
**THE LEVEL OF FOOD SAFETY KNOWLEDGE OF GASTRONOMY AND
CULINARY ARTS STUDENTS IN TURKEY**

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ABSTRACT

This study aims to measure the level of food safety knowledge of the Gastronomy and Culinary Arts students that will be working as chefs or manager in the food and beverage businesses. A total of 113 students at Abant İzzet Baysal University were participated in this question survey study. The overall knowledge score was determined as 72.88% and significantly associated with both the education level and taking course about food safety ($p < 0.05$). No statistical significant difference among gender, different age groups and following the latest developments was found ($p > 0.05$). The biggest knowledge gaps that have been identified in relation to time/temperature control and cooling. However, compared with many studies that are related to food safety Knowledge level, students appeared to be much better than food handlers. The importance of this issue in all gastronomy and culinary arts departments should be increased making necessary adjustments to give an effective food safety cours

Keywords: food safety, gastronomy, student, education, knowledge level, knowledge gap

Introduction

Foodborne diseases resulting from the consumption of contaminated food are a serious public health problem, as well developed countries, causing a significant social and economic burden on communities and their health systems (Martins et al., 2012; Şanlıer, 2009). Analyses of foodborne disease from numerous countries has shown that mass catering and food service facilities are the most frequent cause of outbreaks (Martins et al., 2012; Todd et al., 2012). In 2010, 48.7% of verified foodborne outbreaks associated with catering services or canteens was reported by European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC). In 2014, the outbreaks reported by the EFSA and ECDC involved 45.665 human cases, 6.438 hospitalisations and 27 deaths. The number of human cases and fatalities has increased compared with 2013, when 41.962 human cases and 11 fatalities were reported. Among these, 22.2% of outbreaks were associated and/or occurred in restaurants,

cafes, pubs, bars and hotels (EFSA and ECDC, 2010; 2015a; 2015b). Foodborne diseases are all over the world as well as the problem of public health in our country, which causes economic losses and affects people's quality of life negatively. It is unlikely that the global distribution of diseases is known due to the reporting of foodborne illness to official authorities is very low in our country. We are saddened to see that such a study is not yet sufficient in Turkey, with tens of thousands of cases being reported each year in developed countries, which keep statistics on this issue (Muratoğlu et al., 2016). Foodborne outbreaks are associated with many improper food handling practices such as infected food handlers, inadequate cooking and reheating, improper storage, delayed serving, improper time/temperature control and cross contamination. Among these factors, food handlers play a very important role in the prevention of foodborne diseases because of direct food contact. It is difficult to say food handlers have contributed on these cases; however, throughout the preparation step of the food they have a very active role in transmitting the foodborne pathogens to the people due to their low awareness level of food safety (Egan, 2007; Smigic et al., 2016). In order to have the food handlers acquire the necessary knowledge and awareness about food hygiene, training and education should be provided to them. Nevertheless it is difficult to say that these things will always give positive results in their behavior (Martinet al., 2012; Seaman and Eves, 2008).

The aim of the Department of Gastronomy and Culinary arts is to educate students on kitchen management, restaurant management, food and beverage management and provide knowledge to be a manager in a food and beverage operation. It is highly important that the knowledge level of the students on food safety should be determined since after graduation their responsibility will be in the catering establishments' kitchen departments. Although many studies have been performed in order to investigate the level of the knowledge and practice of food safety among food handlers that work in some food businesses such as restaurants, hotels and catering services (Baş et al., 2006; Bolton et al. 2008; Martins et al., 2012; Panchal et al., 2013; Pincler et al., 2014; Sun et al., 2012; Şanlıer, 2009; Todd et al., 2010; Walker et al., 2003), no such study which examined the knowledge of food safety among students in department of gastronomy and culinary arts had been offered in the university. With the aim of designing educational and training programs at the universities, it would be very logical to define the knowledge level of the students on food safety issues.

Materials and methods

Collection of Data. This survey was conducted in 2016, from 24 April to 29 April, involving 113 students studying at the department of Gastronomy and Culinary Arts in Abant İzzet Baysal University in Bolu, Turkey. Questionnaire. A questionnaire form was designed to obtain information about students 'knowledge of food poisoning, cross contamination, high-risk

food groups, cleaning, temperature control, storage, food labelling and packaging. The questionnaire form was developed based on previous studies conducted by Giritlioglu et al. (2011) and Panchal et al. (2013) and rearranged according to pre-test results (data was not showed). The questionnaire included 20 questions that were given to the students and they were asked to choose among “true” and “false”. In addition, the answer of “do not know” was also added for each question, to minimize the possibility to select the correct answer randomly. In addition, 6 questions were related with demographic characteristics of students (gender, age, education level, taking course about food safety, following the latest developments, confident about food safety). Knowledge scores were calculated by counting of items answered correctly. The knowledge score range that was between 0 and 20 were converted to 100 points (Baş et al., 2006).

Statistical analysis. Knowledge scores were analyzed using an independent sample t-test for two groups, such as gender, taking course about food safety, following the latest developments, confident about food safety or analysis of variance (ANOVA) with post-hoc Duncan test for more than two groups such as age and education level. All statistical analyses were conducted using SPSS for Windows (version 21.0, USA) and values with a $p < 0.05$ were considered statistically significant.

Results and discussion

Sampling characteristics. Total of 113 students were involved and among these the number of male and female participants were 42.5 and 57.5%, respectively. Regarding the education level, 30.1% of the students were in the first year, 17.7% were in the second year, 31.9% were in the third year and 20.4% were in the last year of university. The major group (80.5%) of the students were between 20 and 24 years of age. The total of 92 (81.4%) students had taken a course about food safety whereas 21 (18.6%) of the participants had received no training. Approximately half (56.6%) of the participants had followed the latest developments about food safety. The total 33.6% all participants have found themselves confident in the field of food safety, whereas 66.4% have not (Table 1).

Food safety knowledge scores. As shown in Table 2, the mean food safety knowledge score was determined as 72.88%. The mean knowledge score reported in our study is greatly higher than 47.1, 51.5 and 31.8% reported by Martins et al. (2012), Bas et al. (2006) and Osaili et al. (2013) and for the food handlers in Portugal, Turkey and Amman, respectively. Moreover, the mean knowledge score was significantly associated with the education level and taking course about food safety ($p < 0.05$). No statistical significant difference among gender, different age groups and following the latest developments were found ($p > 0.05$). The students taking food safety course

had the highest scores (74.29%) compared to the ones not taking the course (66.67%) as it is seen Table 3. Similarly, Bas et al. (2006) reported that total score of food safety knowledge questionnaire was higher in trained food handlers (45.8 ± 17.6) than untrained food handlers (40.8 ± 14.3) ($p < 0.05$). These results showed that training is very important to ensure food safety. Furthermore, as presented on Table 4, first and second year students had the lowest knowledge score as 66.24% and 66.00% whereas third and last year students had the highest knowledge score as 76.89% and 76.52%, respectively ($p < 0.05$). Experience of students in sector and increasing knowledge in the advancing years in their education has led to the knowledge level of increase.

Previous survey studies have revealed that many food handlers, restaurant head chefs, catering managers other employees in charge of food production have lack of knowledge about food safety (Bas et al., 2006; Jianu and Chis, 2012; Martin et al., 2012; Osaili et al., 2013; Smigic et al., 2016; Walker et al., 2003). Moreover, it was concluded that the staff that has already received training on food safety has better perception and knowledge level than those that did not have education. Therefore regular training programs for the food safety should be introduced (Läikkö-Roto and Nevas, 2014; Todd et al., 2010).

Knowledge gaps. Factors that may pose the greatest risk for food safety in the kitchen; inadequate heat treatment and reheating, keeping the foods in dangerous temperature range, cross-contamination, inadequate personal hygiene, supplying improper food. All these dangers are risk factors that can be prevented with the right measures to be taken during the production. So, there are lots of things to do for kitchen staff and managers (Smigic et al., 2016; Todd et al., 2007). Therefore the level of students' knowledge and shortcomings were further examined in detail in terms of these critical food safety issues. Frequency and percentage of the students' knowledge level on food safety was showed in Table 5 and all critical food safety issues mentioned in questionnaire form was analyzed according to percentage of correct and incorrect answers obtained for each question response.

Time/temperature control and cooling is the most common contributing factor to foodborne illness. Approximately 75-85% of all foodborne illness are the result of time temperature abuse, %56 of these cases are the result of improper cooling. After cooking, high risk foods should be stored above 60°C since food poisoning bacteria do not grow at temperatures above 60°C. If the temperature falls into the danger zone between 5°C and 60°C, the bacteria will be able to grow and multiply rapidly (WHO, 2006). Foods that need time and temperature control for safety must be cooled from 57°C to 5°C or lower within six hours. First, cool food from 57°C to 21°C within two hours. Then cool it from 21°C to 5°C or lower in the next four hours. However, the total cooling time cannot be longer than six hours. Therefore, it is not right to wait the cooked food to

cool at the room temperature (National Restaurant Association, 2016a). Food safety knowledge questions that were most frequently answered incorrectly were related to time/temperature control and cooling. Only a quarter of students (23.0%) had correct knowledge about “Cooked foods should be put into the refrigerant after cooling at room temperature”. Additionally only 45.1% of the students knew that “Food should be served in two hour after its preparation”. It means that nearly a half of the students participating in this study did not have adequate knowledge on mentioned issue. Giritlioglu et al. (2011) reported that 75.6% of the cookery students knew that food must not be served later than 2 h after its preparation.

Safe internal cooking temperatures vary for different types of foods, therefore it is important that know what internal temperature of food needs to reach to be safe to eat. Internal cooking temperature for poultry must be reached at 74°C (National Restaurant Association, 2016b) Since harmful contaminants cannot be seen, smelled or tasted, the food should be cooked at a safe internal cooking temperature to avoid food poisoning. Our results showed that only 55.8% of the students knew that “Internal temperature should be 74°C for poultry”. Unfortunately, however, this also means that nearly a half of them were not aware of this danger.

Raw milk consumption is one of the most important problems that can pose a problem in terms of food security in the world. Raw milk can carry dangerous bacteria which are responsible for causing numerous foodborne illnesses. According to an analysis by the Centers for Disease Control and Prevention (CDC), between 1993 and 2006 more than 1500 people in the United States became sick from drinking raw milk or eating cheese made from raw milk. In addition, CDC reported that unpasteurized milk is 150 times more likely to cause foodborne illness and causes 13 times more hospitalizations than illnesses involving pasteurized dairy products (FDA, 2012). In our study only 50.4% students could identify UHT and pasteurized milks are safer than raw milk. This result indicated the presence of a great lack of knowledge about this issue. Many microbial contamination caused to foodborne diseases leave no obvious clue at the level that can be determined by visual, olfactory or tactile. Therefore microbiological analyses are needed to detect microbial pathogens present on food (Smigic et al., 2016). In the present study, 77% of students knew that checking food by smelling and tasting is not appropriate to evaluate food safety. Smigic et al. (2016) informed that only 36.3% of food handlers in different country, Serbia, Greece and Portugal, knew that smelling, tasting or visually checking food is not appropriate to evaluate food safety. The higher knowledge level of the students compared with the people working in the food sector shows the importance of food safety education.

Perishable foods should never be thawed on the counter or in hot water and must not be left at room temperature for more than two hours. There are safe ways to thaw food: in the refrigerator, in cold water by changing the water every 30 minutes, and in the microwave (USDA,

2013). 64.6% of students gave correct answer “Frozen meat should be thawed at room temperature” question while 31.9% gave the wrong answer. Additionally, our results indicated that 34.5% of students knew that “meat can be thawed in cold water” and 51.3% of students knew that “microwave oven can be used for thawing”. Refreezing the thawed meat can cause foodborne diseases therefore this is important issue for food safety. Knowledge level of students about this subject demonstrated high result with 92.0%. Osaili et al. (2013) informed that only 67% of food handlers in fast food restaurants that thaw frozen meat and poultry in the refrigerator and 24 and 4% of the correspondents use water or microwave for thawing, respectively. Bolton et al. (2008) indicated that 63% of head chefs and catering managers in Ireland use refrigerator or cold room in thawing frozen meat, 19% of them thaw the frozen meat at room temperature and 3.5% in the microwave. Giritlioglu et al. (2011) reported that about half of the cookery students (53.7%) knew that meat should not be thawed at room temperature. As it seen knowledge level of students about this subject is more than in previous studies.

The ideal temperature for bacteria to multiply is 37°C, this is the average human body temperature. When food is kept at temperatures colder than 5°C or hotter than 63°C, bacterial growth slows down or stops (WHO, 2006). 89.4% of the students knew that bacteria do not stop reproduction at human temperature while 2.7% gave the wrong answer. Giritlioglu et al. (2011) also determined in their study that 70.8% of the cookery department students knew that bacteria continue to multiply at human temperature.

Cross contamination is one of the most common causes of food poisoning. Food, equipment, food contact surfaces and people are considered important sources of cross-contamination. A few of the most important measures to be taken regarding this issue; don't let raw meat, poultry or unwashed raw vegetables touch other foods and clean worktops and utensils with hot water and detergent and remember to disinfect those surfaces that have come in contact with raw meat, poultry and unwashed raw vegetables. In the study high rates of correct answers on this issue were given. About 92.0% of students knew that raw and ready to eat foods should be stored separately. Similarly 92.9% of students knew that keeping the raw and ready to eat foods together could be caused foodborne diseases. About 85% counters in the study area should be washed with hot, soapy, disinfectant water after work. Contrary to these findings Jianu and Chis (2012) reported that only 44% of food handlers knew that raw and ready to eat foods must be stored on separate shelves. The number of correct answer of this question is higher than that reported by Osaili et al. (2013), for food handlers at fast food restaurants in Amman and Irbid cities. Our study showed that the overall knowledge of students on food safety is better than the many previous studies. It may be associated with current inadequate knowledge of the staff working in the sector or good education level of gastronomy and culinary arts students. The differences on knowledge level of the students may stem from such factors as the differences in

the survey questions and the survey protocols. However, it was clearly seen that in the study the knowledge level of the students that took a course was quite good. As a result of this situation it is of vital importance to train qualified people that have adequate knowledge level on food safety. Many foodborne illnesses will be reduced provided that an effective food safety education is given to the students that will be working in the catering establishment. The importance of this issue in all gastronomy and culinary arts departments should be increased making necessary adjustments to give an effective food safety course. For the further studies to be research applying the same questionnaire a comparative method between different universities can be recommended. Furthermore the same questions can be asked to the people working in food and beverage sector and the results can be compared to those studying in departments of gastronomy and culinary arts. Finally the practice and attitude of the students about food safety can be measured.

Reference

- Baş, M., A. Ş. Ersun and G. Kivanç. 2006. The evaluation of food hygiene knowledge, attitudes, and practices of food handlers' in food businesses in Turkey. *Food Control*. 17(4): 317–322.
- Bolton, D., A. Meally, I. Blair, D. McDowell and C. Cowan. 2008. Food safety knowledge of head chefs and catering managers in Ireland. *Food Control*. 19: 291–300.
- EFSA and ECDC. 2010. The commodity summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in the European union in 2008, European Food Safety Authority, European Centre for Disease Prevention and Control. *EFSA Journal*. 8(1): 1–313.
- EFSA and ECDC. 2015a. The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2013, European Food Safety Authority, European Centre for Disease Prevention and Control. *EFSA Journal*. 13(1):1–162.
- EFSA and ECDC. 2015b. The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2014, European Food Safety Authority, European Centre for Disease Prevention and Control. *EFSA Journal*. 13(12):1–191.
- Egan, M. B. 2007. A review of food safety and food hygiene training studies in the commercial sector. *Food Control*. 18(10): 1180–1190.

FDA. 2012. The Dangers of Raw Milk: Unpasteurized Milk Can Pose a Serious Health Risk, <http://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/UCM239493.pdf> (Accessed 03 August 2016)

Giritlioglu, I., O. Batman and N. Tetik. 2011. The knowledge and practice of food safety and hygiene of cookery students in Turkey. *Food Control*. 22(6): 838–842.

Jianu, C. and C. Chis. 2012. Study on the hygiene knowledge of food handlers working in small and medium-sized companies in western Romania. *Food Control*. 26: 151–156.

Läikkö-Roto, T. and M. Nevas. 2014. Restaurant business operators' knowledge of food hygiene and their attitudes toward official food control affect the hygiene in their restaurants. *Food Control*. 43: 65–73.

Martins, R., T. Hogg and J. Otero. 2012. Food handlers' knowledge on food hygiene: the case of a catering company in Portugal. *Food Control*. 23: 184–190.

Muratoğlu, K., Çetin, Ö. and Çolak, H. 2015. The Epidemiology of Foodborne Diseases. *Journal of Food Hygiene and Technology*, 1(3): 1-8.

National Restaurant Association. 2016a. <http://www.restaurant.org/Manage-My-Restaurant/Food-Nutrition/Food-Safety/Cooling-food-correctly/> (Accessed 20 December 2016)

National Restaurant Association. 2016b. <http://www.restaurant.org/Manage-My-Restaurant/Food-Nutrition/Food-Safety/Cooking-TCS-food/> (Accessed 20 December 2016)

Osaili, T. M., D. O. Abu Jamousa, B. A. Obeidata, H. A. Bawadia, R. F. Tayyemb and H. S. Subihc. 2013. Food safety knowledge among food workers in restaurants in Jordan. *Food control*. 31(1): 145–150.

Panchal, P. K., P. Bonhote and M.S. Dworkin. 2013. Food safety knowledge among restaurant food handlers in Neuchatel, Switzerland. *Food Prot. Trends*. 33(2): 133–144.

Panchal, P. K., A. Carli and M.S. Dworkin. 2014. Identifying food safety knowledge gaps among restaurant food handlers in Bolzano, Italy. *Food Prot. Trends*. 34(2): 83–93.

Pichler, J., J. Ziegler, U. Aldrian and F. Allerberger. 2014. Evaluating levels of knowledge on food safety among food handlers from restaurants and various catering businesses in Vienna, Austria 2011/2012. *Food Control*. 35(1): 33–40. Seaman, P. and Eves, A. 2008. Food hygiene training in small to medium-sized care settings.

International Journal of Environmental Health Research, 18(5): 365-374. Smigic, N., I. Djekic, M. L. Martins, A. Rocha, N. Sidiropoulou and P. E. Kalogianni. 2016.

The level of food safety knowledge in food establishments in three European countries. Food Control. 163: 187–194.

Sun, Y. M., S. T. Wang and K. W. Huang. 2012. Hygiene knowledge and practices of night market food vendors in Tainan City, Taiwan. Food Control. 23(1): 159–164.

Şanlıer, N. 2009. The knowledge and practice of food safety by young and adult consumers. Food Control. 20: 538–542. Todd, E. C., J. D. Greig, C. A. Bartleson and B. S. Michaels. 2007. Outbreaks where food

workers have been implicated in the spread of foodborne disease. Part 3. Factors to outbreaks and description of outbreak categories. J. Food Prot. 70(9):2199–2217.

Todd, E. C., B. S. Michaels, D. Smith, J. D. Greig and C. A. Bartleson. 2010. Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 9. Washing and drying of hands to reduce microbial contamination. J. Food Prot. 73(10): 1937–1955.

Tokuc, B., G. Ekuklu, U. Berberoglu, E. Bilge and H. Dedeler 2009. Knowledge, attitudes and self-reported practices of food service staff regarding food hygiene in Edirne, Turkey. Food Control. 20: 565–568.

USDA. 2013. United States Department of Agriculture Food Safety and Inspection Service,

<http://www.fsis.usda.gov/wps/portal/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/the-big-thaw-safe-defrosting-methods-for-consumers/bigthaw2> (Accessed 22 August 2016).

Walker, E., C. Pritchard and S. Forsythe. 2003. Food handlers' hygiene knowledge in small food businesses. Food Control. 14(5): 339–343.

World Health Organization (WHO). 2006. Five keys to safer food manual. WHO Department of Food Safety, Zoonoses and Foodborne Diseases, http://www.who.int/entity/foodsafety/publications/consumer/manual_keys.pdf

(Accessed 22 August 2016).

TABLE 1 Socio-Demographic Profile of Students

Socio-demographic variables	Frequency	Percentage
<i>Gender</i>		
Male	48	42.5
Female	65	57.5
Total	113	100
<i>Age</i>		
15-19	19	16.8
20-24	91	80.5
25-29	2	1.8
30 and above	1	0.9
Total	113	100
<i>Education level</i>		
First year	34	30.1
Second year	20	17.7
Third year	36	31.9
Fourth year	23	20.4
Total	113	100
<i>Taking course about food safety</i>		
Yes	92	81.4
No	21	18.6
Total	100	100
<i>Following the latest developments about food safety</i>		
Yes	64	56.6
No	49	43.4
Total	113	100
<i>Confident about food safety</i>		
Yes	38	33.6
No	75	66.4
Total	113	100

TABLE 2 The Mean Food Safety Knowledge Score

Score	Frequency	Percentage	Mean	Std. Deviation
20	1	0.9		
25	1	0.9		
30	1	0.9		
35	1	0.9		
40	2	1.8		
45	2	1.8		
50	2	1.8		
55	3	2.7	72.88	14.74
60	8	7.1		
65	10	8.8		
70	12	10.6		
75	22	19.5		
80	22	19.5		
85	11	9.7		
90	10	8.8		
95	5	4.4		
Total	113	100		

The above the mean score are given in bold type.

TABLE 3. Results of t-test Related to Knowledge Scores and Characteristics of Students

		Frequency	Mean	Std. Deviation	t	P-value*
Gender	Male	46	71.56	18.51	-0.758	-0.758
	Female	65	73.85	11.24		
Taking course about food safety	Yes	92	74.29	11.61	2.175	.032
	No	21	66.67	13.99		
Research of new information about food safety	Yes	64	73.91	13.70	0.848	.398
	No	49	71.53	16.05		
Sufficient level: Food safety about	Yes	38	75.65	14.39	1.435	.154
	No	75	71.47	14.81		

*P-Value <0.05 is significantly different

TABLE 4. Results of Duncan Test Related to Knowledge Scores and Characteristics of Students

		Frequency	Mean	Std. Deviation	Min.	Max.	t	P*
Age	15-19	19	68.68	11.28	50.00	95.00	0.928	.430
	20-24	91	73.74	15.39	20.00	95.00		
	25-29	2	67.50	10.60	60.00	75.00		
	30 and above	1	85.00	-	85.00	85.00		
Education Level	First Year	34	67.06	14.20	25.00	95.00	5.322	.002
	Second Year	20	68.00	20.67	20.00	95.00		
	Third Year	36	77.63	8.74	55.00	95.00		
	Fourth Year	23	78.26	13.11	20.00	95.00		
Source of information of research of new information about food safety	Tv Program	24	71.25	14.46	40.00	95.00	0.733	.412
	Journal	12	77.92	13.22	40.00	90.00		
	Book	8	71.25	18.85	30.00	95.00		
	Other	20	75.75	10.54	60.00	95.00		

*P-Value <0.05 is significantly different

TABLE 5. Level of Students' Knowledge about on Food Safety

	Answers given by students					
	True		False		Do not know	
	Freq.	%	Freq.	%	Freq.	%
Bacteria stops reproduction at human temperature.	3	2.7	101	89.4	9	8.0
Food should be served in two hours after its preparation.	51	45.1	35	31.0	27	23.9
Internal temperature should be 74 °C for poultry.	63	55.8	8	7.1	42	37.2
Keeping the raw and ready to eat foods together can be caused foodborne diseases.	105	92.9	6	5.3	2	1.8
New products should be placed at the front of shelf.	9	8.0	97	85.8	7	6.2
Cooked foods should be put into the refrigerant after cooling at room temperature.	79	69.9	26	23.0	8	7.1
It should be indicated date and label on products in the storage.	101	89.4	6	5.3	6	5.3
Raw and ready to eat foods should be stored in the same place.	7	6.2	104	92.0	2	1.8
UHT and pasteurized milks are safer than raw milk.	57	50.4	35	31.0	21	18.6
If the package of product is not damaged, it is considered as safe food.	28	24.8	77	68.1	8	7.1
Packaging material should be selected from materials that do not allow migration.	102	90.3	7	6.2	4	3.5
Frozen meat should be thawed at room temperature.	36	31.9	73	64.6	4	3.5
Refreezing the thawed meat can cause foodborne diseases.	104	92.0	7	6.2	2	1.8
Meat can be thawed in cold water.	39	34.5	45	39.8	29	25.7
Microwave oven can be used for thawing.	58	51.3	41	36.3	14	12.4
Leftovers can be used for new meal.	18	15.9	74	65.5	21	18.6
In use of broken or cracked eggs, there is no problem in terms of food safety.	4	3.5	102	90.3	7	6.2
The contamination of microorganisms from raw meat can cause the disease or death.	94	83.2	8	7.1	11	9.7
It is possible to understand by tasting whether food is safe.	15	13.3	87	77.0	11	9.7
Countertop should be washed with hot soapy or disinfected water after work.	96	85.0	8	7.1	9	8.0

*The correct answers to items are given in bold type.