



## The Evaluation of Food Allergy Knowledge and Attitudes of Hotel Service and Kitchen Staff in İzmir

Turgay BUCAK<sup>a</sup> , \*Serkan YİĞİT<sup>b</sup> 

<sup>a</sup>Dokuz Eylül University, School of Applied Sciences, Department of Gastronomy and Culinary Arts, Izmir/Turkey

<sup>b</sup>Mardin Artuklu University, Faculty of Tourism, Department of Gastronomy and Culinary Arts, Mardin/Turkey

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### Abstract

The aim of this study is to determine the knowledge and attitudes of service and kitchen staff about food allergy working in hotels in Izmir. In this context, data were collected through a questionnaire from 808 service and kitchen staff who is working in 4 and 5 star hotels in İzmir. Within the scope of the study, the service and kitchen staff were compared according to their knowledge and attitudes about food allergies. As a result of the comparison, it was determined that the kitchen staff had more knowledge about food allergies than the service staff. The majority of the participants were able to distinguish the main food allergens, but this rate decreased when the participants knew the difference between food allergy and food intolerance. In particular, it was revealed within the scope of the research that the participants had a lot of wrong information about dealing with customers who showed a food allergy reaction. The result show that service and kitchen staff need a comprehensive food allergy training.

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\* Corresponding Author

E-mail: serkanyigit@artuklu.edu.tr (S. Yiğit)

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## INTRODUCTION

In the world, the frequency of eating out is increasing with each passing year (Kolanowski et al., 2020; Goffe et al., 2017). It is possible to see the increase in the frequency of eating out all over the world in Turkey as well. In a study conducted by the European Education and Scientific Research Foundation (TAVAK) in Turkey; found that consumers spent \$10.4 billion on food and beverage businesses in 2018 (TAVAK, 2018). With the increase in eating out all over the world, food and beverage businesses have become one of the places where food allergy reactions are frequently seen (Lee & Sozen, 2016).

The cause of food allergy reactions occurring in food and beverage businesses is related to more than one factor. Among these factors; cross-contamination in food preparation, lack of knowledge about food allergy, unexpected or hidden food allergies, and food allergens not listed on the menus (Furlong, McMorris & Greenhawt, 2008; Wen & Kwon, 2016; Tatlı & Akoğlu, 2020). In addition, sometimes miscommunication not only between service and kitchen staff, but also among guests with food allergies can cause food allergy reactions. Considering all these risks, it is clear that service and kitchen staff play a critical role in food allergy management in food and beverage businesses (Dupuis, et al., 2016).

Food allergies are a public health issue causing reactions that can threaten human life (Demir & Ulusoy, 2017). In Turkey, the research conducted by the Turkish National Association of Allergy and Clinical Immunology (Allergy and Immunology Association - AID) shows 6% of infants, 4% of children, 2% of adolescents and 1% of adults have food allergies. The incidence of food allergy has doubled in Turkey as well as the rest of world in the last 10 years (AID, 2017). Individuals with food allergies should stay away from the foods that they are allergic to at home, schools and especially food and beverage enterprises (Sogut et al., 2015).

Food allergy is a negative health condition resulting in an abnormal immune response to food consumed (Kwon, Lee & Wen, 2020). Food allergies can occur even consuming small amounts of food or even causing severe allergic reactions if there is skin contact or inhalation (Gupta et al., 2019). Most of the world's food allergies, also called the big eight; milk, eggs, fish, shellfish, wheat, peanuts and soybeans (Choi & Rajagopal, 2013; Radke et al., 2016; van Dam & Wiersma, 2012; FARE, 2019). Today, food allergy and food intolerance are two concepts that are often confused with each other. A real food allergy is an immune system reaction that affects many organs in the body. In some cases, an allergic food reaction can be severe or even life-threatening. In contrast, food intolerance symptoms are usually less severe and often limited to digestive problems (Mayo Clinic, 2019a). Food allergy reactions can cause different reactions in people depending on allergy levels. People with mild levels of food allergies; while having reactions such as sneezing, itching or digestive disorders. People with severe levels of allergies they show suffocation reactions similar to asthma attacks, swelling of the tongue, lips and throat (Abbot et al., 2007). Among these reactions, anaphylaxis is the most dangerous. Anaphylaxis is a severe allergic reaction that affects the body's systematic functions, which can put a person in a coma or even cause death (Mayo Clinic, 2019b).

In Turkey, the food allergy cases have becoming more frequent (Ulaş-Kadioğlu, 2017). With the increase of people with food allergies in Turkey, public and private organizations have started to carry out some studies on the subject. In 2018, map of food allergies of Turkey was revealed. As a result of the study in western parts of Turkey, mostly milk allergies are high in density, while inland and eastern parts egg allergies are high in density (Anadolu Agency, 2018). In another study, the 14 most common food allergies (peanuts, tree nuts, soybeans, mustard, eggs,

lupin, milk, fish, gluten, celery, sesame seeds, sulfur dioxide, molluscs and shellfish) in Turkey were identified. These food allergies have also been written on food labels in Turkey in recent years (Posta, 2019). And also some studies of prevalence of food allergy have been conducted in Turkey (Gelincik, et al., 2008; Orhan, et al., 2009). Based on these studies when compared prevalence of food allergy in Turkey is lower than Northern and Western European countries. Despite of food allergy is an issue that deeply affects human health, the data on the true prevalence of food allergy in the general population is insufficient and many people, including service and kitchen staff are unaware that an allergic reaction to food could be have fatal consequences (Kaya, et al., 2013; Tatlı & Akoğlu, 2020).

Food allergy is an issue that deeply affects human health if not taken seriously. Therefore, staff of food and beverage enterprises are responsible for the health of a guest with food allergies during the time guests spend in the restaurant. To avoid a life-threatening event, food and beverage businesses must be prepared for food allergy cases. (Lee & Sozen, 2016). Thus, it is very important to determine the level of food allergy knowledge and attitudes of service and kitchen staff. Although the issue of food allergy is an extremely important issue for the food and beverage industry, studies in the literature are limited. For this reason, this study is considered important in terms of revealing the current state of knowledge about food allergy of the service and kitchen staff working in hotels in Izmir.

### **Food Allergies in Restaurant Operations**

Many of the reactions caused by food allergies occur out-of-home consumption (Bock, Munoz-Furlong & Sampson, 2001). People with food allergies should pay special attention to the food they consume, especially in at the restaurants. As a result of increased food allergies and their reactions, the issue of food allergy has become an extremely important issue for the food and beverage industry (Choi & Rajagopal, 2013). After a person with a food allergy arrives at the restaurant and informs the service staff regarding her/his allergy, the responsibility is shared with the relevant service and kitchen staff at the restaurant. With the increasing number of people involved in the process, it can be difficult to control the outcomes of food allergens in restaurants (Wham & Sharma, 2014).

In previous studies mostly focus on the knowledge of the restaurant staff about food allergies and food allergens, and their attitudes and risk management practices to meet the needs of people with food allergies. (Mandabach et al., 2005; Bailey et al., 2011; Dupuis, et al., 2016; Young & Thaivalappil, 2018; Soon, 2018). For example Abbot Et al. (2007) in their study, restaurant staff lack of knowledge about food allergy and food allergy reactions. If a service and kitchen staff in a restaurant do not have enough knowledge about food allergies, they may have great problems meeting the demands of a guest (Kronenberg, 2012). Wen and Kwon (2016) conducted a study; they reveal that service staff rarely ask guests who come to the restaurant if they are allergic to any food. This behavior is considered the guest's own responsibility if the guest has a food allergy and should tell it to the service staff. The guest who is aware of the her/his food allergy should clearly supply the information to the service staff (Barnett et al., 2020).

In order to restaurants safely serve to person with food allergies; all service and kitchen staff need to have sufficient knowledge of menu components, potential allergens and allergen-free food preparation methods, especially food allergies (Abbot et al., 2007; Ajala et al., 2010). The lack of undesirable conditions as a result of food allergies in restaurants is directly proportional to the quality and training of service and kitchen staff (Pratten & Towers, 2004). In cases where service and kitchen staff are not aware of the important and key issues in food allergy (Choi and Rajogopal, 2013; Dupuis et al., 2016), the catering business not only loses guests, it can also suffer legally and financially.

## **Material and Method**

### **Population and Sample**

The universe of the study consists of service and kitchen workers working in all hotels in İzmir. Since it is not possible to reach all the hotels that make up the universe in terms of both time and cost, the study was only applied on 4 and 5 star hotels in İzmir. Therefore, the sample of this study is the service and kitchen staff who is working in 4 and 5 star hotels in İzmir. The study had been made between June 2019 and September 2019. In the study, a questionnaire was applied to 890 people working in twelve different four- and five-star hotels in Izmir. After obtaining permission from the hotel businesses, a questionnaire was applied to the service and kitchen staff. Data collection is based on face-to-face and drop-collection method. The respondents are selected through convenience sampling method. In total, 890 questionnaires is collected. Following the suggestion of Hair Et al., 2014, 82 questionnaires are excluded due to incomplete and straight-lining responses. 808 of these questionnaires were included in the analysis.

### **Research Design**

In the first section of the questionnaire used in the study; there are four questions in order to determine the demographic characteristics of the service and kitchen staff. These questions are; gender, level of education, experience and position they are in. The second section contained nine knowledge questions capturing various aspects of food allergy knowledge (information), such as common allergens, symptoms and responses to reactions. These questions were formulated as true-false and obtained from previous studies (Bailey et al., 2011; Lee & Sozen, 2016; Radke et al., 2016). In the third section, multi-item scaled questions that measured the attitudes of service and kitchen staff towards food allergies was used. The scale used by Choi and Rajagopal (2012) was used in the study. The scale was translated into Turkish by taking expert opinion and its validity was ensured.

### **Statistical analysis**

Descriptive statistics, such as frequencies, means, and standard deviations, were used to describe the characteristics of the data statistics, including t-test and analysis of variance (ANOVA). In order to understand whether the data is normally distributed, kurtosis and skewness coefficients were taken into account. If the kurtosis and skewness values are in the range of  $\pm 3.29$ , it can be said that the data are normally distributed (Kim, 2013). The kurtosis and skewness values of the data obtained in the study are shown in Table 1. Therefore, parametric tests were used in this study.

**Table 1.** Kurtosis and Skewness Values and Factor Analysis Results

No	Statements	Skewness	Kurtosis	Factor Loading
1	It is important to me that accurate information about food ingredients is provided to customers with a food allergy.	-1,621	2,501	0,658
2	I think preventing incidences of food allergies is an important part of my job responsibilities at my workplace.	-1,245	2,013	0,432
3	I believe appropriate precautions can be taken to avoid cross-contamination between foods at my work place.	-1,456	2,857	0,783
4	I believe that the disclosure of accurate allergen information to customers with a food will decrease the likelihood of a food allergy creation.	-1,411	2,936	0,535
5	I think all food service and kitchen staff should be well informed about food allergies.	-1,077	1,066	0,712
6	I am willing to change my food handling behaviors related to handling food allergens.	-1,234	1,506	0,401
7	I believe that knowledge about food allergies would make me more confident about handling food at my workplace	-1,570	2,886	0,589
8	I think understanding the basics of food allergies will be useful to me at my workplace.	-1,576	3,085	0,621
9	I believe small amounts of food allergen can not cause a food allergy reaction*.	-1,395	2,411	0,505
10	I think the manager (executive chefs) at my work place should educate me about food allergies and allergen handling.	-1,407	2,308	0,801
11	Learning more about food allergies is important to me personally.	-0,875	0,582	0,513
12	I think individuals involved in food preparation should be more knowledgeable about food allergies than server or cashiers.	-1,388	2,495	0,425
13	I am willing to attend food allergy training courses/workshops to learn more about food allergies.	-1,285	2,350	0,742
14	I believe I can effectively handle a food allergy emergency situation at my work place.	-1,089	1,376	0,543
<b>Explained Variance</b>		%51,433		
<b>Scale Mean</b>		3,89		
<b>Cronbach's Alfa</b>		0,763		
<b>KMO</b>		0,801		
<b>p</b>		,000		

All fourteen statements in the scale used in the study were gathered under a single dimension, and the Kaiser-Meyer-Olkin (KMO) value was determined as 0.801. The p value of the scale was obtained as .000. It has been determined that the related scale provides construct validity and is reliable. As a result of the factor analysis, the variance value of the factor analysis was determined as 51,433%. This ratio supports that factor analysis is statistically significant and valid.

The level of significance for all comparisons was set at 0.05. In order to compare the information scores of service and kitchen staff on food allergies with the effectiveness of food allergy and allergen training, cross-factor group covariance analysis (ANCOVA) was applied. The maximum composite score of the food allergy information questions was 23. If the respondent chose the answer correctly, that item was coded with a "1." If the respondent answered the incorrect question, the item was coded with a "0."

## Results

### Demographic Characteristics

**Table 2.** Demographic characteristics of service (n:452) and kitchen staff (n:356)

Demographic Characteristics		n=808		%	
<b>Gender</b>					
Female		235		29,08	
Male		542		67,08	
Missing Value		31		3,84	
<b>Education Levels</b>					
Primary		105		13,0	
High School		262		32,43	
Associate Degree		167		20,66	
Graduate		225		27,85	
Post Graduate		49		6,06	
<b>Experience</b>					
0-2 years		260		32,18	
3-5 years		230		28,46	
6-8 years		116		14,35	
9-11 years		54		6,68	
12-14 years		29		3,59	
15 years and more		111		13,75	
Missing Value		8		0,99	
<b>Position</b>					
Busboy	114	25,2	Commis	50	14,0
Waiter	221	48,9	Demi-Chef	88	24,7
Captain	53	11,7	Chef de Partie	88	24,7
Chief	45	10,0	Sous Chef	53	14,9
Manager	16	3,5	Chef de Cuisine	33	9,3
Missing Value	3	0,7	Pastry Chef	23	6,5
			Executive Sous Chef	10	2,8
			Executive Chef	11	3,1
<b>Is there a food allergy chart in your business?</b>					
Yes		340		42,08	
No		467		57,80	
Missing Value		1		0,12	
<b>Has there ever been a food allergy reaction in your business?</b>					
Yes		108		13,37	
No		697		86,26	
Missing Value		3		0,37	
<b>Have you been trained in food allergy and nutrient allergens?</b>					
Yes		446		55,20	
No		361		44,68	
Missing Value		1		0,12	

The majority of the 808 staff (67.08%) who participated in the study were male staff. The majority of the staff received training at high school level (32.43%). Most staff have experience in the range of 0-2 years (32.18%) and 3-5 years (28.46%). Service staff mainly work in the position of waiter (48.9%), while kitchen staff work in Demi-Chef (24.7%) and Chef de Partie (24.7%) position. Service and kitchen staff often answered “no” (57.80%) to the question of whether there was a food allergy chart in their business. When asked if there has ever been a food allergy reaction in their business, staff are asked if they have had a food allergy reaction; again, they often marked “no”

(86.26%). Finally, staff were asked if their were trained in food allergies and food allergens, and the staff asked this question: “yes” (55.20%).

### Food allergy knowledge of service and kitchen staff

The knowledge of the service and kitchen staff about food allergy was measured with questions in the form of true and false. The maximum score they can get if staff answer all the questions correctly is 23. The majority of service staff (70.79%) scored between 12 and 17 points. The average scores of the service staff (min:7, max:22) are  $13.74 \pm 2.65$ . The majority of kitchen staff (56.17%) scored between 15 and 22 points. The average scores of kitchen staff (min:4, max:23) are  $14.83 \pm 4.44$ . The average scores of all the staff who participated in the study were  $14.22 \pm 3.59$ .

**Table 3.** Food allergy knowledge of of service and kitchen staff

Statements	Service staff (N: 452)		Kitchen staff (N:356)	
	<i>n</i>	Correct %	<i>n</i>	Correct %
<b>Which of the following products are among the main food allergens?</b>				
Peanuts (Correct)	374	82,74	291	80,83
Tomatoes (False)	93	20,56	45	12,5
Milk and Dairy Products (True)	386	85,40	321	89,17
Strawberry (False)	94	20,80	65	18,06
Shellfish (True)	401	88,72	312	86,67
Egg (True)	311	68,81	245	54,20
Chocolate (False)	171	37,83	201	55,83
<b>Which of the following reactions is a food allergy reaction?</b>				
Difficulty Breathing (True)	391	85,50	302	84,83
Redness and Itching (True)	341	75,44	292	82,02
Headache (False)	241	53,32	274	76,97
Tongue adn Throat Swelling (True)	142	31,42	201	56,46
Fever (False)	271	59,96	286	80,34
Coughing (False)	182	40,27	197	55,34
<b>What do you do if you see a food allergy for example guest having trouble breathing ?</b>				
I will call 112 Health Emergency Line (True)	307	67,92	294	82,58
I serve water to the guest (False)	178	39,38	203	57,02
If the guest has the medicine with him, I recommend him to take it (False)	254	56,19	177	49,71
I recommend the guest to vomit (False)	102	22,57	136	38,20
If a guest has an allergy, to ease the allergy food should be served with cold water (False)	242	53,5	243	68,5
Guests with food allergies can safely consume a small amount of the allergen food (False)	312	69,0	256	71,9
After the production of food, allergens can be removed and served safely to the guest (False)	287	63,5	253	71,1
Food cooked according to standards does not cause food allergies (False)	325	71,9	270	76,12
A food allergy reaction can cause death. (Correct)	342	75,7	285	80,1
Food tolerance and food allergy are the same two concepts. (False)	271	60,0	236	66,3

Independent sample t-test and service and kitchen staff information scores about food allergies and whether they have previously received allergy training were compared. The result was significant ( $p < 0.05$ ). Male service and kitchen staff's food allergy knowledge score ( $14.43 \pm 3.84$ ) was higher than that of female staff ( $13.97 \pm 3.33$ ). According to the results of the one-way ANOVA test; there is a significant difference between the service staff food allergy scores with different levels of education ( $F_{2,655}=10,994$ ,  $p < 0.05$ ). The results of the multi-comparison Tukey's test showing which groups the differences originated from, there is no significant difference in the food

allergy scores of staff who have received high school education (mean:  $13.78 \pm 3.50$ ) and associate degree education (mean:  $13.99 \pm 3.33$ ). However, there was a significant difference between the scores of staff who received undergraduate level education (mean:  $15.18 \pm 3.44$ ) and the scores of high school and associate degree staff on food allergies ( $p < 0.05$ ).

One-factor inter-group covariance analysis was applied to compare the knowledge scores of the participants about food allergies and their effectiveness with the training of food allergies and allergens. The independent variable was the participants' food allergies information scores and the independent variable food allergies and allergens training. The education levels of the participants were used as a covariate in the analysis. Preliminary controls were carried out to confirm that there was no violation of normality, linearity, homogeneity of variances, homogeneity of regression trends and reliable measurement of the covariate. There is a significant difference between food allergy and allergens training and education levels of the participants ( $F(2, 30) = 177, p = 0.00$ , partial eta squared = 0.30 ( $p < 0.05$ )). It was concluded that there is a statistical relationship between the education levels of the participants on food allergies that affect the knowledge scores of the participants about food allergies.

#### Attitudes towards service and kitchen staff with food allergies

Service and kitchen staff, “I believe appropriate precautions can be taken to avoid crosscontact between foods at my workplace statement” ( $4.33 \pm 1.15$ ) and “I am willing to change my food handling related habits/methods to food allergens statement” ( $4.32 \pm 1.08$ ) they have participated the most. Staff have the least participation among the statements; “I think preventing incidences of food allergies is an important part of my job responsibilities at my workplace” ( $2.49 \pm 1.53$ ) and “I believe small amounts of food allergen can cause a food reaction allergy” ( $3.53 \pm 1.47$ ).

**Table 4.** Attitudes towards service and kitchen staff with food allergies

	Attitude Items ( $\alpha = 0,763$ ) (Scale Mean: 3,89 S.D: 0,60)	Mean	Std. Dev.
1	It is important to me that accurate information about food ingredients is provided to customers with a food allergy.	4,19	1,09
2	I think preventing incidences of food allergies is an important part of my job responsibilities at my workplace.	2,49	1,53
3	I believe appropriate precautions can be taken to avoid cross-contamination between foods at my work place.	4,33	1,15
4	I believe that the disclosure of accurate allergen information to customers with a food will decrease the likelihood of a food allergy creation.	4,16	1,11
5	I think all food service and kitchen staff should be well informed about food allergies.	3,79	1,23
6	I am willing to change my food handling behaviors related to handling food allergens.	4,32	1,08
7	I believe that knowledge about food allergies would make me more confident about handling food at my workplace	4,15	1,14
8	I think understanding the basics of food allergies will be useful to me at my workplace.	4,08	0,99
9	I believe small amounts of food allergen can not cause a food allergy reaction*.	3,53	1,47
10	I think the manager (executive chefs) at my work place should educate me about food allergies and allergen handling.	3,66	1,38
11	Learning more about food allergies is important to me personally.	3,64	1,32
12	I think individuals involved in food preparation should be more knowledgeable about food allergies than server or cashiers.	3,93	1,26
13	I am willing to attend food allergy training courses/workshops to learn more about food allergies.	4,19	1,03
14	I believe I can effectively handle a food allergy emergency situation at my work place.	4,02	1,14



\*The expression is coded in reverse. Note: Five Point Likert Scale: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly Agree

Independent sample t-test and service and kitchen staff information scores about food allergies and whether they have previously received allergy training were compared. The result was significant ( $p < 0.05$ ). The score of service and kitchen staff who had previously been trained in food allergies and allergens ( $14.69 \pm 3.61$ ) was higher than those who had not previously been trained for food allergies and allergens ( $13.66 \pm 3.47$ ). Another independent sample t-test analysis compared the score on food allergy to gender. The result was found to be statistically significant ( $p < 0.05$ ). Male service and kitchen staff's food allergy knowledge score ( $14.43 \pm 3.84$ ) was higher than that of female staff ( $13.97 \pm 3.33$ ).

According to the results of the single-factor variance analysis; there is a significant difference between the service staff food allergy scores with different levels of education ( $F_{2,655}=10,994$ ,  $p < 0.05$ ). The results of the multi-comparison Tukey test showing which groups the differences originated from, there is no significant difference in the food allergy scores of staff who have received high school education (mean:  $13.78 \pm 3.50$ ) and associate degree education (mean:  $13.99 \pm 3.33$ ). However, there was a significant difference between the scores of staff who received undergraduate level education (mean:  $15.18 \pm 3.44$ ) and the scores of high school and associate degree students on food allergies ( $p < 0.05$ ).

One-factor inter-group covariance analysis was applied to compare the knowledge scores of the participants about food allergies and their effectiveness with the training of food allergies and allergens. The independent variable was the participants' food allergies information scores and the independent variable food allergies and allergens training. The education levels of the participants were used as a covariate in the analysis. Preliminary controls were carried out to confirm that there was no violation of normality, linearity, homogeneity of variances, homogeneity of regression trends and reliable measurement of the covariate. There is a significant difference between food allergy and allergens training and education levels of the participants ( $F(2, 30)=177$ ,  $p=0,00$ , partial eta squared= 0.30 ( $p < 0,05$ )). It was concluded that there is a statistical relationship between the education levels of the participants on food allergies that affect the knowledge scores of the participants about food allergies.

## Discussion

Food and beverage enterprises need to follow not only new trends and current but also food allergies which are important issues for human health moreover need to take the necessary precautions. In the following years, food and beverage industry need to become fully equipped for food allergies (Lee & Xu, 2015). If the issue of food allergy is not taken seriously, consequences may arise threatening human health. In addition to this sad situation, food and beverage management may face undesirable situations such as legal problems, compensation and loss of brand value (Borchgrevink et al., 2009). For this reason, this study aims to demonstrate the knowledge and attitudes of service and kitchen staff about food allergy within the scope of five-star hotels operating in İzmir. Considering the scarcity of studies on food allergy in Turkey, the data obtained as a result of this study is as important. The research results revealed that the service and kitchen staff who participated had lack of knowledge and execution regarding food allergies.

The participants were asked to reply true or false about the main nutrient allergens; 81% of the participants were able to respond true to the correct answers. The staff responded correctly to shellfish (89.12%), the wrong answers

'strawberry and tomato' were marked by the staff as the main food allergen at 82.92%. Although 90% of food allergy-induced cases worldwide are caused by major food allergens (peanuts, tree nuts, eggs, shellfish, fish, soy, wheat and milk), guests may be allergic to any food. Therefore, staff should be sensitive to other food allergies. Service and kitchen staff responded correctly to 68.58% in defining food allergy reactions. One of the food allergy reactions, breathing difficulties (85.77%) was the most accurate response. Service and kitchen staff were able to respond correctly to 42.45% of tongue and throat swelling, which is one of the reactions of food allergies. This indicates that the staff involved in the research have a major problem in defining indicators of food allergy reactions. Knowing the indicators of reactions caused by food allergies is just as important as knowing allergens that cause food allergies. It is possible to save human life with a reaction indicator that can be detected at the right time. Service and kitchen staff are asked; What do you do if you see, for example, a food allergy guest having trouble breathing? The only correct answer to the question is to call the emergency line 112, which is 74.38% correctly answered. One of the wrong answers to this question is that staff were able to respond correctly to the guest's vomiting at a rate of 29.45%. Six other questions were asked to test the information of the staff about their food allergies. There were two questions standing out with the answers given by the staff. The first of these questions, the answer is false; 60.02% of the staff responded correctly to the question that food should be served with cold water to dilute the allergen if a guest has an allergic reaction.

Another wrong question is that food tolerance and food allergy are the same two concepts, and 62.75% of the service and kitchen staff answered correctly. In general, service and kitchen staff information about food allergies is insufficient. Staff are short of information on issues that play an important and key role in food allergy. This conclusion is in parallel with results of other studies (Choi & Rajogopal, 2013; Dupuis et al., 2016).

Based on the answers given by service and kitchen staff to the attitude scale; least attended statement is: "*I think preventing incidences of food allergies is an important part of my job responsibilities at my work place*" ( $2.49 \pm 1.53$ ). It is one of the responsibilities of service and kitchen staff to have a guest leave the restaurant with satisfaction in addition to eliminate situations that may threaten the health of the guest during the meal. If the guest has shared information to the service or kitchen staff that he or she is allergic to food, the responsibility should be shared equally among all staff. For this reason, food and beverage enterprises should establish and implement standardized rules and steps on food allergies. Another least attended statement is: "*I believe small amounts of food allergen can not cause a food allergy*" ( $3.53 \pm 1.47$ ) which reveals a lack of information about food allergies and cross-contamination by service and kitchen staff. The most participated statements are: "*I believe appropriate precautions can be taken to avoid cross-contamination at my workplace*" ( $4.33 \pm 1.15$ ) and "*I am willing to change my food handling related to handling food allergens*" ( $4.32 \pm 1.08$ ). Service and kitchen staff reveal that food allergy reactions are preventable and they want to improve themselves about food allergies and food allergens. Based on this result, it is recommended that food and beverage enterprises periodically provide education and training about food allergy and food allergens to their staff. Role-play practices (implementations) with case studies can be implemented in order for the education and trainings to be successful and permanent. They should also include what kind of food allergens are included in the menus of food and beverage businesses.

According to the independent sample t test results; Food allergy knowledge score increases as the education level of service and kitchen staff increases. This situation re-emerges the problem of the recruitment of well-trained staff

to food and beverage enterprises that have been under discussion in Turkey for years. Moreover it also occurred in both the ANOVA and ANCOVA tests. In the ANOVA test, food allergy knowledge scores of graduate level educated staff differ from the food knowledge allergy score of those who have been educated at associate and high school level. In the ANCOVA test, statistical correlation was detected between food allergy education and education levels of staff that is effective in the food allergy scores of the staff. Food allergy training is more effective as the level of education of staff increases. In this case, food and beverage enterprises should review their food allergy education according to their staff education levels. Staff should be grouped according to their level of education and given different levels of food allergy education and trainings.

## Conclusions

The issue of food allergies in Turkey has been ignored for years. Due to legal deficiencies in legislative regulations, food allergy training is left to the initiative of enterprises. With the legal arrangements made by the state, it should be obligatory to provide training covering a specific period of time to the people who will work in the service and kitchen departments. Operating five-star hotels should provide training on food allergy to service and kitchen staff and focus on the importance of the food allergy issue in İzmir. The results obtained within the scope of the study will be shared with İzmir Provincial Directorate of Health, relevant non-governmental organizations moreover a joint project food allergy education for staff will be planned with the Ministry of Health, universities and private institutions. According to the results of the exam to be held at the end of mentioned education, staff with certain score on food allergy will obtain a certificate which will enable them to work in the service or kitchen department. If the project can be carried out successfully, it will be discussed with the Ministry of Health for its implementation throughout Turkey.

## Limitations and Future Research

This study only includes four and five-star hotels located in İzmir. Therefore, the results obtained cannot be generalised for all service and kitchen staff. It is suggested that further studies are to be at a broader and generalizing level. With the results obtained from such comprehensive and wide sample studies, a standardized food allergy roadmap (guide) can be drawn for food and beverage enterprises in Turkey.

## Declaration

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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