

Article

ASSESSMENT OF THE FOOD SAFETY AND HYGIENE PRACTICES OF FOOD HANDLERS IN NICOSIA, NORTH CYPRUS

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ABSTRACT

The aim of this study was to detect the most important gaps in knowledge on food safety among food handlers in Nicosia, Northern Cyprus. The survey was conducted from Marc 2022 to Mey 2022, 25 food catering businesses with 141 participants who work as kitchen employees in Nicosia North Cyprus. 56.7% (65% male, 34.2% female) of the contributors reported that they have a training regarding food and beverages. It was also revealed that male participants who reported to have the training regarding food and beverages were significantly higher compared to female participants ($p<0.05$). It was also revealed that the number of male participants who have working experience between 6 to 10 years were significantly higher compared to female participants ($p<0.05$). The rate of participants with more than 10 years of experience was 35.5% (42.2% male, 15.8% female). It has also been observed that the number of women working in this field started to decrease starting from the sixth year. The low percentage of participants' correct answers shows that employees' hygiene knowledge needs to be improved. For this purpose, courses and on-the-job training can be planned.

Keywords: Food safety, food and beverage, hygiene, food-borne diseases, catering industry, healthy food.

Introduction

There are many factors that have led to the increase in the demand for the catering business such as sociocultural developments, the rise in education and income levels, women's role in-working life, the effect of industrialisation and technological developments (Bulduk et al., 2003). An access to safe and nutritious food is a key factor for promoting health and maintaining life. Unsafe foods that contain detrimental bacteria, viruses, parasites or chemicals may cause more than 200 diseases ranging from diarrhoea to cancer. It has recently been reported that each year, 125000 children dying from foodborne diseases every year, who under 5 years of age. (WHO, 2024).

Hygiene has a vital importance in establishments in catering industry. With the cooperation of employers and employees in these businesses a hygienic environment can be arranged. Success can be achieved in this industry by presenting safe, tasty and healthy food. There are many factors that may affect this success, such as; the stages and conditions while cooking and preparing, reliability of the

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source of food as well as hygienic practices of the staff (Sökmen, 2023; Baş & Sağlam, 1997; Sargon & Çakıroğlu, 2006).

In cases where the employee does not practice hygiene, the food can be contaminated with bacteria, virus, parasites, mould and chemical substances through contact surfaces, runny nose and skin cross contamination. Food borne infections are one of the most important public health issues as it causes death or illnesses. By understanding the concept and importance of hygiene and sanitation, precautions can be made beforehand (Sökmen, 2023; Merdol et al., 2000; Fielding et al., 2001).

Hygiene, in medicine, means health knowledge. In other words, it means protect and support health. Hygiene can be also defined as basic elements to protect the health. The cleanliness of the employee can be explained as the personal hygiene of the employee. The microbiologic quality of food is closely associated with the health of the employee at work (Marriott, 1999; Kozak et al., 2008). Hygiene is a science concept that helps individuals and society to protect and develop the health of people. It also applies and combines health information and documents to sustain. In other words, hygiene in catering businesses, means fairness in working, health and cleaning rules in the work place. Another definition for sanitation, which is commonly used as a synonym for hygiene, is creating and sustaining healthy and hygienic circumstances. The sanitation term is more comprehensive. The most important issue employee faces is being the porter. These people carry the pathogenic microorganisms with their body without being affected by it and spread them via contact. As the carrier is unaware of this issue, there is a higher chance of spreading these infectious diseases in the food production (Gökdemir, 2003; Buluduk, 2003; Chigozie et al., 2014; Ersin & Beyhan, 2022).

The employee working in these catering services has a vital role. The hygiene information, attitude and practice of the employee is one of the essential aspect for customer satisfaction and businesses. The employees may cause food-borne illnesses through microbiologic transmission for several reasons such as; they might be a carrier, where they are not having their regular medical check-ups or not delinquency with the hygiene rules for hands, mouth, body and clothes.

Table 1. Some food-borne diseases over the years

Year	Hepatitis A	Typhus	Brucellosis
2011	19	3	- *
2012	6	11	1
2013	20	1	2
2014	7	2	5
2015	6	2	6
2016	7	0	0
2017	2	2	0
2018	1	10	0
2019	0	6	0
2020	0	10	0
2021	0	5	0

Notes: Differences were determined between the data of the statistical institution and the Ministry of Health. The highest figure in these differences was preferred; * Data not available.

Table 1 shows some food-borne diseases diagnosed in Northern Cyprus between the years 2011-2021. According to 2011 data, 19 individuals who live in the country was diagnosed with Hepatitis A, in 2012,

11 person diagnosed, in 2013, 20 person diagnosed with Hepatitis A, In 2018 and 2020, Typhus 10 and 10 were detected, respectively (Turkish Republic of Northern Cyprus (TRNC) Ministry of Health Nicosia-North Cyprus, 2022; TRNC Statistical Institute Nicosia, North Cyprus, 2022).

The importance of the food safety for economy as well as human health is incontrovertible. This research aims to contribute to the elimination of the deficiencies in food safety and hygiene issues of food and beverage businesses whose sensitivity has increased due to the pandemic.

Material and Method

This research has been conducted in 25 food catering businesses with 141 participants who work as kitchen employees in Northern Cyprus. This study was carried out by obtaining the ethical permission of the University of Kyrenia Ethics Commission, dated 09.03.2022 and numbered GU/2022/01-012.

It is aimed to measure how much the staff knows and applies the hygiene and sanitation rules. In order to achieve this goal, 32 (13 questions about food hygiene, 13 questions about employee hygiene, 6 questions about kitchen utensils and kitchenware hygiene) questions from the created question pool questions that would reveal the level of hygiene knowledge were selected and the answers were asked to be “I agree”, “I am undecided (neither agree nor disagree)” or “I disagree” from the answers to these questions.

The data was collected between the 2022 Marc-2022 Mey and analysed through statistical programme (SPSS 20). The demographic variables, for example, age group, gender, duty, educational level, working experience in the field, and education level about catering employees are presented with the numbers as well as percentages. One way ANOVA has been used in order to compare more than two groups. Chi-square test was used in cross-tab with multiple comparisons, such as responses to hygiene recommendations by gender. Statistical significance level was determined as $p < 0.05$ in all analyses.

Table 2 shows the hygiene recommendations included in the research. Recommendations 1, 4, 5,7,11,17, 18, 19, 22, 23, 29, 31 and 32 were about food hygiene, 2, 6, 8, 9, 10,13, 12, 20, 21, 24, 25, 27, 28 and-were about employee hygiene whereas statements 3, 14, 15, 16, 26, and 30 were about kitchen utensils and kitchenware.

Table 2. Hygiene recommendations included in the research

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1. Food hygiene means clearing the food from the pathogen factors.
 2. Each employee is bacteria carrier and have potential to spread the bacteria
 3. There is no obstacle to keep kitchen and food litters together in the kitchen.
 4. Employees, who are responsible to serve the food can touch food without any gloves.
 5. Cooked and uncooked food should be prepared in different stands.
 6. A bacterium usually spreads through air.
 7. Food poisoning can harm the image of the institution.
 8. Hands are organs that contain many microorganisms.
 9. Bacteria can spread through open wounds and trough digestive system.
 10. Employee should have health check-ups every 6 months
 11. Hot food should be held temperatures at 60 or above until served.
 12. It is inconvenient for employees to enter the kitchen with the clothes they wear outside.
 13. Employees who work in the kitchen should wear clean and ironed cap.
 14. The cold room and the fridge should be well organised and clean.
 15. There is no inconvenience for sun rays to hit in to storage and pantry
 16. Service areas as well as food preparation areas should be dry and well maintained.
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17. There is no inconvenience to store products containing milk, eggs and meat in high temperatures.
 18. The person purchasing the meat should pay attention to the label of the meat.
 19. Don't insert hand into water glasses.
 20. There should be sufficient numbers of shower and washroom for employee.
 21. Employee who has flu, cold or diarrhoea would be allowed to work in the background or should be called in sick.
 22. Water which has been tested by labs should be used in the kitchen.
 23. There is no problem to hold forks and knives from the top part
 24. Washing the hands in a hygienical way means washing with hot and soapy water until wrists and brushing the nails.
 25. Employee should be careful to hygiene when entering and leaving the working area.
 26. Food Preparation stations should be cleaned after food being prepared.
 27. There is no problem for employees to smoke in the kitchen.
 28. There is no need for clothes to be washed and dried after being used and cleaned.
 29. Hot food should be warmed or chilled in small and shallow containers.
 30. Employees should be careful with the washing, rinsing and the sterilising the plates.
 31. Garbage should be taken away from kitchen as crushed or grinded.
 32. There is no problem to keep cooked food outside for 2 hours before the serving.
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Table 3 demonstrates the general features of the participants with their genders. Total of 141 participants took place in this research, 103 (73%) of them were male and 38 (27%) were females. The age average of the participants who took part in this study was 31.58 ± 9.29 (male 31.61 ± 8.95 , female 31.50 ± 10.28) by their genders can be observed from the Table 3. Among 30.5% of the participants (30.1% male, 31.6% female) were aged between 18 and 25, whereas 39.7% (38.8% male, 42.1% female) were between age of 26 and 35. The percentage of participants aged between 26 and 45 was 20.6% (22.3% male, 15.8% female). Around 30% (35% male, 18.4% female) of the participants were secondary school graduates, whereas the percentage of those who graduated from high school or equivalent was 27.7 (30.1% male, 21.1% female). The ratio of male participant who graduated from the high school or equivalent was statistically significant compared to female participants ($p < 0.05$).

Around 25.5% of the participants were chefs (27.2% male, 21.1% female), 22.7% of them were bus boy (16.5% male, 39.5% female), whereas 16.3% (18.4 male, 10.5% female) were station chefs. The percentage of chief cook were 14.2 (17.5% male, 5.3% female), and 13.5% (15.5% male, 7.9%) of the participants were assistant head cook. Additionally, 7.8% of the participants were dish washers (4.9% male, 15.8% female). The number of the male head cook were significantly higher compared to female participants ($p < 0.05$).

With regards to working experience of the participants, around 35.5% reported to work on the field more than 10 years (42.7 male, 15.8% female). The percentage of participants who were working in this field between 6-10 years was 13.5 (16.5% male, 5.3% female). On the other hand, 29.8% (26.2% male, 39.5% female) of the participants have a working experience of between 2 to 5 years, whereas 21.3% of those have less than 2 years of working experience. Among those 14.6% was male and 39.5% female. It was also revealed that the number of male participants who have working experience between 6 to 10 years were significantly higher compared to female participants ($p < 0.05$).

Moreover, 56.7% (65% male, 34.2 female) of the contributors reported that they have a training regarding food and beverages. It was also revealed that male participants who reported to have the training regarding food and beverages were significantly higher compared to female participants ($p < 0.05$).

Table 3. General characteristics of individuals by gender

n (%)		Gender		
		Male	Female	Total
Age ($\bar{X} \pm S$)		103(73.0)	38(27.0)	141(100.0)
Age Groups:		31.61±8.95	31.50±10.28	31.58±9.29
	18-25	31(30.1)	12(31.6)	43(30.5)
	26-35	40(38.8)	16(42.1)	56(39.7)
	36-45	23(22.3)	6(15.8)	29(20.6)
	+45	9(8.7)	4(10.5)	13(9.2)
Educational Status:				
	Primary School	11(10.7)	9(23.7)	20(14.2)
	Middle School	36(35.0)	7(18.4)	43(30.5)
	High School & Equivalent School	31(30.1)*	8(21.1)	39(27.7)
	University	25(24.3)	14(36.8)	39(27.7)
Job:				
	Chef	18(17.5)**	2(5.3)	20(14.2)
	Chef Assistant	16(15.5)	3(7.9)	19(13.5)
	Section Chief	19(18.4)	4(10.5)	23(16.3)
	Cook	28(27.2)	8(21.1)	36(25.5)
	Pageboy	17(16.5)	15(39.5)	32(22.7)
	Dishwasher	5(4.9)	6(15.8)	11(7.8)
Working time in this area:				
	- 2	15(14.6)	15(39.5)	30(21.3)
	2-5	27(26.2)	15(39.5)	42(29.8)
	6-10	17(16.5)***	2(5.3)	19(13.5)
	10+	44(42.7)	6(15.8)	50(35.5)
Food and beverage training:				
	Yes	67(65.0)****	13(34.2)	80(56.7)
	No	36(35.0)	25(65.8)	61(43.3)

Notes: * p=0.011; ** p= 0.000; ***p=0.000; ****P= 0.001

Table 4 shows the responses given to the hygiene recommendations in the study by gender. Additionally, Suggestions 1; Food hygiene means clearing the food from the pathogen factors. 97,9% (98,1% male, 97,4% female) stated that they definitely agree to the fact that each. Suggestions 2; Each participant is bacteria carrier and have potential to spread the bacteria, 85,1% (86,4% male, 81,6% female) stated that they definitely agree to the fact that each. Suggestions 3; There is no obstacle to keep kitchen and food litters together in the kitchen. 97,2% (97,2% male, 100% female) stated that they disagree to the fact that. Suggestions 4; Employees, who are responsible to serve the food can touch food without any gloves. 81,6% (80,6% male, 80,2% female) stated that they disagree to the fact that. Suggestions 5; Participants, Cooked and uncooked food should be prepared in different stands. 80,1% (72,8% male, 100% female) stated that they agree to the fact that. Suggestions 6; Participants, Bacteria are usually spread through the air. 68,8% (57,3% male, 100% female) stated that they agree to the fact that. Suggestions 7; Participants, Food poisoning can harm the image of the institution. 99,3% (99,0% male, 100% female) stated that they agree to the fact that. Suggestions 8; Participants, Hands are organs that contain many microorganisms. 99,3% (99,0% male, 100% female) stated that they agree to the fact that. Suggestions 9; Participants, Hands are organs that contain many microorganisms. 92,2% (90,3% male, 97,4% female) stated that they agree to the fact that. Suggestions 10;"Employee should have health check-ups every 6 months." 92.2% of participants (91.3% male, 94.7% female) agreed with the assumption. Suggestions 11; Participants, Hot food should be held temperatures at 60 or above until

served. 77,3% (79,6% male, 71,1% female) stated that they agree to the fact that. Suggestions 12; It is inconvenient for participants to enter the kitchen with the clothes they wear outside. The participants stated that they agreed with this proposal at 92.9% (90,3% male, 10(0,0)% female). All participants; " Employees who work in the kitchen should wear clean and ironed cap." He agreed with the 13th recommendation (100.0% men, 100.0% women). Suggestions 14;" The cold room and the fridge should be well organised and clean." 88,7% of the participants (88,7% male, 100.0% female) stated that they agreed with this recommendation. Suggestions 15;" There is no inconvenience for sun rays to hit in to storage and pantry." 75,2% of the participants (66,0% male, 100.0% female) stated that they agreed with this recommendation. Suggestions 16;" Service areas as well as food preparation areas should be dry and well maintained." 99,3% of the participants (99,3% male, 100.0% female) stated that they agreed with this recommendation. Suggestions 17;" There is no inconvenience to store products containing milk, eggs and meat in high temperatures. ." 90,8% of the participants (87,4% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 18;" The person purchasing the meat should pay attention to the label of the meat." 91,5% of the participants (88,3% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 19;" Don't insert hand into water glasses." 73,8% of the participants (64,1% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 20;" There must be sufficient number of showers and toilets for the employee." 83.7% of the participants (82.5% male, 86.8% female) stated that they agreed with this recommendation. Suggestions 21;" Employee who has flu, cold or diarrhoea would be allowed to work in the background or should be called in sick." 92,9% of the participants (90,3% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 22;" Water which has been tested by labs should be used in the kitchen." 90,8% of the participants (87,4% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 23;" There is no problem to hold forks and knives from the top part." 72,3% of the participants (72,3% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 24;" Washing the hands in a hygienical way means washing with hot and soapy water until wrists and brushing the nails." 83,7% of the participants (84,5% male, 81,6% female) stated that they agreed with this recommendation. Suggestions 25;" Employee should be careful to hygiene when entering and leaving the working area." 95,0% of the participants (95,0% male, 100.0% female) stated that they agreed with this recommendation. Suggestions 26;" Food Preparation stations should be cleaned after food being prepared." 87,2% of the participants (86,4% male, 89,5% female) stated that they agreed with this recommendation. Suggestions 27;" There is no problem for employees to smoke in the kitchen." 92,9% of the participants (90,3% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 28;" There is no need for clothes to be washed and dried after being used and cleaned." 85,8% of the participants (80,6% male, 100.0% female) stated that they disagreed with this recommendation. Suggestions 29;" Hot food should be warmed or chilled in small and shallow containers." 63,1% of the participants (64,1% male, 60,5% female) stated that they agreed with this recommendation. Suggestions 30;" Employees should be careful with the washing, rinsing and the sterilising the plates." 97,9% of the participants (97,9% male, 10(0,0)% female) stated that they agreed with this recommendation. Suggestions 31;" Garbage should be taken away from kitchen as crushed or grinded" 97,9% of the participants (97,9% male, 10(0,0)% female) stated that they agreed with this recommendation. Suggestions 32;" There is no problem to keep cooked food outside for 2 hours before the serving." 90,7% of the participants (87,4% male, 10(0,0)% female) stated that they disagreed with this.

Table 4. Responses given to the hygiene recommendations in the study by gender

n (%)	Responses	Gender		
		Male	Female	Total
		103(73,0)	38(27,0)	141(100,0)
1. Food hygiene is depuration of the food from the factors that cause disease.	Agree	101(98,1)	37(97,4)	138(97,9)
	Neutral	2(2,2)	0(0,0)	2(1,4)
	Disagree	0(0,0)	1(2,6)	1(0,7)
2. Each employee is a carrier of bacterias and are capable to spread bacteria	Agree	89(86,4)	31(81,6)	120(85,1)
	Neutral	5(4,9)	1(2,6)	6(4,3)
	Disagree	9(8,7)	6(15,8)	15(10,6)
3. There is no obstacle to keep kitchen and food litters together in the kitchen.	Agree	3(2,1)	0(0,0)	3(2,1)
	Neutral	1(0,7)	0(0,0)	1(0,7)
	Disagree	99(97,2)	38(100,0)	137(97,2)
4. Employees, who are responsible to serve the food can touch food without any gloves.	Agree	17(16,5)	6(15,8)	23(16,3)
	Neutral	3(2,9)	0(0,0)	3(2,1)
	Disagree	83(80,6)	32(84,2)	115(81,6)
5. Cooked and uncooked food should be prepared in different stands.	Agree	75(72,8)	38(100,0)	113(80,1)
	Neutral	10(9,7)	0(0,0)	10(7,1)
	Disagree	18(17,5)	0(0,0)	18(12,8)
6. Bacteria are usually spread through the air.	Agree	59(57,3)	38(100,0)	97(68,8)
	Neutral	16(15,5)	0(0,0)	16(11,3)
	Disagree	28(27,2)	0(0,0)	28(19,9)
7. Food poisoning can harm the image of the institution.	Agree	102(99,0)	38(100,0)	140(99,3)
	Neutral	1(1,0)	0(0,0)	1(0,7)
	Disagree	0(0,0)	0(0,0)	0(0,0)
8. Hands are organs that contain many microorganisms.	Agree	102(99,0)	38(0,0)	140(99,3)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	1(1,0)	0(0,0)	1(0,7)
9. Bacteria can spread through open wounds and trough digestive system.	Agree	93(90,3)	37(97,4)	130(92,2)
	Neutral	8(7,8)	0(0,0)	8(5,7)
	Disagree	2(1,9)	1(2,6)	3(2,1)
10. Employee should have health check-ups every 6 months.	Agree	94(91,3)	36(94,7)	130(92,2)
	Neutral	8(7,8)	2(5,3)	10(7,1)
	Disagree	1(1,0)	0(0,0)	1(0,7)
11. Hot food should be held temperatures at 60 or above until served.	Agree	82(79,6)	27(71,1)	109(77,3)
	Neutral	16(15,5)	9(23,7)	25(17,7)
	Disagree	5(4,9)	2(5,3)	7(5,0)
12. It is inconvenient for employees to enter the kitchen with the clothes they wear outside.	Agree	93(90,3)	38(100,0)	131(92,9)
	Neutral	6(5,8)	0(0,0)	6(4,3)
	Disagree	4(3,9)	0(0,0)	4(2,8)
13. Employees who work in the kitchen should wear clean and ironed cap.	Agree	103(100,0)	38(100,0)	141(100,0)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	0(0,0)	0(0,0)	0(0,0)
14. The cold room and the fridge should be well organised and clean.	Agree	87(88,7)	38(100,0)	125(88,7)
	Neutral	3(2,1)	0(0,0)	3(2,1)
	Disagree	13(9,2)	0(0,0)	13(9,2)

15. There is no inconvenience for sun rays to hit in to storage and pantry.	Agree	17(16,5)	0(0,0)	17(12,1)
	Neutral	18(17,5)	0(0,0)	18(12,8)
	Disagree	68(66,0)	38(100,0)	106(75,2)
16. Service areas as well as food preparation areas should be dry and well maintained.	Agree	102(99,3)	38(100,0)	140(99,3)
	Neutral	1(0,7)	0(0,0)	1(0,7)
	Disagree	0(0,0)	0(0,0)	0(0,0)
17. There is no inconvenience to store products containing milk, eggs and meat in high temperatures.	Agree	9(8,7)	0(0,0)	9(6,4)
	Neutral	4(3,9)	0(0,0)	4(2,8)
	Disagree	90(87,4)	38(100,0)	128(90,8)
18. The person purchasing the meat should pay attention to the label of the meat.	Agree	91(88,3)	38(100,0)	129(91,5)
	Neutral	6(5,8)	0(0,0)	6(4,3)
	Disagree	6(5,8)	0(0,0)	6(4,3)
19. Don't insert hand into water glasses.	Agree	66(64,1)	38(100,0)	104(73,8)
	Neutral	13(12,6)	0(0,0)	13(9,2)
	Disagree	24(23,3)	0(0,0)	24(17,0)
20. There should be sufficient numbers of shower and washroom for employee.	Agree	85(82,5)	33(86,8)	118(83,7)
	Neutral	10(9,7)	4(10,5)	14(9,9)
	Disagree	8(7,8)	1(2,6)	9(6,4)
21. Employee who has flu, cold or diarrhoea would be allowed to work in the background or should be called in sick.	Agree	93(90,3)	38(100,0)	131(92,9)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	10(9,7)	0(0,0)	10(7,1)
22. Water which has been tested by labs should be used in the kitchen.	Agree	90(87,4)	38(100,0)	128(90,8)
	Neutral	11(10,7)	0(0,0)	11(7,8)
	Disagree	2(1,9)	0(0,0)	2(1,4)
23. There is no problem to hold forks and knives from the top part.	Agree	35(24,8)	0(0,0)	35(24,8)
	Neutral	4(2,8)	0(0,0)	4(2,8)
	Disagree	102(72,3)	38(100,0)	102(72,3)
24. Washing the hands in a hygienical way means washing with hot and soapy water until wrists and brushing the nails.	Agree	87(84,5)	31(81,6)	118(83,7)
	Neutral	7(6,8)	5(13,2)	12(8,5)
	Disagree	9(8,7)	2(5,3)	11(7,8)
25. Employee should be careful to hygiene when entering and leaving the working area.	Agree	134(95,0)	38(100,0)	134(95,0)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	7(5,0)	0(0,0)	7(5,0)
26. Food Preparation stations should be cleaned after food being prepared.	Agree	89(86,4)	34(89,5)	123(87,2)
	Neutral	3(2,9)	1(2,6)	4(2,8)
	Disagree	11(10,7)	3(7,9)	14(9,9)
27. There is no problem for employees to smoke in the kitchen.	Agree	10(9,7)	0(0,0)	10(7,1)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	93(90,3)	38(100,0)	131(92,9)
28. There is no need for clothes to be washed and dried after being used and cleaned.	Agree	16(15,5)	0(0,0)	16(11,3)
	Neutral	4(3,9)	0(0,0)	4(2,8)
	Disagree	83(80,6)	38(100,0)	121(85,8)
29. Hot food should be warmed or chilled in small and shallow containers.	Agree	66(64,1)	23(60,5)	89(63,1)
	Neutral	23(22,3)	10(26,3)	33(23,4)
	Disagree	14(13,6)	5(13,2)	19(13,5)
30. Employees should be careful with the washing, rinsing and the sterilising the plates.	Agree	100(97,9)	38(100,0)	138(97,9)
	Neutral	0(0,0)	0(0,0)	0(0,0)

	Disagree	3(2,1)	0(0,0)	3(2,1)
31.Garbage should be taken away from kitchen as crushed or grinded.	Agree	79(76,7)	38(100,0)	117(83,0)
	Neutral	0(0,0)	0(0,0)	0(0,0)
	Disagree	24(23,3)	0(0,0)	24(17,0)
32.There is no problem to keep cooked food outside for 2 hours before the serving.	Agree	7(6,8)	0(0,0)	7(5,0)
	Neutral	6(5,8)	0(0,0)	6(4,3)
	Disagree	90(87,4)	38(100,0)	128(90,7)

Note: $p > 0,05$

Findings

The total of 141 participants took part in this research, 103 (73%) of them was male and 38 of them were female (27%). The participants who took part in this research were from young part of the population with the average age was 31.58 ± 9.29 (31.61 ± 8.95 male, 31.50 ± 10.28 female). Among those 39.7% of them was between the age group of 26-35 (38.8% male, 42.1% female). About 30.5% (35% male, 18.4% female) were secondary school graduate.

the participants were secondary school graduates, whereas the percentage of those who graduated from high school or equivalent was 27.7 (30.1% male, 21.1% female). The ratio of male participant who graduated from the high school or equivalent was statistically significant compared to female participants ($p < 0.05$).

The percentage of chief were 14.2 (17.5% male, 5.3% female), The number of the male head cook were significantly higher compared to female participants ($p < 0.05$).

In addition to this, 25.5% (27.2% male, 21.1% female) of participants were Cook. The percentage of participants with experience of more than 10 years was 35.5% (42.2% male, 15.8% female). It has been also observed that the number of women working in this field started to decrease from the sixth year.

The percentage of participants who were working in this field between 6-10 years was 13.5 (16.5% male, 5.3% female). It was also revealed that the number of male participants who have working experience between 6 to 10 years were significantly higher compared to female participants ($p < 0.05$).

Moreover, 56.7% (65% male, 34.2% female) of the contributors reported that they have a training regarding food and beverages. It was also revealed that male participants who reported to have the training regarding food and beverages were significantly higher compared to female participants ($p < 0.05$).

The Suggestions "Food hygiene is depuration of the food from the factors that cause disease" has been answered correctly by 97,9% (98,1% male, %97,9 % female) of the participants. It was determined that the participants had sufficient knowledge about the definition of hygiene.

In addition, 85.1% of the participants (86.4% male, 81.6% female) responded correctly to the suggestion "Every employee is a carrier of bacteria and has the ability to spread bacteria." It was observed that the participants had sufficient knowledge that employees could play a role in the spread of the disease.

Additionally, as mentioned above, 81.6% of the participants (80.6% male, 84.2% female), "Employees responsible for serving the food can touch the food without gloves." He stated that his proposal was wrong. Thus, they showed that they knew the importance of gloves for hygiene.

“Cooked and uncooked foods should be prepared on different counters.” 80.1% of the participants (72.8% male, 100.0% female) answered this proposal correctly. However, it makes a difference that all female participants and 72.8% of male participants responded correctly to this suggestion.

In addition, “Bacteria is often spread through the air.” There is also a suggestion. This suggestion was answered correctly by 68.8% of the participants (57.3% male, 100.0% female). This shows the lack of knowledge that participants may play a role in spreading the disease to customers. It is particularly noteworthy that 57.3% of male participants and 100.0% of female participants answered correctly.

Additionally, “Bacteria can spread through open wounds and through digestive system.” was answered accurately by 92.2% (90.3% male, 97.4% female) of the employee. This shows that participants working in this field have sufficient knowledge about bacteria that can spread through open wounds and the digestive system.

On the other hand, “Employee should have health check-ups every 6 months” Suggestions answered correctly by 92.2% (91.3% male, 94.7% female) of the employee, which indicates the employee have knowledge of importance of 6 months health checkups and spreading disease to customers.

Moreover, responses to another Suggestions “Hot food should be held at temperatures 60 or above until served” were correct with the 77.3% (79.6% male, 71.1% female). This indicates that the employee have poor knowledge of microorganisms which can lead to mass poisoning stop growing temperatures above 60 degrees.

In addition, “There is no harm in sunlight hitting the warehouse and cellar.” This proposal was also included. 75.2% of the entrepreneurs (66.0% men, 100.0% women) answered this proposal correctly. Regarding the healthy storage of food, the 66.0% correct answer given by male participants is lower than the answer given by female participants (100.0%).

Additionally, “Don’t insert hand into water glasses.” 73.8% of the participants (64.1% male, 100.0% female) answered the question correctly. This situation was found to be important as 64.1% of the male participants and all of the female participants answered correctly about the fact that microorganisms could be spread to cleaned surfaces by the hands of the participants working in this field.

“There must be sufficient number of showers and toilets for the employee.” 83.7% of the participants (82.5% male, 86.8% female) responded correctly to the suggestions. This may indicate that the facilities are inadequate to provide sufficient numbers or toilets and showers for the employee's personal hygiene. Or participants may not know the importance of the number of showers and toilets.

On the other hand, “There is no problem in holding forks and knives from the top.” The suggestions were answered correctly at a rate of 72.3% (72.3% male, 100.0% female). To this suggestion, 72.3% of male participants and 100.0% of female participants responded correctly. male participants is lower than the answer given by female participants. It was observed that the responses of male participants to this proposal were lower than the responses of female participants.

In addition to this, 83.7% (84.5% male, 81.6% female) of the participants reported right answers to “Washing the hands in a hygienical way means washing with hot and soapy water until wrists and brushing the nails.”, which also indicates that participants have inadequate knowledge of the importance of hygienic hand wash which can lead to spreading the germs to customers as a consequence.

Additionally, in this study, 87.2% of the participants (68.4% male, 89.5% female) answered correctly to Recommendation 26: "Food preparation stations should be cleaned after food preparation." This

answer is 68.4% among male employees who participated in the research. And it is lower than female employees (89.5%).

Lastly, with regards to this Suggestions, “Hot food should be warmed or chilled in small and shallow containers” 63,1% (64,1% male, 60,5% female) of the employees who took part in this research answered correctly. This Suggestions had the lowest amount of right answer in this research which indicates that the participants who took part in this study had insufficient knowledge of the importance of cooling or heating the food quickly to stop bacterial growth in the food.

Discussion

No matter how hygienically foods are stored, prepared, cooked or preserved, a service completed with dirty tools can contaminate the food with microorganisms. Previous research has revealed that there are employees that are inattentive to their hygiene (Medeiros, et al., 2001). Those who work with foods and beverages carry a huge responsibility in terms of human health. Most of the food poisoning originate from the employee. In case where person that has or had contagious disease comes into contact with the food or beverages can cause a danger that leads to serious consequences. For this reason, employees should complete their medical checkups two times a year and should not attend to work while ill or sick (Gökdemir, 2003).

In this present research while 56.7% (65% of those male and 34.2% female) of the employees were detected to have training regarding food and beverages, in Chigozie et al.’s research this number was 32.1% (Chigozie et al., 2014). In Ünlüönen and Cömert’s study it was 97.3% (Ünlüönen & Cömert, 2013). Lee et al.’s study it was 74.6% (Lee, et al., 2017). whereas in Sharif et al.’s study it was 8.1% (Sharif et al., 2013). From the studies that have-been completed over the year, we can see that there are still employees that has no training and work in this field.

In this study 97,9% (98,1% male, %97,9 % female) of the employee’s response to “Food hygiene is depuration of the food from the factors that cause disease” Suggestions was correct. In Akabanda et al.’s study this Suggestions was answered correctly with the percentage of 86.4% (Akabanda et al., 2017).

Additionally, the Suggestions “Each employee is a carrier of bacterias and are capable to spread bacteria” was answered correctly by 85,1% (86,4 % male, 81,6% female) of the employee. In Ünlüönen and Cömert’s study, for instance, this number was 39% (Ünlüönen & Cömert, 2013), whereas in Akabanda et al.’ study this amount was 60% (Akabanda et al., 2017). Sharif et al., on the other hand revealed that 93% of the employees answered this Suggestions correctly (Sharif, et al., 2013).

In this study, 81,6% of the participants (80,6 % male, 84,2% female) answered following Suggestions correctly “Employees who are responsible to serve the food can touch food without any gloves.” This question was answered correctly by 40.8% in Cömert and Özen’s research (Cömert & Özel, 2015) 60% in Akabanda et al.’s research (Akabanda et al., 2017) and 93% in Sharif et al.’s research (Sharif et al., 2013). Also, Baş, Ersun and Kıvanç (Baş et al., 2006) revealed that one of the most important factors leading to food poisoning was the hands of the employee who were not pay attention to personal hygiene. In Şanlıer and Tunç (2008) study, for instance, it was revealed that 93.3% of kitchen employee ‘sometimes wash their hands’ before touching the food.

In this study 80,1% (72,8% male, 100,0% female) of the participants response to “Cooked and uncooked food should be prepared in different stands.” suggestions were correct. However, in another study this suggestion was answered correctly with only the percentage of 61,6% (Unal & Coskun, 2020).

Additionally, the suggestions “Bacteria are usually spread through the air.” was answered correctly by 68,8% (57,3% male, 100,0% female) of the employee. Kayalı’s study, for instance, this number was 39% (Kayalı, 2013).

On the other hand, ninth Suggestions “Bacteria can spread through open wounds and through digestive system.” was answered accurately by 92,2% (90,3 % male, 97,4 % female) of the employee. In Ünlüönen and Cömert(2013), this number was 32.6% (17), whereas in Akabanda et al., (2017) the amount was 71.5%.

Furthermore, the other suggestions “Employee should have health check-ups every 6 months”, reported rightly by 92,2% (91,3 % male, 92,2 % female) of the employee. In Ünlüönen and Cömert’s study, this number was 55.8%, whereas 35.2% in Cömert and Özel (2015), and 86% in Sharif et al.’s study (Sharif, Obaidat & Al-Dalalah, 2013). In Şanlıer and Yaman (1999), it was revealed that the 90% of the employees have their checkup once a year Thus, this number is lowe in Chigozie et al. (2014) by 71.4%. In addition, 77,3% (79,6 % male, 71,1 % female) of the participants responded suggestions 11, which was “Hot food should be held at temperatures of 60 or above until served” correctly in this research. In other studies, on the other hand, the figures were 40% (Akabanda et al., 2017). and 60% (Sharif et al., 2013).

Additionally, in this study, “There should be sufficient number of shower and washroom for employee.” suggestions answered accurately by 83,7% (82,5 % male, 86,8 % female) of the participants. In another study there was 46.5% of the employees that replied the Suggestions correctly (Ünlüönen & Cömert, 2013). Therefore, the percentage doubled either within the years or already higher in Northern Cyprus due to the regional differences.

In this study 72,3% (72,3% male, 100,0% female) of the participants response to “There is no problem to hold forks and knives from the top part.” suggestions were correct. Similarly, in the study of Unal and Coskun (2020) same suggestions was answered correctly with the percentage of 71,9 %. Thereafter, there might be no regional difference between these specific suggestions thus, further comparisons are needed.

Additionally, 83,7% (84,5 % male, 81,6 % female) of the participants reported right answers to the suggestions of “Washing the hands in a hygienical way means washing with hot and soapy water until wrists and brushing the nails.”. Similarly, in one study, 86.3% of the participants agreed to the importance of washing the hands in soapy waters (Pang et al., 2015). However, these percentages are significantly different in other studies where 58.4% (Akabanda et al., 2017), of individuals believe in the importance of hand wash with soapy waters (Pang, et al. 2015). Correspondingly, in Chigozie et al. (2014) 30.4% of the employee reported that they wash their hands.

Moreover, 87,2% (86,4% male, 89,5 % female) of the employee answered suggestions 26 which was “Food Preparation stations should be cleaned after food being prepared” right. On the other hand, “Hot food should be warmed or chilled in small and shallow containers” answered correctly by 63,1% (64,1% male, 60,5% female) by the employees who took part in this research. In other studies, conducted, it has been shown that the rate of correctness of the answers reported by the participants is not at the desired level for the Suggestions mentioned above.

Suggestions and Conclusion

The study observed that the number of women working in the kitchen started to decrease from the sixth year onwards and the number of women employees with more than ten years of experience was approximately one-third of the number of men.

“Cooked and raw foods should be prepared on separate counters.” “Bacteria usually spread through the air.” “There is no problem with sunlight reaching the storage and cellar.” “Do not put your hand in water glasses.” “There is no problem with holding forks and knives from above.” All of the female participants answered correctly.

“Hot foods should be heated or cooled in small, shallow containers.” The suggestion had the lowest number of correct answers in this study. This shows that the participants in this study did not have enough knowledge about the importance of cooling or heating food quickly.

The results of this present research revealed the importance of the service training. In addition, previous research has reported improvement in hygiene knowledge with this training (Dag & Merdol, 1999; Tayar & Kılıç, 2014).

In case of those who have contagious diseases come in contact with food and beverages will cause serious health problem in the businesses. In order to prevent this happening, the managers should take principle to keep off the employee from work while being sick. In such businesses, since human health is important, hygiene should be given enough importance. Food safety process where it starts production to consumption. In case of mistakes during the process of buying, production, service or storage can result in food poisonings. The food poisonings also lead to bad publicities in such business as well as reductions in the profits.

Businesses should establish regular cleaning schedules in order to ensure the hygiene in the kitchens. This schedule will be successful with employees taking care of their personal hygiene in the first place. This programme should aim to create awareness to employee about the importance of personal hygiene. In order to create this awareness training should be emphasised as the results revealed that the knowledge of hygiene increases with the training. This shows us that those who have less experience in this field should be given more frequent in service training whereas those who have more experience should have less frequent in service trainings. In addition to this, after this training the practices should be checked regularly and employees should be controlled periodically and show care on hygienic issues.

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