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ULUSAL MESLEK STANDARDI KAPSAMINDA ŞEF ADAYLARININ GIDA GÜVENLİĞİ BİLGİ DÜZEYİ VEUYGULAMA DAVRANIŞLARININ BELİRLENMESİ [1]

DETERMINATION OF FOOD SAFETY KNOWLEDGE LEVEL AND PRACTICE BEHAVIORS OF CHEF CANDIDATES WITHIN THE SCOPE OF OCCUPATIONAL STANDARD

Merve ONUR
Osmaniye Korkut Ata University
Kadirli Faculty of Applied Sciences
Department of Gastronomy and Culinary Arts
merveonur@osmaniye.edu.tr
ORCID: 0000-0001-7985-1243

Aybuke CEYHUN SEZGİN
Hacı Bayram Veli University
Faculty of Tourism
Department of Gastronomy and Culinary Arts
aybuke.ceyhun@hbv.edu.tr
ORCID: 0000-0003-1068-9940

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ÖZ

Yiyecek-içecek sektöründe gıda kaynaklı risklerin ortaya çıkmasını önlemeye yönelik tedbirlerin alınabilmesi amacıyla alanda çalışacak olan bireylere gerekli ve yeterli eğitimin verilmesi en iyi yol olarak görülmektedir. Bu kapsamda gıda kaynaklı olası sorunların en aza indirilebilmesi için özellikle geleceğin şef adaylarının ulusal meslek standardı kapsamında gıda güvenliği bilgi düzeyi ve uygulama davranışlarının anlaşılarak uygun çözümler üretilmesinin önemli olduğu düşünülmektedir. Araştırmada yiyecek-içecek hizmetleri programında eğitim alan öğrencilerin gıda güvenliği bilgi düzeyi ve uygulama davranışlarını belirlenmesi amaçlanmıştır. Ankara ilinde Mesleki ve Teknik Anadolu Liselerinin yiyecek-içecek hizmetleri programında öğrenim gören 544 öğrenciye ulaşılmıştır. Çalışmadan elde edilen veriler istatistik paket programı (SPSS) ve test analiz programı (TAP) paket programı kullanılarak analiz edilmiştir. Analizler sonucunda öğrencilerin gıda üretim aşamalarında ki gıda güvenliği bilgi düzeylerinden; mutfakta hazırlık (%64) ve muhafaza (%57) aşamasında gıda güvenliği konusunda bilgi sahibi iken, servis-sunum (%40) ve pişirme (%39) aşamasında gıda güvenliği bilgi düzeylerinin yetersiz olduğu tespit edilmiştir. Öğrencilerin gıda güvenliğine ilişkin bilgileri (%64) çoğunlukla aldıkları eğitim ile edindikleri dolayısı ile okul eğitiminin büyük rol üstlendiği tespit edilmiştir.

ABSTRACT

Taking precautions to prevent the emergence of food-borne risks in the food and beverage industry, is seen as the best way to provide necessary and sufficient training to individuals who will work in the field. In this context, to minimize possible food-related problems, it is considered important to understand the food safety knowledge level and practice behaviors of future chef candidates within the scope of the national professional standard and to produce appropriate solutions. The research aims to determine the food safety knowledge level and practice behaviors of students studying in the food and beverage services program. 544 students studying in the food and beverage services program of Vocational and Technical Anatolian High Schools in Ankara were reached. The data obtained from the study were analyzed using the statistical package program (SPSS) and test analysis program (TAP). As a result of the analysis, students' food safety knowledge levels in the food production stages; While they knew food safety in the kitchen preparation (64%) and preservation (57%) stages, it was determined that their food safety knowledge level was insufficient in the service-presentation (40%) and cooking (39%) stages. It has been determined that students mostly acquire food safety information (64%) through the education they receive, therefore school education plays a major role.

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Introduction

Turkey is among the countries with an important income in the tourism sector. The increase in tourism revenues is of great importance in terms of the economic development moves of the countries. Food and beverage services, which are the basis of the services offered to customers in the accommodation facilities of the tourism sector, are known as the area with the highest income among the income sources of the enterprises with a share of 25-50% (Şanlıer and Hussein, 2008; Ministry of Culture and Tourism, 2009). In all units connected to food and beverage areas, where economic value is considered important, in terms of public health, it is necessary to take the necessary precautions in terms of food safety at all stages from food production to the serving process. (Bucak, 2012; Ministry of Culture and Tourism General Directorate of Research, 2012; Artık et al., 2022). In this sector, it is seen as the best way to provide the necessary and sufficient training to the individuals who will work in the field in order to take measures to prevent the emergence of food-borne risks for safe food production, and this requires the training of qualified personnel to do the profession (Çiftçi, 2014; MEB, 2011). It is thought that providing these gains to the students who receive education in the fields related to the kitchen and kitchen within the scope of the food and beverage program in the secondary education period, especially on food safety and hygiene, will help them to take measures for the dangers that pose a risk in terms of public health, as well as gaining the reputation of the institutions they work in the future (Şallı, 2016; Özdemir, 2009).

Vocational and technical education has become a necessity in terms of developing countries and ensuring their competitiveness (Ministry of Development, 2014). In order to train the qualified manpower needed by the sector, formal tourism education is given in secondary education institutions in Turkey, affiliated to the Ministry of National Education. This training is divided into two as "Formal Tourism Education within General Education" and "Formal Tourism Education within Vocational Technical Education". The high school level of Vocational Technical Education is within the scope of Formal Tourism Education. At this level, trainings in the field of food and beverage services are given in vocational high schools affiliated to the Ministry of National Education (Hatipoğlu and Batman, 2014). Culinary (cooking) education at the secondary level for the tourism sector in Turkey was first started to be given in Anatolian Hotel Management and Tourism Vocational High Schools in the 2005-2006 academic year. From this date on, vocational high schools such as Girls' Vocational High Schools, Commerce Vocational High Schools, Industrial Vocational High Schools, Multi-Program High Schools and Open Education Vocational High Schools have been given the right to open a kitchen branch (cooking department) if they meet the necessary conditions (in terms of teachers, workshops, equipment).

When the curricula of secondary education institutions in Turkey are examined; It has been observed that the courses on food safety education are given within the scope of the Basic Food Production course in the Vocational and Vocational Technical Anatolian High Schools affiliated to the Ministry of National Education and that the practical courses are passed in the 11th and 12th grades. Food safety and hygiene education is given as a compulsory common course for students studying in the food / beverage services program within the scope of Basic Food Production course. Basic food production course is included in all areas in the food and beverage services program and within the scope of this common course; menu planning, food chopping and cooking techniques, hygiene and sanitation, as well as basic information on service methods are given (MEB, 2011). Within the scope of the course, especially the hygiene and sanitation rules and the ability to gain food safety skills (MEB, 2007; MEB, 2011);

- *Producing food suitable for consumption*
- *Preparing a safe working environment*
- *Ensuring equipment hygiene*
- *Gaining the production ability in the kitchen*
- *Washing dishes by hand and in the machine in accordance with sanitation and hygiene rules*
- *Collecting and removing garbage*
- *Subjects such as washing dishes and removing garbage from the environment in accordance with sanitation and hygiene rules are mentioned.*

At the end of the course, it is aimed to provide healthy and hygienic food production and service to the students within the framework of hygiene and sanitation rules, to provide information about every stage of the food

from the field to the table, as well as to try to gain application skills, not only theory knowledge. Thus, it is aimed to train qualified and equipped personnel for the sector (MEB, 2011). It is thought that it is important to determine the level of knowledge of the cooks who are educated in secondary education institutions in Turkey about food safety and hygiene and their level of transforming the knowledge they have acquired into behavior in the kitchen. For this reason, it was aimed to determine the theoretical knowledge levels and practice behaviors of the students in Vocational and Vocational Technical Anatolian High Schools in Ankara province, which train staff for the food and beverage sector. It is assumed that it is important to determine the knowledge levels and practice behaviors of the kitchen staff, who have an active role in the food and beverage businesses, before they start working in the sector and cause negative situations, in terms of contributing to public health. At the same time, in line with the data obtained as a result of the research, it is aimed to offer suggestions to secondary education institutions that train staff in the food and beverage sector by providing education in this field.

Cookery Training Within The National Occupational Standard

The profession of cook is defined a qualified person who can plan the kitchen and organize the kitchen, plan the menu, prepare cold-hot kitchen and patisserie products, cook the products of the world and local cuisines according to the hygiene and sanitation rules, give importance to customer satisfaction by carrying out professional development activities and supervise the working environment. Gastronomy, which is frequently heard today and identified with the working area of the culinary profession, is expressed as an art that requires choosing good food, preparing it hygienically, turning the plates into a visual show and enjoying them (Harbalıoğlu and Ünal, 2014).

The culinary profession, which was first recognized as an art in England, has taken its place in the status of the most income-generating profession in the world. In the US-based Forbes Magazine, the economy publication that has millions of readers around the world, it is stated that the cookery profession is among the professions that earn the most annually. For this reason, secondary education programs providing education on the culinary profession and academic programs in this field have gained popularity (Hoşcan, Genç and Şengül, 2016). In the field of food and beverage service, it is important to train students within the scope of national occupational standards in order to ensure that the service offered to the consumer is within the standards. Because the service-oriented nature of the tourism sector necessitates specialization and division of labor. For this reason, it is necessary to provide training in the field of food and beverage services in line with certain standards. It is planned to provide qualified culinary education, in other words, to graduate students who have the qualifications stipulated by the national cookery professional standard. The national occupational standard (UMS) is defined as the minimum norm that shows what the necessary knowledge, skills, attitudes and attitudes are accepted by the Vocational Qualifications Authority for the successful performance of a profession (MYK, 2010). The national cookery professional standard is; It refers to elements such as the qualifications, working environment, tools and equipment used and the minimum level of education that must be obtained in order to perform the duties related to the cookery profession at the minimum acceptable standards in the labor market (Öztürk and Görkem, 2011).

In line with this meaning, culinary education; It consists of topics such as selecting and supplying quality materials, hygiene, stock management, production, process and human resources (Kurnaz at al., 2014). During the hygiene education, which is among the training titles given for the culinary profession, education and training are given to the students to gain theoretical and practical competencies in the use and cleaning of kitchen tools-equipment-equipment, food production and service in accordance with hygiene and sanitation rules (MEB, 2015). Occupational standard requirements for hygiene and food safety in the culinary profession by the Vocational Qualifications Authority are given in Table 1 (MYK, 2010).

Table 1. National Occupational Standard For Hygiene And Food Safety İn The Culinary Profession

Personal preparation (Level 4)	**Applies personal care and hygiene rules before entering the kitchen.**
	Complies with the company's dress code.
Preparing equipment, materials and warehouses (Level 4)	According to the prescriptions, it takes the materials suitable for the daily production amount from the intermediate warehouse or has them taken.
	Prepares or gets ready for use by checking the cleanliness of tools, equipment and equipment.
	Inspects whether the warehouses comply with food safety rules and at the required temperature to store food.
Labeling produced food (Level 4)	It determines the shelf life according to food safety rules.
	Makes date labeling on food.
Sampling food (Level 4)	It takes daily samples from the prepared dishes into the witness sample containers.
	Stores sample samples according to food safety rules.
	It sends the sample samples for analysis periodically or in adverse cases such as poisoning.
Evaluating leftover food (Level 4)	Evaluates surplus food according to food safety rules.
	It destroys food that shows signs of spoilage and that has expired in accordance with food safety rules.
Cleaning kitchen utensils (Level 4)	It ensures that the dirty cauldron, pots and pans are taken to the hand washing area in compliance with the regulations in the occupational health and safety legislation.
	It provides the deletion of stainless steel materials in the section.
	It ensures that the cleaned materials are lifted to their places.
To ensure that the areas related to the department are cleaned (Level 4)	It ensures that the rough wastes in the buffet and the workbench are taken to the garbage collection containers by the subordinates and removed from the work area.
	It ensures that its subordinates clean the buffets, counters, sinks and taps with a solution prepared with dish soap and hot water and rinse them with hot water.
	It allows them to rinse the cleaned area with hot water after applying the disinfectant product to the area to be cleaned and waiting for the time specified in the instructions for use.
	Allows drying with a paper towel.
Ensuring the storage of waste in the kitchen (Level 4)	It ensures that the mouth of the garbage bags are tightly connected.
	It ensures that garbage bags are taken to the garbage room and stored according to the regulations in the OHS legislation and environmental health rules.
Participating in studies on food safety monitoring (Level 4)	He/she applies the instructions he/she receives from his/her supervisor regarding insects and rodents.
	It prepares or has its own working areas prepared in line with the instructions received from the supervisor for the spraying works covering the entire enterprise.
	Controls the floor and shelf cleanliness of the warehouses.
	Fills and records forms related to food safety.
General area cleaning (Level 4)	It ensures that the kitchen is cleaned in accordance with the regulations in the OHS legislation.
	It ensures that tools and equipment are cleaned by using the cleaning materials and methods specified in the instructions.

The National Cookery Occupational Standard, which is a criterion in terms of evaluating students' proficiency in the field, expresses the minimum competencies that students should acquire. For this reason, the education given by Anatolian/Hotel Management and Tourism Vocational High Schools and Girls' Vocational High Schools and formal education institutions that train cooks have a great responsibility (Öztürk and Görkem, 2011). The knowledge gained within the framework of the determined standards should be reinforced by transforming them into practice. The skill acquisition of the students in the field of practice is provided by the courses given in the practice kitchen in secondary education and by internships in tourism enterprises (Pelit and Güçer, 2006). Qualified kitchen personnel, who receive theoretical knowledge in culinary education and put their theoretical knowledge into practice by applying it in the sector, can have many benefits for the employee, the institution and the sector (cost reduction, productivity increase, profit increase) (Yılmaz and Tanrıverdi, 2017).

When the scientific studies on the subject are examined; Aratoğlu (2015), in his study to determine the relationship between the knowledge and practices on food safety of the students who received culinary education at Vocational and Technical Anatolian High School and Mengen Vocational School; It has been determined that students who receive culinary education have inadequacy in their knowledge of food safety and problems in their practices. Şallı (2016), on the other hand, in the study he conducted in order to determine the knowledge and practice levels of the students who received culinary education and who did not receive culinary education in "Devrek Vocational School" and to determine the differences; It has been determined that students who have or did not receive culinary education have inadequacy in their knowledge of food safety and problems in their practices. Demir et al., (2017) in his study; They found that the knowledge and practice levels of the participants were moderate on cross-contamination, proper storage of food and beverages according to time and temperature conditions, foods that increase the risk of disease, and the groups with the highest risk of disease in the food-borne disease scale. However, they determined that the level of knowledge of the students about pathogenic microorganisms and the foods they are associated with is quite low. In this study, it has been tried to determine at what level the food safety and hygiene related outputs specified in the national cookery occupational standard are fulfilled by the students studying in the field of culinary education in the Ministry of National Education, theoretically and during practice. In addition, in line with the data obtained as a result of the research, it is aimed to offer suggestions to secondary education institutions that train staff in the food and beverage sector by providing training in this field.

Materials and Methods

In the research, quantitative research method was used to determine the food safety knowledge level and application behaviors of the students studying in the kitchen and pastry branches of the food and beverage services program in secondary education. A questionnaire form was used to collect data in the study. After the necessary permissions were obtained, the questionnaires were administered by the researchers themselves, on the basis of the volunteers of the participants, only to the students who wanted to fill in the questionnaire. Convenience sampling method was used in the research. Convenience sampling is one of the non-random sampling methods and is based on the selection of sample units by the researcher (Yükselen, 2000; Nakip, 2003). Since this method is one of the shortest ways to obtain data in a fast and economical way, both the quantitative research method and the determined sampling method were preferred within the scope of the research. In the data collection process of the research, first of all, necessary permissions were obtained for the application; Within the scope of the study, the Gazi University Senate Ethics Committee was first consulted and the study was found ethically appropriate (No: 75226). In addition, the research was carried out with the permission of the Ankara Directorate of National Education (Issue Number: 14588481-605-99).

***Universe and Sample*:** The population of the research consists of 1906 students studying in the food and beverage services program of Vocational and Technical Anatolian High Schools in Turkey/Ankara. The reason why culinary and pastry students were chosen in this study is that culinary practice courses are given only in this field and at this grade level. Yamane (2011) sampling formula was used to determine the sample size of the study, the sample size was determined as 384, and a total of 544 students were reached with the convenience sampling method. Questionnaire form was used as data collection tool.

Data Collection Tools: The questionnaire form used in the research consists of three parts.In the first part, there is information about the demographic characteristics of the students participating in the research. The second part consists of multiple-choice evaluation questions that include the knowledge of food/beverage preparation, cooking, storage and serving/presentation stages to determine the level of knowledge of students about food safety. In the third part, there are 5-point Likert-type statements (1"never", 2 "rarely", 3 "sometimes", 4 "often", 5 "always") to determine the food safety practices of the students in the kitchen. The achievement test (Bıyıklı, 2011; Çiftçi, 2014; Erdem, 2014; Aratoğlu, 2015) to determine the food safety knowledge levels including the statements/questions used in the research was prepared by taking expert opinion. A 5-point Likert-type questionnaire for practice behaviors was also prepared by (Bıyıklı, 2011; Çiftçi, 2014; Erdem, 2014; Aratoğlu, 2015) in a way that students could easily understand, in accordance with the national occupational standard.

Analysis of Data: The 25 expressions of the scale used in the research to determine the level of food safety knowledge and practice behaviors were grouped under 2 dimensions. These dimensions are divided into "food safety knowledge level" (16 statements), "food safety practices" (9 statements). In the research, the reliability and validity of the statements about food safety information and application behaviors were analyzed by using the statistical package program (SPSS). Then, descriptive statistics about food safety knowledge level and application behavior expressions were included in the research.

The validity and reliability levels of the scale, which was designed as a test format to measure the level of food safety knowledge, were analyzed using the TAP (Test Analysis Program Version 14.7.4) package program developed by Brooks and Johanson (2003). Finally, food safety knowledge level and food safety practice behavior were analyzed. The relationship between them was examined with the Pearson correlation coefficient. When the item discrimination index criteria are examined; Between 0.00 and 0.19, a very weak item, between 0.20 and 0.29, can be improved by correcting the items, between 0.30 and 0.39 it is a very good item, but it can still be considered for improvement, 0.40 and above is a very good item (Tekin, 2008). As a result of the analysis, multiple-choice questions that could not be understood by the students because the item difficulty index was below 0.20 and that were very easy and difficult for the students were removed from the test and 20 questions in the scale were reduced to 16 questions. The scoring of the questions was made as "1" for correct answers and "0" for incorrect answers, and item and test statistics were calculated. The reliability value (KR-20) calculated from the scores obtained as a result of the evaluation of 150 students with the food safety achievement test is 0.70. The reliability value (KR-20) calculated from the scores obtained as a result of the evaluation of 150 students with the food safety achievement test is 0.70. The reliability coefficient of the achievement test (KR-20) applied to 544 students was determined as 0.75. This value shows that the achievement test has a very good reliability value. It turns out that during the pilot application, the students answered at least 1 of 16 questions, at most 15 questions and an average of 8 questions correctly. When the skewness (0.241) and kurtosis (-0.648) values of the achievement test were examined; The distribution of the values between -1 and +1 means that the achievement test scores are close to the normal distribution. It shows that skewness and kurtosis coefficients between -1 and +1 are acceptable values as a measure of the assumption of normality (Morgan, Leech, Gloeckner and Barrett, 2004). The average difficulty (p) index calculated for the scores obtained from the achievement test is medium difficulty with a value of 0.50. It is seen that the average discrimination of the achievement test is 0.443, and it is an achievement test that can distinguish between students who have food safety knowledge level and those who do not. The KMO coefficient of the scale for food safety practices is 0.83. It was determined that the Bartlett test significance level value was 0.000 and the test was significant. The Cronbach's alpha coefficient of the scale was calculated as 0.76. As a result, it has been determined that the scale provides construct validity and is a usable scale.

Conclusion

In this section, some introductory information about the participants and some statistical analyzes to answer the research questions are given. 43 male and 501 female students participated in the study. The fact that female students are more interested in the kitchen and pastry fields of Vocational and Technical Anatolian High Schools has ensured that the number of female students in the research is higher than the number of male students. Considering the distribution of students according to the classes they study; It was determined that 74.6% were

11th grade students and 25.6% were 12th grade students. The fact that the 11th grade students participating in the study are more than the 12th grade students may be due to the fact that most of the 12th grade students are in the internship period. It has been determined that 72.6% of the students study area is kitchen and 27.4% is pastry. It is understood that the kitchen area is higher than the pastry area among the areas where the students study, and the kitchen area is preferred more than the pastry area in the food and beverage services program.

Table 2. Students' Information On Food Safety Education

Expressions	N	%
Food Safety Information		
Yes i know	461	84.7
No I don't know	83	15.3
Food Safety Definition		
correct answer	447	82.2
wrong answer	97	17.8
Consideration of Need for Food Safety Education		
Yes I need	332	61.0
No I don't need	212	39.0
Food Safety Information Resource		
Teacher	349	64.2
Family/reading materials	195	35.8

In the study, 84.7% of the students stated that they had knowledge about food safety, while 15.3% stated that they did not. When the students were asked about the definition of food safety in the form of multiple choice questions, it was determined that the rate of those who answered correctly was 82.2%, and the rate of those who answered incorrectly was 17.8%. It was determined that most of the students who participated in the research made the definition of food safety correctly. While 61% of the students thought that there was a need for education on food safety, 39% stated that there was no need for education. It has been revealed that the majority of the students within the scope of the research see themselves as inadequate in food safety and need education. According to another result obtained from the research, although 84.7% of the students think that their knowledge about food safety is sufficient, 61% of them need education on this subject and they want to have more information about food safety. 35.8% of the students stated that they learned information about food safety from family and reading materials, and 64.2% from their teachers. According to these data, it is seen that the majority of the students achieve their food safety gains from school. It has been revealed that students mostly acquire information about food safety through the education they receive and they do not make an individual effort to obtain information.

Table 3. Students' Achievement Test On Food Safety

Food Production Stages	True		False			
	N	%	N	%	$\bar{X}$	Σ
Preparation						
1. The healthiest way to thaw frozen meat	262	48.2	282	51.8		
2. Food with the highest risk of bacterial contamination	448	82.4	96	17.6	.64	.27
3. Color of equipment used for raw meat and poultry	339	62.3	205	37.7		
Cooking						
4. Pre-cooking method for frozen vegetables	191	35.1	353	64.9		
5. Cooling method of cooked food	207	38.1	337	61.9		
6. The minimum value for the internal temperature of the cooked food	100	18.4	444	81.6	.39	.21
7. Maximum time cooked food can stay in dangerous temperature zones	346	63.6	198	36.4		
8. Dangerous temperature range in which microorganisms can grow rapidly in cooked food	239	43.9	305	56.1		
Food Preservation					.57	.27

9. Risk when cooked and raw foods are stored together in the refrigerator	334	61.4	210	38.6		
10. The most accurate method of removing food from the warehouse	374	68.8	170	31.2		
11. Storage temperature of frozen foods	259	47.6	285	52.4		
12. The type of food that should be kept in cold storage	274	50.4	270	49.6		
Service/Presentation						
13. Preservation method of refrigerated food until service	312	57.4	232	42.6		
14. The temperature at which hot food should be served	115	21.1	429	78.9	.40	.25
15. The temperature at which cold food should be served	296	54.4	248	45.6		
16. Bacteria most abundant in nails, nose and acne	153	28.1	391	71.9		
Food Safety Achievement Test Overall Average					**.48**	**.16**

From the findings of the research;

In preparation; When the answers given by the students to the achievement test about the preparation stage of food production are examined; While 48.2% of the students knew correctly that the healthiest method of thawing frozen meat should be "in the refrigerator at $+4^0$C", it was revealed that 51.8% of them had incorrect information on this subject and gave incorrect answers.

During the cooking phase; Considering the answers given by the students to the achievement test related to the cooking stage from the food production steps; While 35.1% of the students answered correctly, the necessity of cooking frozen vegetables after thawing them in the refrigerator was answered incorrectly by 64.9%. 18.4% of the students answered correctly, while 81.6% of them incorrectly answered the requirement that the internal temperature should be at least "70^0C" in cooked food. Most of the students do not know that the internal temperature of cooked food should be at least 70^0C.

In the preservation phase; It was determined that 47.6% of the students gave the correct answer and 52.4% incorrectly answered that the storage temperature of frozen foods should be "-18^0C". It was determined that most of the students had insufficient knowledge of the storage temperature of frozen foods.

In the service/presentation phase; It was seen that 21.1% of the students gave correct answers and 78.9% gave wrong answers that hot meals should be at a temperature of "65^0C and above" during service. While 54.4% of the students knew that cold dishes should be at least "50^0C and below" during service, 45.6% gave the wrong answer (Table 3).

When the success rates of the preparation, cooking, preservation and service/presentation stages of the students in the achievement test on food safety during the food production stages are evaluated; It was determined that they were successful at the rate of 64% in the preparation phase, 57% in the preservation phase, 40% in the service/presentation phase and 39% in the cooking phase. The general success average of the students in the food safety theoretical knowledge achievement test was 48%. It has been observed that the highest level of knowledge on food safety issues is obtained during the preparation phase and the lowest level of knowledge is obtained during the cooking phase. In general, it was determined that the students' level of theoretical knowledge on food safety during the preparation, cooking, preservation and service/presentation stages of food production was at a moderate level ($\bar{x}=0.48\pm0.16$) (Table 3). However, it has been observed that the level of knowledge of the students in subjects that require technical knowledge, such as degrees, is insufficient at all stages of food production.

Table 4. Distribution Of Students' Food Safety Practice Behaviors In The Kitchen

Expressions	Never		Rarely		Occasionally		Often		Always			
	N	%	N	%	N	%	N	%	N	%	$\bar{x}$	S.D.
• I use equipment such as wooden spoons in the kitchen.	23	4.2	34	6.3	62	11.4	116	21.3	309	56.8	4.20	1.129
• I pay attention to the smell, color, appearance and taste of the food to be used.	18	3.3	23	4.2	42	7.7	76	14.0	385	70.8	4.45	1.027
• I also use the knife and chopping board I use for meat for vegetables.	326	59.9	77	14.2	66	12.1	38	7.0	37	6.8	4.13	1.264
• I wash the vegetables and fruits with cold running water before using them.	24	4.4	24	4.4	68	12.5	67	12.3	361	66.4	4.32	1.124
• I always wash poultry such as chicken before use.	30	5.5	44	8.1	57	10.5	71	13.1	342	62.8	4.20	1.232
• I freeze foods by separating them into disposable portions.	38	7.0	53	9.7	111	20.4	112	20.6	230	42.3	3.81	1.270
• I do not keep the food cooked in the kitchen at room temperature for more than 2 hours.	44	8.1	76	14.0	125	23.0	89	16.4	210	38.5	3.63	1.331
• I pay attention to the expiry date of foods.	31	5.7	29	5.3	41	7.5	74	13.6	369	67.9	4.33	1.173
• I pay attention to the storage temperature when storing food.	26	4.8	42	7.7	90	16.5	106	19.5	280	51.5	4.05	1.191
Food Safety Practices											**4.12**	**0.698**

Within the scope of the research, it was determined that 70.8% of the students always paid attention to the statement "I pay attention to the smell, color, appearance and taste of the food to be used", while 3.3% never paid attention. The general behavior average of the students was ($\bar{x}$=4.45±1.02), and this expression was determined as the practice with the most positive behavior among the food safety practices. It was determined that 59.9% of the students did not use the same equipment and 6.8% did not use the same equipment for the statement "I also use the knife and chopping board for vegetables". The general behavior mean of this negative expression is ($\bar{x}$=4.13±1.26). In general, it shows that the majority of the students are aware of the cross-contamination factor of using different chopping boards and knives for meat, chicken, fish and vegetables and they act carefully in this regard. To the statement "I do not keep cooked food in the kitchen at room temperature for more than 2 hours", 38.6% of the students stated that they always, 16.4% often, 23% occasionally, 14% rarely, 8.1% never. The expression was the least applied expression between the general behavior mean ($\bar{x}$=3.63±1.33) and positive behaviors. In general, it was determined that the general behavior average of the statements about determining the students' practices regarding food safety in the kitchen was at a good level ($\bar{x}$=4.12±0.69) (Table 4).

The results obtained within the scope of the research are similar to the results of some researches in the field. Aratoğlu (2015) found in his study that the general knowledge level of high school students who received culinary education on food safety was at a moderate level (55.47 points). He stated that the knowledge level of

the students in the cooking stage was insufficient and their knowledge level in the preparation stage was normal. In this study, it is similar to the finding that the theoretical knowledge level of the students on food safety is at a medium level (48%). At the same time, in this study, it was determined that the level of knowledge of the students at the cooking stage was similar to the finding that the level of knowledge was lower compared to the other stages. In line with the results obtained from the research, Şallı (2016) and Demir et al., (2017) determined in their studies that the knowledge and application levels of the students were moderate, and they thought that the students who received culinary education were insufficient in the level of knowledge about food safety and they experienced problems in the applications.

Results and Discussion

In this research, which aims to determine the food safety theoretical knowledge level and application behaviors of 11th and 12th grade students studying in the fields of cuisine and pastry within the scope of the food and beverage services program in secondary education; It has been determined that students are successful in food safety in the preparation and preservation stages, while they are below the medium level in the cooking and serving / presentation stages. It has been revealed that the students have insufficient knowledge on norms such as temperature degrees and time from memorization and theoretical knowledge, especially in information questions about the cooking phase. While it was determined that the majority of the students had a sufficient level of knowledge in questions about food safety during the preservation phase, it was determined that the number of wrong answers given to the questions about temperature levels decreased the average success rate. In the service/presentation stage, it was determined that the knowledge level of the students regarding food safety remained below the average. In general, it has been determined that the students' food safety theoretical knowledge levels are at a moderate level. It was observed that while the students generally fulfilled the food safety practices in the kitchen preparation stage, they showed less positive behavior towards food safety practices during the preservation and storage stages of the foods. It was determined that the general behavior average of the statements about determining the application behaviors of the students regarding food safety in the kitchen was at a good level.

Another purpose of the research is to interpret the level of fulfillment of the outputs related to food safety and hygiene specified in the national cookery occupational standard by the students studying in the field of culinary education in the Ministry of National Education. According to the results obtained, it was determined that the students remained at a moderate level in the general success average of the food safety theoretical knowledge achievement test. For this reason, studies that determine the knowledge and practice levels of food and beverage services program students should be given weight and training should be given about the points they lack in this direction. In addition, in the departments where the food and beverage services program is taught, various warning signs or posters about food safety should be kept in mind by drawing attention to the critical points such as temperature-time, which reduces the level of knowledge of the students, not by memorization, but visually.

In order for the theoretical education of the students of the kitchen field to be permanent, the application courses in which the theoretical knowledge is transferred into practice should be emphasized and the students should be taught by trying in the kitchen. Students should be directed to institutions and organizations that implement an effective food safety control system during their internship periods. As a result, it is suggested that the teachings on the preservation and storage stages in the process from the production to the service of the food should be emphasized, and the level of knowledge should be increased in the subjects related to the cooking and service-presentation stages.

In order to increase the positive behavior of students, food safety and hygiene issues should be included more in the school curriculum. During the school's internship period, students should be directed to institutions and organizations that implement the HACCP (Hazard Analysis Critical Control Point) program, which is an effective food safety control system. To ensure hygiene and sanitation, necessary tools and equipment such as caps, bonnets, gloves and masks should always be available in the practice kitchen and their use should be encouraged. It has been observed that the theoretical and practical training that students received during the

education/training period was effective in their fields of study. For this reason, the quality of the education provided should be increased by taking necessary precautions for more effective use of information regarding food safety.

Compliance with Ethical Standards

Gazi University Ethics Committee numbered E-75226, it was stated that this research did not violate any ethical element. Again, with the decision of the Directorate of National Education numbered E-10335436, it was stated that this research did not violate any ethical element.

Conflict of Interest

This study is a part of the master's thesis completed by the first author under the supervision of the second author. The second author guided the whole process of the study and the researchers contributed equally to the process of transforming the thesis into an article.

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GENİŞLETİLMİŞ ÖZET

Yiyecek içecek sektöründe güvenli gıda üretimi ve gıda kaynaklı risklerin ortaya çıkmasını önlemeye yönelik tedbirlerin alınabilmesi amacıyla alanda çalışacak olan bireylere gerekli ve yeterli eğitimin verilmesi en iyi yol olarak düşünülmektedir. Özellikle yiyecek-içecek hizmeti alanında tüketiciye sunulan hizmetin standartlar dâhilinde olabilmesi için ulusal meslek standartları kapsamında öğrenci yetiştirilmesi önemsenmektedir. Turizm sektörünün hizmet odaklı olması alanında uzmanlaştırma ve iş bölümünü gerekli kılmaktadır. Nitelikli aşçılık eğitiminin verilmesi diğer bir deyişle ulusal aşçılık meslek standardının öngördüğü yeterliğe sahip öğrenciler mezun edilmesi planlanmaktadır. Dolayısı ile yiyecek-içecek programı kapsamında geleceğin kalifiye şeflerini yetiştiren ortaöğretim kurumlarında öğrencilere gıda güvenliği ve hijyeni konusunda kazanımları sağlamanın ilerde toplum sağlığı açısından risk oluşturan tehlikeler için tedbirlerin alınmasını kolaylaştıracaktır. Bu kapsamda gıda kaynaklı olası sorunların en aza indirilebilmesi için özellikle geleceğin şef adaylarının ulusal meslek standardı kapsamında gıda güvenliği bilgi düzeyi ve uygulama davranışlarının anlaşılarak uygun çözümler üretilmesinin önemli olduğu düşünülmektedir. Araştırmada Türkiye'de ortaöğretim kurumlarında eğitim alan aşçı adaylarının gıda güvenliği bilgi düzeyleri ve edindikleri bilgileri mutfakta davranışa dönüştürme düzeylerini tespit edilmesi amaçlanmıştır. Amaç kapsamında Türkiye'de ortaöğretim kurumlarının ders müfredatları incelendiğinde; gıda güvenliği eğitimine yönelik derslerin Milli Eğitim Bakanlığı'na bağlı Meslek ve Mesleki Teknik Anadolu Liseleri'nde Temel Yiyecek Üretimi dersi (zorunlu ders) kapsamında verildiği ve uygulamaya yönelik derslere 11. ve 12. sınıflarda geçildiği gözlemlenmiştir. Bu nedenle araştırmanın evrenini Ankara ilinde Mesleki ve Teknik Anadolu Liselerinin yiyecek-içecek hizmetleri programında 11. ve 12. sınıflarında öğrenim gören 1906 öğrenci oluşturmaktadır. Araştırmada evrenin hepsine ulaşılamadığı için evreni temsil eden örneklem alma yoluna gidilmiş ve kolayda örneklem yöntemi ile toplamda 544 öğrenciye ulaşılmıştır. Araştırmada, veri toplama aracı olarak anket formu kullanılmıştır. Anket formunun birinci kısımda araştırmaya katılan öğrencilerin demografik özelliklerini içeren bilgiler yer almaktadır. İkinci kısmında öğrencilerin gıda güvenliği hakkında bilgi düzeylerini belirlemeye yönelik yiyeceklerin/içeceklerin hazırlanma, pişirme, muhafaza ve servis/sunum aşamalarındaki bilgilerinin yer aldığı çoktan seçmeli değerlendirme sorularından oluşmaktadır. Üçüncü kısımda ise öğrencilerin gıda güvenliği uygulamalarını belirlemeye yönelik 5'li likert tipi (1"hiçbir zaman", 2 "nadiren", 3 "ara sıra", 4 "sıklıkla", 5 "her zaman") ifadeler yer almaktadır. Araştırmada istatistik paket programı (SPSS) ve TAP (Test Analysis Programı Version 14.7.4) paket programı kullanılarak gıda güvenli bilgi ve uygulama davranışlarına yönelik ifadelerin güvenirlik ve geçerliliği analiz edilmiştir. Araştırmada elde edilen veriler t-testi ve homogenty testi kullanılarak analiz edilmiştir. Gıda güvenliği uygulama davranışları ve gıda güvenliği başarı testinin bağımsız değişkenlere göre farklılaşıp farklılaşmadığı t-testi ile incelenmiştir. Ardından bazı bağımsız değişkenlerin kategorileri arasında fark bulunmasından dolayı t-testinin yapılıp yapılamayacağını ölçmek amacıyla homogenty testi yapılmıştır. Elde edilen veriler istatistiki paket programına aktarılarak analize tabi tutulmuştur. Araştırma sonucunda araştırmaya katılan öğrencilerin %61.0'ı gıda güvenliği konusunda eğitime ihtiyaç olduğunu düşünürken, %39.0'ı ise eğitime ihtiyaç olmadığını belirtmiştir. Dolayısı ile öğrencilerin büyük çoğunluğunun gıda güvenliği konusunda kendilerini yetersiz gördüğü ve eğitime ihtiyacı oldukları ortaya çıkmıştır. Araştırmanın bir diğer bulgusu ise öğrencilerin %35.8'si gıda güvenliği hakkındaki bilgileri aile ve okuma materyallerinden, %64.2'sinin öğretmenlerinden öğrendikleri belirlenmiştir. Bu verilere göre; öğrencilerin büyük çoğunluğunun gıda güvenliğine yönelik kazanımlarını okuldan sağladığı görülmektedir. Öğrencilerin gıda güvenliğine ilişkin bilgileri (%64) çoğunlukla aldıkları eğitim ile edindikleri, gıda güvenliğine yönelik başka öğrenme materyallerine başvurmadıkları belirlenmiştir. Okul eğitiminin gıda güvenliği konusunda birincil rol üstlendiği gözlemlenmiştir. Gıda üretim basamaklarından hazırlık, pişirme, muhafaza ve servis/sunum aşamalarının başarı oranları değerlendirildiğinde; hazırlık aşamasında %64, muhafaza aşamasında %57, servis/sunum aşamasında %40 ve pişirme aşamasında %39 oranında başarılı oldukları tespit edilmiştir. Öğrencilerin gıda güvenliği teorik bilgi başarı testinden aldığı genel başarı ortalaması ise %48 olmuştur. Gıda güvenliği konularında hazırlık aşamasında en yüksek bilgi düzeyine, pişirme aşamasında ise en düşük bilgi düzeye sahip olunduğu görülmüştür. Genel olarak öğrencilerin gıda üretiminde hazırlık, pişirme, muhafaza ve servis/sunum aşamalarında gıda güvenliği teorik bilgi düzeyinin orta seviyede ($\bar{x}$=0.48±0.16) olduğu tespit edilmiştir. Fakat gıda üretim aşamalarının ifadelerine yönelik ortalamalarına bakıldığında öğrencilerin derece gibi teknik bilgi gerektiren konularda bilgi seviyelerinin yetersiz kalındığı gözlemlenmiştir. Öğrencilerin gıda güvenliğine ilişkin uygulama davranışlarını belirlemeye yönelik ifadelerin genel davranış ortalamasının ise iyi seviyede ($\bar{x}$=4.12±0.69) olduğu tespit

edilmiştir. Uygulama derslerine giren eğitmenlerin öğrencilerin yetersiz ve eksik olduğu noktaları ve yanlış uygulamalarını düzeltebilmeleri için uzun süreli gözleme dayalı çalışmalara ağırlık vermeleri gerekmektedir. Araştırma sonuçlarından önerilerde bulunmak gerekirse; gıdanın üretiminden servisine kadar olan süreçte servis-sunum ve pişirme aşamalarına yönelik öğretilerin üzerinde durulması gerektiği, pişirme ve servis-sunum aşamasına yönelik konularda da bilgi seviyelerinin artırılması gerektiği önerilmektedir. Özellikle gıda güvenliği ile ilgili çeşitli uyarıcı tabelalar veya afişlerle öğrencilerin bilgi düzeyini düşüren sıcaklık-süre gibi kritik noktalarla ilgili eğitimlerin ezber olarak değil görsel açıdan dikkat çekilerek akılda kalıcılığı sağlanmalıdır. Mutfak alanı öğrencilerinin aldıkları teorik eğitimin kalıcı olabilmesi için teorik bilgilerin pratiğe aktarıldığı uygulama derslerine ağırlık verilmeli ve öğrencilerin mutfakta deneyimleyerek öğrenmeleri sağlanmalıdır.