergy among fifth semester students in Faculty of Medicine of Udayana University, Denpasar, Bali and came out as an essential topic to be evaluated. This research hopefully would create an urge among students to take precaution regarding the emerging of food allergic reaction cases.

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