Food Safety Knowledge, Attitude, and Practice of Food Handlers in Kitchens of Foodservice Establishments in Lideta Sub-city, Addis Ababa, Ethiopia

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LIST OF ACRONYMS

AAFDA	Addis Ababa Food and Drug Authority
EFDA	Ethiopian Food and Drug Administration
EMoH	Ethiopian Ministry of Health
ESA	Ethiopian Standard Agency
FH	Food handlers', in this document context are Cooks and others who perform related activities in the kitchen
FS	Food Safety
FSE	Foodservice Establishments, in this document context is "Bar and Restaurant"
JEE	Joint External Evaluation
IHR	International Health Regulation
KAP	Knowledge, Attitude, and Practice
TRA	Theory of Reasoned Action
WHO	World Health Organization

ABSTRACT

Background: Food safety KAP of food handlers is crucial for food safety. Food safety KAP is usually associated with socio-demographic characteristics of food handlers. Food handlers' intention to change their behavior for food safety is essential for reducing food contamination and foodborne disease.

Methods: The study covered two hundred and six food handlers working in 59 "bar and restaurants." The survey was a cross-sectional study using a structured questionnaire adapted from a similar study. The population with two hundred three food handlers was analyzed. Three subjects did not agree to provide consent.

Results: Most food handlers were females (96.1%, N=195) aged 18-52 years. Most FH had attended elementary and high school. The majority of the subjects had 1-5 years of experience in the kitchen (81.3%, N=165). The majority did not participate in FS training (85.2%, N=173); the total satisfactory FS knowledge, attitude, and practice scores were 37%, 61.5%, and 33%, respectively. There was an association between knowledge, attitudes, and practice scores. The linear regression analysis showed that the knowledge score increased with their educational level, experience, training, and training sessions.

Conclusion: This study revealed that participants had insufficient food safety knowledge, attitude, and practice. Therefore, they should receive food safety training and health education.

Keywords: Food-handlers, food safety, food safety regulation, food safety KAP

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Globally the burden of foodborne disease is increasing. It is a significant public health trait (Bisht et al., 2021; Saeed, Osaili, & Taha, 2021). Having safe food is a fundamental human right (Fung, Wang, & Menon, 2018). People may become cured from eating healthy and safe foods. Human beings rely on food to sustain their life and health (Fung et al., 2018). Without food safety, many people could become ill and die. The WHO estimates that in 2010, foodborne pathogens were responsible for 600,652,361 sick cases and 418,608 deaths worldwide (Havelaar et al., 2015; WHO, 2015).

Contaminated or unsafe food brings danger to public health. Vulnerable groups like infants, young children, pregnant women, the elderly, and those with an underlying illness are particularly in danger. According to studies, 220 million children catch diarrheal diseases per year, and 96,000 children die (WHO, 2020b). Moreover, unfit foods create a vicious cycle of diarrhea and malnutrition, decreasing the nutritional status of the most vulnerable (WHO, 2020b).

According to a world bank report in 2018, the total productivity loss associated with foodborne diseases in low- and middle-income countries was estimated to cost US$ 95.2 billion per year; an estimated annual cost of treating foodborne illnesses was US$ 15 billion (WHO, 2020a).

In Africa, the burden of foodborne disease was reported high, according to the burden of foodborne illness per capita, with a median of 2455 foodborne Disability Adjusted Life Years (DALYs) per 100,000 inhabitants (Keba et al., 2020; WHO, 2015).

According to the Joint External Evaluation of IHR, Ethiopia scores two out of five on multisectoral collaboration for foodborne disease (WHO, 2016). The indicator of JEE evaluation of the International Health Regulation in 2017 shows that Ethiopia did not show considerable progress or improvement (Garfield, Bartee, & Mayigane, 2019). The NHS report indicates, about 60% of the disease burden is related to poor hygiene and sanitation. Food sources, contaminated raw food items, improper storage mechanisms, poor personal hygiene, improper food preparation, and storage temperature are the main factors for foodborne disease outbreaks (Ayana, Yohannis, & Abera, 2015).

The other problem is the limitation of the surveillance infrastructure. It is challenging to find reliable data that could provide clues for a relationship between the cause of the death and foodborne or food-related diseases. If we could find reliable data, it would be easy to convince policymakers about the public health importance of allocating funds to prevent food-related diseases (Ayalew, Birhanu, & Asrade, 2013).

The prevalence of diseases caused by contaminated food increased gradually, and it is one of the public health traits (Bisht et al., 2021; Saeed et al., 2021). Because of contamination of the food with different microorganisms every year, many people suffer and die. Most causes of infections and deaths are by pathogens like *Salmonella* sp.,

Campylobacter sp., Enterohaemorrhagic *Escherichia coli*, norovirus by eating contaminated food (Saeed et al., 2021). The other impact of food-related diseases is the economic impact. Individuals and countries' economies significantly reduced due to foodborne disease (Scharff et al., 2016). Moreover, the occurrence of food-related illnesses that have existed since a long-ago persists, and a new type of food-related disease continues to emerge (Newell et al., 2010).

The African countries are low-income countries (developing countries), and Ethiopia is one of them (Grace, 2015). The burden of food-related diseases in developing countries is high. However, food-related illness is not only a problem in developing countries. . Moreover, most food handlers in Africa are illiterates who work just by experience or have high school level certificates (Sibanyoni, Tshabalala, & Tabit, 2017).

Ethiopia has the food safety regulatory body for food service providing establishments at different levels. The Ministry of Health, Ethiopia, and the regional Food and Drug Administration are major regulatory bodies. "Bar and restaurant" are regulated by provincial EFDA health inspectors based on the Ethiopian standard and checklist. The measure includes the physical, structural requirements, environmental, hygiene, and sanitary conditions. In addition, they require a training certificate of the food handlers. Foodservice establishments started training implementation in 2021 after the ESA collaborated with the FEMoH set standards for "bar and restaurant." The follow-up for implementation is now on the verge of starting. Before this standard, there was no requirement for food handlers to be trained for deployment in foodservice establishments.

However, they must present a health certificate, confirming that they are free from infectious diseases.

To open a new food service providing facility like “bar and restaurant,” registration and health certificate are required from the health authority. Then, the owners must request health authorities for the food service establishment to be evaluated before starting service. Then, the officers will carry out a thorough health inspection on the establishment and food handlers. Finally, if it fulfills the standard set by the ESA, they will provide permission.

The standard does not require educational status for food handlers; only training of food handlers on food safety-related topics is needed. Moreover, the food handlers’ have to present a training certificate. The owners of food service providers also have the responsibility to train them before they start working.

Microorganisms can contaminate food at different stages; the primary cause of food contamination is during food processing or preparation. Therefore, controlling the “bar and restaurant” food preparation process is essential because food handlers, due to lack of knowledge of food safety, food hygiene, hygienic practice, and by infected food handlers can contaminate the food at different stages of food preparation and during serving (Chekol, Melak, Belew, & Zeleke, 2019; Gizaw, Gebrehiwot, & Teka, 2014; Mama & Alemu, 2015).

Studies find that food handlers' attitudes or behaviors towards hygienic food preparation practices play a significant role in food contamination or reducing food quality (Akabanda, Hlortsi, & Owusu-Kwarteng, 2017). Furthermore, trained food handlers and higher educational levels have better knowledge and a positive attitude towards food safety and vice versa (Angelillo, Foresta, Scozzafava, & Pavia, 2001).

The prevalence of foodborne disease is high in Ethiopia, especially bacterial foodborne diseases that can contaminate food at different levels (Belina, Hailu, Gobena, Hald, & Njage, 2021; Berhe, Bugssa, Bayisa, & Alemu, 2018). The major contributing factors to foodborne diseases are poor inspection and surveillance systems for such diseases at "bar and restaurant" (Ayalew et al., 2013), absence or poor implementation of the training requirement, low level of education, experience, installation of inadequate sanitary facilities, poor working condition, high turnover, food handlers' skill, behavior or attitude, and practice (Nyamari, 2013).

Food handlers play a significant role in improving hygiene and sanitation and increasing food safety at "bar and restaurant." Therefore, the purpose of the study was to examine the level of KAP of food handling among the kitchen staff working at "bar and restaurant" and to see the association between the differences in KAP of food handling among the kitchen staff working at "bar and restaurant." In addition, the study can help to recommend possible solutions and as a starting point for further research.

1.2 LITERATURE REVIEW

1.2.1 FOOD SAFETY-RELATED KAP AMONG FOOD HANDLERS

There were different studies on food handlers' food safety knowledge, attitude, and practice in the world., Studies regarding food safety KAP of food handlers primarily focus on developing countries (Zanin, da Cunha, de Rosso, Capriles, & Stedefeldt, 2017). Most studies showed that even if food handlers have food safety knowledge, some do not want to change it to practice because of their reluctance, behavioral issues, or attitudes towards food safety (Zanin et al., 2017).

According to a study by (Sirichokchatchawan, Taneepanichskul, & Prapasarakul, 2021), the legislation does not require food handlers' training on food safety in Bangkok and Myanmar, and most of them had primary educational levels. Another study showed that most food handlers were illiterate (Kumalo et al., 2021). Food safety knowledge and attitude positively affect food handlers' hygienic practices (Aquino, Yap, Lacap, Tuazon, & Flores, 2021). food handlers are the primary source of foodborne diseases in the food business industry. A study on the prevalence of intestinal parasites and *Salmonella typhi* among food handlers working in catering establishments at public institutions in Dawuro Zone, South-Western Ethiopia, were infected with different types of parasites or had experiences of infection with different types of parasites. *Ascaris lumbricoides* were the most prevalent parasite, followed by *E. histolytica/dispar (*Kumalo et al., 2021*)*.

Even if the food handlers know about food safety, that knowledge alone may not guarantee food safety unless they change their attitude. However, these pieces of evidence from different studies in different countries and situations supported that food handlers' KAP toward food safety is crucial for preventing and controlling foodborne diseases (Akabanda et al., 2017).

1.2.2 HEALTH BEHAVIOR CHANGE MODELS/THEORIES

1.2.2.1 Theory of reasoned action (TRA)

TRA is concerned about individual motivational factors as determinants of performing a particular behavior. This theory assumed that the best predictor of behavior is the intention, determined by attitude towards certain health behaviors (Montano & Kasprzyk, 2015). That means the primary thing is bringing the food handlers motivation to have the intention to change their attitude towards food safety.

According to this theory person's behavior is determined by an intention to implement that behavior (Silverman, Hanrahan, Huang, Rabinowitz, & Lim, 2016). Intention determines the food handlers' attitude towards food safety or other health behavior. A behavior change needs the intention to change that behavior first. To motivate and make food handlers change their attitude, we need to design our training program to change their attitude towards food safety.

Multiple interventions are required to initiate and develop an attitude or to gain behavioral change in any programs; for example, health education, pear-to-pear

discussions, individual counseling, and so on; FHs need to be engaged and have access to and participate in different training and education programs to change their attitude and develop their skills and practice. The training program should focus on changing the food handlers' attitude. Some studies show that using theory in crafting intervention is crucial and successful. Ethiopian Ministry of Health provides Health education in many different ways; in this era, thanks to technology and globalization, there are many ways to provide health education. (Glanz, Rimer, & Viswanath, 2008).

1.2.3 FOOD SAFETY REGULATIONS

There are many regulations and regulatory organizations on food safety and other infectious diseases control. One of the well-known regulations is the International Health Regulation (IHR), 2005. The primary purpose of IHR 2005 was to prevent, protect and control public health responses to the international spread of diseases and avoid international interference with international traffic and trade. One of the major components of IHR is food safety and communicable disease (PAHO/WHO, 2020). The IHR was adopted in the 58th World Health Assembly in 2005 and focused on acute events with national or international public health concerns. Ethiopia is one of the member countries of IHR.

According to the WHO state party self-assessment annual report, globally, IHR's all capacities average is 65% (WHO, 2020c). Based on the evaluation of all capacities average of the countries self-assessment report, the average global 2018-2020 food safety IHR progress was 65% (WHO, 2020c).

In Africa, the WHO state party self-assessment latest annual report of IHR showed that the average of all capacities was 49% (WHO, 2020c). The average Africa 2020 food safety IHR progress score was also 46%.

According to the self-assessment report, the average 2020 food safety IHR progress was 40% in Ethiopia, and the average of all capacities was 67% (WHO, 2020c).

There are many organizations concerned with food safety in Ethiopia. The major ones are the Ministry of Health of Ethiopia, Ethiopian Food and Drug Control Authorities, Ethiopian Ministry of Culture and Tourism, Ethiopian Ministry of Agriculture, Ethiopian Standard Agency, and Ethiopian Ministry of trade, different federal and regional governmental bodies, non-governmental organizations, and research institutes. Ethiopian Ministry of Health, EFDA, and regional health offices accordingly regulate food service providing establishments like hotels, motels, “bar and restaurant,” restaurants, catering services, and alike. Regarding “bar and restaurant,” the Ethiopian government established standards. The regulatory body regularly controls bar and restaurant kitchens, food handlers, hygiene, and sanitation infrastructure using structured checklists. The food service establishments (“bar and restaurant”) must fulfill specific hygiene and environmental health requirements and receive a certificate of health from the health authority before starting the business (ESA, 2021).

The Ministry of Health and provincial Food and Medicine Administration regulates food service providing establishments based on the standard. On the other hand, the Federal

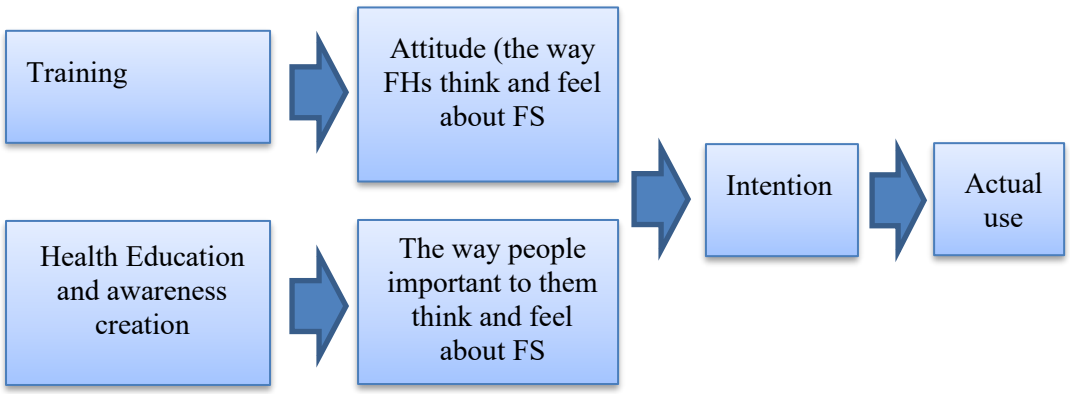
EFDA mainly focuses on those packed foods manufactured by factories and imported from other countries. Moreover, the Ministry of Culture and Tourism also has a part in regulating these institutions.

There is a shortage of data on foodborne diseases in Ethiopia. The surveillance system is weak. The policymakers need to have accurate data on foodborne diseases to make the appropriate decisions (Ayalew et al., 2013). Studies conducted in two Ethiopian cities (Dire Dawa and Arbaminch) showed that the prevalence of good food handling practices was 52.4% and 32.6%, respectively (Chekol et al., 2019; Legesse, Tilahun, Agedew, & Haftu, 2017).

1.3 THEORETICAL FRAMEWORK

The theoretical framework is designed based on the Theory of Reasoned Action (TRA). According to TRA, food safety training and health education are essential to motivate the FH to have an intention to change their attitude towards desirable food safety attitude.

Figure 1. Conceptual Framework



The above figure (Figure 1) explains two factors that affect human behavioral intentions: attitude towards behavior and subjective norms (Zolait, 2014).

1.4 STUDY QUESTIONS

What are the differences of KAP by general characteristics among food handlers?

What is the association among the food safety Knowledge, Attitude, and Practice of FHs?

1.5 OBJECTIVES

To evaluate the level of KAP among food handlers by general characteristics, to see the association between KAP among food-handlers, and to examine the current inspection and training program for food-handlers in Ethiopia.

1.6 GOAL

This study aims to improve food safety knowledge, attitude, and practice of food handlers, improve food safety in foodservice providing establishments and reduce foodborne diseases.

CHAPTER 2: METHODS

2.1 TARGET POPULATION AND SAMPLING TECHNIQUE

The target populations were food handlers (cooks and others who perform related activities found in the kitchens of 59 "bar and restaurant," Lideta Sub City, Addis Ababa, Ethiopia. There were 59 "Bar and Restaurant" in Lideta Sub City. The total number of food handlers (the population size) was 206. Only 203 food handlers participated from the 206 total population after three subjects refused to participate in this study.

2.2 STUDY DESIGN AND SAMPLE COLLECTION

A structured questionnaire and a quantitative cross-sectional survey method were used. The total number of "Bar and Restaurants" found in the Sub-city was 59. The entire 59 "bar and restaurant" were visited, and two hundred three (203) food handlers were surveyed in face-to-face interviews. Data collectors asked the questions using similar words for all FH and involving all food handlers. Moreover, data collectors have interviewed food handlers by taking a break from work 10-15 minutes. The information of this study can be used as an initiation for further research and can be generalized.

The respondents were interviewed face-to-face on a once-off basis during working hours without prior notice of the interview. Before and after the survey, respondents were explained the study, received consent, and assured the confidentiality of their status. The survey material was read and completed by an interviewer in individual interviews without adding other words to the questions clearly in the same way for all participants. Sufficient amount of time provided to participants to answer questions.

A structured questionnaire was adapted from a previously published article to meet the study's purpose (da Vitória, Oliveira, de Almeida Pereira, de Faria, & de São José, 2021). The tool has 36 questions, including ten knowledge, ten attitude, ten practice questions related to food safety, and six socio-demographic questions.

Data were tabulated in Microsoft Office Excel spreadsheets and analyzed using IBM SPSS Statistics software version 25.

2.3 MEASUREMENT

The questionnaire was adapted from a similar previous study, and I changed it to Google form; please refer to APPENDIX D (A. G. da Vitória, 2021; da Vitória et al., 2021). According to the research by (da Vitória et al., 2021), the KAP questionnaire was subjected to a reproducibility test given the limitations associated with using such instruments, such as imprecise answers and failure to understand the material. In addition, test-retest reliability was determined with 29 food handlers from one food service unit and was not part of the research sample. Furthermore, the questionnaire was administered at the participants' workplace, and the retest procedure took place 15 days after the first administration. Finally, a validity test was carried out to check the consistency of attitude questions, and Cronbach's alpha result is 0.83.

The knowledge section consists of 10 questions aimed at accessing and evaluating general knowledge of food handlers on food safety and hygiene. In the attitude section, the questionnaire used ten questions to assess attitude towards food safety practices. Finally,

the questionnaire used another ten questions in the practice section to assess and evaluate actual agreement and uptake of various food safety measures.

To calculate the total food handlers' food safety KAP score, in the knowledge questions, Answers determined the score by providing 1 point for each correct answer and zero (0) for incorrect answers, and I do not know answers. The expected knowledge score was ten. For the attitude questions, participants were asked to select their response from a Likert scale of 1 to 5, where 1=’Strongly disagree’, 2=’Disagree’, 3=’Neutral, 4=’Agree’, and 5=’Strongly agree’. The acceptable attitude answers provided 1 point (agree or strongly agree) and zero (0) for unacceptable attitude (neutral, disagree, and strongly disagree). Practice-related questions were also answered in the 5 points Likert scale like the attitude questions; 1 point meant good practice answers (never or always) in the practice questions section. I used codex Alimentarius food safety standards, Ethiopian food safety standards and. HACCP principles to determine correct answers.

2.4 ANALYSIS OF DATA COLLECTED FROM THE SURVEY

First, the Kolmogorov-Smirnov test performed, Q-Q plot checked for linearity to check the normality of data using SPSS. When the data shows the non-normal distribution, it was log normalized before any arithmetic test. Then, using descriptive statistics percent and Frequency of sociodemographic characteristics was calculated. To evaluate the total knowledge, attitude and practice scores of food handlers, correct knowledge answers added to knowledge score, attitude answers added to attitude score, and practice answers added to practice score. Then, to evaluate the association among total KAP scores, the

Pearson correlation (r) test was carried out respecting the probability of error ($p<0.05$). To evaluate the strength of the correlations of sociodemographic variables with total KAP scores linear multiple regression was carried out. The strength of the correlations was categorized as by rule of thumb, negligible, 0.01 to 0.09, very low (0.10 to 0.29), moderate 0.30 to 0.49, high 0.5 to 0.69, and very high 0.70, as suggested by (Davis & Burglin, 1976; Evans, 1996).

Independent T-test and analysis of variance (ANOVA) were used to compare the difference in the mean KAP score while considering education, training, training session, or general socio-demographic situations. Then, multiple linear regression was carried out to look at the variable, which affected the total mean KAP score. Finally, the multiple linear regression analysis models were established to identify the impact of the independent variables (Education, experience, previous participation in training, time since the last training, knowledge, and attitudes) on mean KAP scores. All analyses result assumed a significance level of 5%. Adopted, Correlation

2.5 ETHICAL CONSIDERATIONS

First, Yonsei University, Severance Hospital Ethical Clearance Committee evaluated the study. Then, the Ministry of Health, Ethiopia, and Addis Ababa food and Drug Administration considered and provided permission letters to carry out the study. Finally, the participants were required to give consent before the interview.

CHAPTER 3: RESULTS

3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

The total number of respondents was 206; out of these respondents, 203 respondents gave consent and participated in this study. The detailed survey result of socio-demographic characteristics was as follows:

Table 1. The results obtained from the survey about socio-demographic characteristics

Gender	Gender Ratio	Frequency	Percent (%)
	Male	8	3.9
	Female	195	96.1
	Total	203	100
Age	Age group	Frequency	Percent (%)
	18-19	22	10.8
	20-24	54	26.6
	25-29	52	25.6
	30-34	35	17.2
	35-39	19	9.4
	40-44	12	5.9
	45-49	7	3.4
	50-54	2	1.0
	Total	22	10.8
Education	Educational status	Frequency	Percent (%)
	Elementary School	114	56.2
	High School	72	35.5
	College Certificate	8	3.9
	College Diploma	6	3.0

	University Degree	3	1.5
	Total	203	100.0
	Total	203	100
Previous training related to food safety	Period	Frequency	Percent (%)
	None	173	85.2
	One year or more	25	12.3
	In the last six months	3	1.5
	In the last three months	2	1.0
	Total	203	100.0
Number of participation sessions in food safety training	Sessions	Frequency	Percent (%)
	None	175	86.2
	Once	20	9.9
	Two times	4	2.0
	Three times	2	1.0
	Four times and above	2	1.0
	Total	203	100.0
Experience	Work experience	Frequency	Percent (%)
	Less than or equal to 1 Year	50	24.6
	2-5 Years	115	56.7
	6-10 Years	30	14.8
	11-15 Years	6	3.0
	>15 Years	2	1.0
	Total	203	100.0

Out of the total food handlers who served as cooks and engaged in related activities in the kitchen of 206 "bar and restaurant," most were females (96.1%) (Table **1**). The survey

results of socio-demographic variables showed that most food handlers were females because most people in our society designated food preparation as a women's job. Regarding educational status, most of them were elementary school and high school graduates, summation of their percentage both academic levels account for about 91.7%. That means most of them had low educational levels. The vast majority were young (18-29, 62.5%) with a low experience level, 80.8%, and 1-5 years of experience.

Most of the food handlers have not participated in training (85.2%). Those food handlers who were experienced in one year and above were 13.2% (Table 1). A few respondents participated in training in the last three and six months. Out of those respondents who participated in the training, most of them participated in one training session.

3.2 TOTAL KAP SCORE OF FOOD HANDLERS

Table 2. The score obtained in an evaluation of the total KAP of food handlers

Variables	Respondents Met 70% and above score	Mean ± S. D	Range Minimum and Maximum
Knowledge	37	4.30 ± 1.58	0 – 8
Attitude	61.5	7.37 ± 1.55	1 - 9
Practice	33	6.13 ± 2.99	1 - 10

An evaluation of the result obtained from this study shows that the total knowledge score of participants who reached 70% and above achievement was 37%. In other words, 63 percent of participants failed under the total low score of knowledge (Table 2). On the other hand, the total score of those who achieved 70% and above (Satisfactory result) of

attitude and practice results were 61.5% and 33%, respectively (Table 2). The classification of the score was based on a 70% correct response rate; those participants who reached 70% and above correct answers were considered satisfactory according to the study by (Soares, Almeida, Cerqueira, Carvalho, & Nunes, 2012).

3.3 KNOWLEDGE

Most of the participants have a low total knowledge score (63%). The mean total knowledge score was 4.3, and the minimum and maximum scores were 0 and 8, respectively (Table 2).

The first and most unanswered knowledge question was whether washing vegetables with running water and soaking them in water with vinegar is sufficient for making food safe 94.1% said yes. However, institutions are required to use standard cleaning chemicals for washing vegetables and fruits.

A significant number of food handlers replied that handwashing with soap and water and drying with tissue paper is enough to protect the food from contamination, which is wrong. Handwashing with water and soap was not enough to prevent the food from contamination; they must sanitize their hands.

The second question with many wrong answers was the contact between raw and cooked foods, such as lettuce, used in fried/cooked food production. Although in the presentation of fried/cooked food, lettuce couldn’t contaminate the food, other foods like raw meat,

poultry, and seafood when coming in contact with cooked meat or stored together with any ready-to-eat foods can cause cross-contamination.

The other knowledge question with the high wrong answer was foods that do not consumable always have a foul smell and taste spoiled, and most participants replied yes. Unfit for consumption foods may or may not have a bad smell and taste.

Regarding whether defrosting could be performed in a basin at room temperature, 68% of participants said yes, this was wrong. Defrosting can be done in a refrigerator to make the food safe.

A significant number of participants with a correct answer observed that consumption of undercooked food could lead to disease (90.1%). Furthermore, using foods after the expiration date can cause disease likewise (90.1%) correct answers. Finally, the use of adornments could contaminate the food 73.9% correct answer. Thus, respondents had better knowledge in the above three question areas.

3.4 ATTITUDE

The mean total attitude score was 7.37, and the minimum and maximum were 1 and 9, respectively. Therefore, when we compare participants who reached 70% correct answers with a total attitude score (61.5%) with a total knowledge score (37%), the total attitude score was higher than that of knowledge score.

Regarding attitude questions, the lowest score was obtained from the question the best way to defrost meat is in a bowl with water (5%) of the respondents have disagreed. On the other hand, the highest attitude score was essential to learn about safe food handling to prevent food contamination (86.7%). In general, most respondents' attitude score of food safety was inadequate (Table 2).

Table 3 Arithmetic Mean attitude on food safety of food handlers

Statement	Mean	Sd. Deviation
Raw foods should be stored separately from cooked foods.	4.59	.806
Wearing necklaces, earrings make food contamination possible.	4.09	1.070
Foods with past expiration dates should not be consumed even where there are no changes in their smell and taste.	4.58	.825
Food handlers with injuries, bruises, or hand injuries should not touch or handle food.	4.57	.895
It is important to learn about the safe handling of food to avoid contamination and disease a part of my professional responsibilities	4.79	.637
Always wash hands thoroughly before handling food.	4.77	.612
Checking the expiration dates of the products and checking that the packaging is in good condition is necessary.	4.69	.695
Proper hygiene of utensils and equipment that comes into contact with food is necessary to reduce the risk of contamination.	4.72	.670
Thawed foods can be refrozen.	2.49	1.440
The best way to defrost meat is in a bowl with water.	1.78	.952

Participants were asked to select their response from a Likert scale of 1 to 5, where 1='Strongly disagree', 2='Disagree', 3='Neutral, 4='Agree', and 5='Strongly agree'. Referring to (Table 3), most food handlers agree that it's essential to learn about safe food handling to avoid contamination, washing hands before handling food, proper hygiene of

utensils, checking expiration dates, and storing raw and cooked food separately. On the other hand, few food handlers disagree that thawed foods can be refrozen, and the best way to defrost meat is in a bowl with water. Thawed foods should not be refrozen and the best way to defrost meat is in refrigerator.

3.5 PRACTICE

The lowest score from the total KAP score reached 70% was the total practice score (33%). Most of the answers obtained from respondents were not safe food safety practices (67%) (Table 2).

Table 4. Food handlers food Safety KAP score relationship with socio-demographic variables

		Knowledge		Attitude		Practice	
Characteristics (N=203)	N	Mean ± Sd.	P-value	Mean ± Sd.	P-value	Mean ± Sd.	P-value
Gender			0.222		0.016		0.090
Male	8	3.63 ± 1.30		4.25 ± 2.91		4.37 ± 3.02	
Female	195	4.32 ± 1.59		6.32 ± 2.34		6.20 ± 2.97	
Age			0.013		0.002		0.005
18-19 years	22	3.18 ± 1.89		4.50 ± 2.96		4.36 ± 2.52	
20-24 years	54	4.35 ± 1.53		5.85 ± 2.48		6.07 ± 2.61	
25-29 years	52	4.14 ± 1.56		6.19 ± 2.29		5.52 ± 3.31	
30-34 years	35	4.60 ± 1.59		7.06 ± 1.81		7.20 ± 2.56	
35-39 years	19	4.68 ± 1.11		6.95 ± 2.04		7.21 ± 3.15	
40-44 years	12	4.92 ± 1.31		7.42 ± 1.98		7.00 ± 3.05	
45-49 years	7	5.00 ± 1.29		6.86 ± 1.86		6.00 ± 3.42	
50-54 years	2	4.00 ± 0.00		6.50 ± 0.71		9.00 ± 0.00	
Education level			0.001		0.002		0.003
Elementary School	114	4.04 ± 1.67		6.07 ± 2.36		6.04 ± 3.12	
High School	72	4.29 ± 1.22		5.99 ± 2.42		5.67 ± 2.73	
College Certificate	8	5.25 ± 1.16		7.88 ± 1.36		8.00 ± 1.85	
College Diploma	6	6.67 ± 1.21		9.00 ± 0.63		9.17 ± 1.60	
University Degree	3	6.67 ± 0.58		8.67 ± 0.58		9.67 ± 0.58	
Experience			0.496		0.061		0.079
<=1	50	3.98 ± 1.73		5.40 ± 2.77		5.92 ± 2.90	
2-5 years	115	4.35 ± 1.56		6.47 ± 2.23		6.23 ± 3.00	

6-10 years	30	4.57 ± 1.52		6.47 ± 2.32		5.40 ± 3.12	
11-15 years	6	4.67 ± 1.03		7.33 ± 1.21		8.67 ± 1.37	
>15 years	2	4.00 ± 0.00		7.00 ± 1.41		9.00 ± 0.00	
Time until last training			0.109		0.195		0.067
None	175	4.21 ± 1.59		6.26 ± 2.39		6.26 ± 2.95	
In the last three month	23	5.00 ± 1.50		6.36 ± 2.32		5.36 ± 3.13	
In the last six month	3	3.67 ± 0.58		3.33 ± 3.06		3.00 ± 1.73	
One year or more	2	4.00 ± 0.00		7.00 ± 1.41		9.00 ± 0.00	
Times of Training			0.124		0.470		0.623
None	175	4.19 ± 1.58		6.21 ± 2.42		6.23 ± 2.97	
Once	20	5.00 ± 1.45		6.25 ± 2.38		5.80 ± 3.21	
Two times	4	5.50 ± 1.29		8.25 ± 096		4.50 ± 3.87	
three times	2	4.50 ± 0.71		5.00 ± 1.41		4.00 ± 0.00	
Four times or more	2	4.00 ± 2.83		5.50 ± 0.71		6.00 ± 1.41	

The above table (Table 4) shows that participants' food safety mean KAP score significantly differs based on their socio-demographic variables. The mean attitude score for males and females and the mean KAP score based on their age and educational status differed significantly ($p<0.05$). Female participants have higher attitude mean scores than males. In addition, the older their age, the higher the mean KAP score, and the higher their educational level, the higher the mean KAP score observed.

Table 5. The total food safety KAP scores Pearson's correlation; the survey results from the study on food handlers in the kitchens of "bar and restaurant."

	Knowledge	Attitude	Practice	P-value
Knowledge	-	0.431	0.525	0.001
Attitude	-	-	0.609	0.001
Practice	-	-	-	-

The correlation is significant at the 0.01 level (two-tailed)

The above table (Table 5) shows analysis of the survey result has a significant association among participants' food safety total knowledge, attitude, and practice scores. In other words, the correlation obtained from the score results shows a medium positive association among knowledge to attitude, knowledge to practice, and attitude to practice total scores. In other words, as participants' knowledge scores increased, their attitude and practice scores increased—furthermore, when participants' attitude scores increased, the practice scores also increased.

Table 6. Total KAP scores and socio-demographic variables result from multiple linear regression analyses

	Knowledge				Attitude				Practice			
	Beta	P	CI 95%	Beta Std.	Beta	P	CI 95%	Beta St.	Beta	P	CI 95%	Beta Std.
Education	2.25	0.001	0.85,4.92	.268	2.08	.018	.36,3.81	.164	2.276	.042	.08,4.47	.144
Experience	0.77	0.240	-0.516,2.05	.084	2.97	.003	.99,4.94	.215	1.386	.277	-1.12,3.90	.080
Previous Training	1.36	0.410	-1.89,4.62	.068	3.69	.148	-1.31,8.69	.121	.119	.971	-6.25,6.49	.003
Training Sessions	1.49	0.109	-0.34,3.32	.131	0.250	.861	-2.56,3.06	.014	-2.76	.129	-6.33,.82	-.128

Table 6 shows the strength of association of sociodemographic variables with total knowledge, attitude, and practice scores. The result revealed that all of the sociodemographic variables were significantly associated with the total KAP score. Especially educational level was strongly correlated with all total KAP scores. The number of training sessions attended by food handlers and the number of times the food handlers previously trained on food safety was strongly associated total attitude and practice scores, respectively.

CHAPTER 4: DISCUSSION

Most of the food handlers in the “bar and restaurant” kitchens in Lideta Sub City, Addis Ababa, Ethiopia, were females aged 18 and 52 years (96.1%) in this study. According to other studies, the majority of the food handlers were females, similar to this study (Alemayehu, Aderaw, Giza, & Diress, 2021; Azanaw, Dagne, Andualem, & Adane, 2021; Gizaw et al., 2014). Traditionally, food, handling, and preparation were considered their job in every household in Ethiopia. Even if there are currently some signs of progress, it is still a persistent designation in the community. Most of the participants attended elementary school 56.2% and high school (35.5%); this educational status is characteristic of the profile of food handlers in our country, according to previous studies (Alemayehu et al., 2021; Mekonnen, Solomon, & Yosef, 2021). Ethiopian legislation does not require a specific educational level. However, the Ethiopian bar and restaurant standard require food handlers training (ESA, 2021) for these professionals, but the implementation needs more effort. Because the field does not require a higher educational level, the payment is inadequate. Food safety and food safety training can be affected by this negatively. Because of their level of academic status, the capacity of food handlers to receive the knowledge from the training and change their understanding to attitude and practice is challenging (Pérez-Gregorio, González-Barreiro, Rial-Otero, & Simal-Gándara, 2011; Seaman & Eves, 2006).

There is a strong association between food handlers’ educational level and good food hygiene practices. Therefore, when planning training for food handlers’, access to

academic levels is critical. According to a study by (Alipio, 2020), food safety pieces of training impact the implementation of good food safety practices, and it doesn't mean that it will change their behaviors.

Most of the participants in this study had 1-5 years of experience and did not participate in training; other similar studies in different parts of the country show the same result indicating that the legislation did not require training in the past (Azanaw et al., 2021). Healthcare providers should provide training to food handlers at least twice a year. Training providers must plan the project to change the behaviors of food handlers, and the regulatory body should evaluate its efficacy and methodology (da Cunha, de Rosso, Pereira, & Stedefeldt, 2019).

Grades acquired from the KAP questionnaire show that total practice response found the lowest score, compared to total attitude and knowledge score. Also, total knowledge and attitude responses found inadequate scores. In general, the total KAP scores of food handlers were very low. A study by (Gizaw et al., 2014) in the other areas of the country revealed that the food handlers have insufficient knowledge, attitude, and practice. This research identified the need for improvement of food handlers' knowledge, attitude, and practice. Six knowledge questions presented a high percentage of incorrect answers. For example, questions about hand hygiene-related have high wrong answers. The majority of the food handlers said that washing hands with soap and water is sufficient to maintain food safety. According to Hazard Analysis Critical Control Point (HACCP) principles, food handlers should do hand hygiene with odorless soap and antiseptics. Also, the

Ethiopian "bar and restaurant" standard requires to fulfill HACCP (ESA, 2021). The low level of knowledge leads to the improper procedure of food hygiene practice. Hand hygiene is a major part of food safety. Failing to know and practice proper hand hygiene practices leads to contamination of the food. The Food handlers may be misunderstood the question that handwashing with soap is sufficient, which is wrong.

Maintaining hand hygiene is crucial because failure to maintain hand hygiene may become the source of microorganisms and cross-contamination (Baş, Ersun, & Kıvanç, 2006). In addition, Proper hand hygiene practices can significantly lower the risk of food contamination and foodborne disease (Akabanda et al., 2017).

Responses regarding washing vegetables without using appropriate chemicals showed a high percentage of incorrect answers. According to Ethiopian “bar and restaurant,” food handlers shall wash vegetables using appropriate chemicals (ESA, 2021).

The respondents reported that foods unfit for consumption always have a bad smell and sour taste. However, foods unfit for consumption may or may not have a foul smell and bad taste. Their response shows that the food handlers' knowledge of unfit foods was meager, considerably affecting food safety. This study’s result was similar to a study by (Soares et al., 2012) conducted on food handlers; the study result indicates 16.3% of participants did not know that expired food may not show a foul smell and sour taste.

The total attitude score of food handlers was lower than the result of the knowledge score. According to research by (Akabanda et al., 2017), the attitude of food Handlers has a

significant impact on the prevention of food contamination and contagious disease. They need to consider food hygiene and safety strategies and measures. The attitudes of food handlers are necessary to implement their knowledge to practice (Lee, Abdul Halim, Thong, & Chai, 2017).

In this study, knowledge scores directly correlated with practice scores and attitude scores. The result is the same with a study in Jima Town which identified low knowledge scores associated with inappropriate food safety practices (Mekasha, Neela, & Kumela, 2016). However, in contrast, this result is different from other studies that found out that there is no association between knowledge score and practices in Ethiopia (Tegegne & Phyo, 2017). There was an association between attitude scores and practice scores as well. It means that a low level of knowledge leads to inappropriate food safety practices and attitudes. A Low level of attitude also leads to improper food safety practices.

There was a considerable difference in knowledge score by age and level of education. A notable difference in attitude has been observed based on educational status and age. There was also a significant difference in practice scores with age and level of education. There was no significant difference in scores obtained from training and experience (Table 4).

The result analysis also shows that an increase in educational status has a positive relationship with food safety attitude, and training and training sessions should be supported and controlled. This result indicates that the government needs to set

requirements in the level of education for food handlers. Ethiopian bar and restaurant standards did not consider academic status (ESA, 2021). Therefore, the government should consider the academic situation, enhance and support the implementation of the standard and regulatory body. On the other hand, even if knowledge scores statistically were not strongly associated with training and training sessions, the low level of the total knowledge score of food handlers' indicates that the they need to have consecutive training (Table 4).

This research presented the results obtained from the survey questions, and the responsible body must put necessary solutions in place as soon as possible. The findings from this research may also help for further future studies. Food handlers must receive the required knowledge and convert it to appropriate attitudes and practices.

Limitations subjected to the present study: to know more about the food handlers' knowledge, attitude, and practice, the food handlers should be observed their daily activities for a certain period or certain days during food preparation to get a closer result to the reality; because cross-sectional study methods are a snapshot at one point at a time. In addition, bias because of the unrealistic responses of the cooks (the survey was self-reported).

CHAPTER 5: CONCLUSION

The results obtained by this research indicated that food handlers who work in the "bar and restaurant" of Lideta Sub City, Addis Ababa, Ethiopia have insufficient food safety knowledge, attitude, and practice. In addition, there was a significant association between total knowledge score, total attitude score, and total practice score. In addition, there was an association between socio-demographic variables and total food safety KAP scores.

Good food safety practices will be achieved if the food handlers are trained and educated about food safety, improving their knowledge, and changing their attitudes. The training and health education should be provided at least twice a year with the appropriate methodology. In addition, the training should contain a method that can bring the food handlers to change their attitude towards food safety.

The association of total food safety KAP score with socio-demographic variables shows a significant association between educational level and total KAP score. Therefore, the food handlers should be motivated to upgrade their academic status, and the responsible body should provide continuous and effective health education. Health education should be behavioral change communication. In addition, the training, number of training sessions, and experiences were correlated with total KAP scores. Therefore, the responsible body should focus on training food handlers and an adequate awareness creation program and health education for people important to food handlers.

The evaluation of KAP is the initial step in understanding the food handler's point of view. After this evaluation, other strategies become essential to enhance this knowledge. Multisectoral cooperation with governmental and non-governmental organizations and other stakeholders working on food safety and SDG are necessary. In addition, the responsible body should prepare detailed legal or policy documents (guidelines) that support the training program of food handlers, training centers, certification of food handlers, etc. I suggest nearby health facilities to the foodservice providing establishments should offer the training to the food handlers and provide certifications, in the district in the country. Non-governmental organizations might support the training program technically and financially.

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APPENDIX

Appendix A. Participants total knowledge response

No.	Knowledge questions	Total N (%) Response			
		Yes	No	I don't know	Total
1	Hand hygiene, which consists of washing hands gently with neutral detergent under running water and drying with a paper towel, can prevent food contamination	199 (98)	-	4 (2)	203 (100)
2	A food handler with a disease, such as diarrhea, influenza, and sore throat, poses a risk of food contamination	187 (92.1)	2 (1)	14 (6.9)	203 (100)
3	The use of adornments, such as earrings, rings, and watches, can cause food contamination	150 (73.9)	11 (5.4)	42 (20.7)	203 (100)
4	Water can be a vehicle for disease transmission, but once it becomes ice, the risk of disease transmission is reduced	111 (54.7)	30 (14.8)	62 (30.5)	203 (100)
5	Contact between raw and cooked foods, such as lettuce, which is used in the presentation of fried/cooked food, can contaminate the cooked food	167 (82.3)	17 (8.4)	19 (9.4)	203 (100)
6	Foods unfit for consumption always have a bad smell and taste spoiled	127 (62.6)	68 (33.5)	8 (3.9)	203 (100)
7	Using food one day after the expiration date, even when there is no change in smell and flavor, is a health risk	183 (90.1)	6 (3)	14 (6.9)	203 (100)
8	Washing vegetables in running water and soaking them in water with vinegar is sufficient for making this food safe for consumption	191 (94.1)	6 (3)	6 (3)	203 (100)
9	Defrosting can be performed in a basin with or without water in the sink or on a table or countertop that is not refrigerated (room temperature)	138 (68)	48 (23.6)	17 (8.4)	203 (100)
10	Consumption of undercooked food can lead to diseases that cause vomiting and diarrhea	183 (90.1)	4 (2)	16 (7.9)	203 (100)

Appendix B. Participants total attitude response

No.	Attitude Questions	Response in N (%)				
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	Raw foods should be stored separately from cooked foods	4(2)	2 (1)	11 (5.4)	39 (19.2)	147 (72.4)
2	Thawed foods can be refrozen	37 (18.2)	11 (5.4)	28 (13.8)	65 (32)	62 (30.5)
3	Wearing necklaces, earrings make food contamination possible	5 (2.5)	8 (3.9)	53 (26.1)	34 (16.7)	103 (50.7)
4	Foods with a past e should not be consumed even where there are no changes in their smell and taste	3 (1.5)	4 (2)	14 (6.9)	34 (16.7)	148 (72.9)
5	Food handlers with injuries, bruises, or hand injuries should not touch or handle food	3 (1.5)	7 (3.4)	17 (8.4)	21 (10.3)	155 (76.4)
6	The best way to defrost meat is in a bowl with water	5 (2.5)	5 (2.5)	29 (14.3)	65 (32)	99 (48.8)
		Not at all important	Low importance	Not sure	Important	Very important
7	It is important expiration date that to learn about the safe handling of food to avoid contamination and disease is a part of my professional responsibilities	2 (1)	2 (1)	6 (3)	17 (8.4)	176 (86.7)
8	Always wash hands thoroughly before handling food	-	5 (2.5)	5 (2.5)	21 (10.3)	172 (84.7)
9	Checking the expiration dates of the products and checking that the packaging is in good condition is necessary	2 (1)	2 (1)	9 (4.4)	31 (15.3)	159 (78.3)
10	Proper hygiene of utensils and equipment that comes into contact with food is necessary to reduce the risk of contamination	2(1)	2 (1)	7 (3.4)	28 (13.8)	164 (80.8)

Appendix C. Participants total practice score

No.	Practice Questions	Response in N (%)				
		Never	Rarely	Sometimes	Often	Always
1	Do you clean your hands properly before handling food	-	2(1)	1 (0.5)	45 (22.2)	155 (76.4)
2	Do you keep your nails short, unpolished and remove all adornments	3 (1.5)	15 (7.4)	60 (29.6)	47 (23.2)	78 (38.4)
3	Do you handle food when you have diarrhea or another illness or unprotected hands	184 (90.6)	14 (6.9)	3 (1.5)	1 (0.5)	1 (0.5)
4	Do you thaw foods outside of refrigerated areas (room temperature)	98 (48.3)	11 (5.4)	23 (11.3)	64 (31.5)	7 (3.4)
5	Do you check the shelf life of the food at the time of receipt	3 (1.5)	17 (8.4)	35 (17.2)	38 (18.7)	110 (54.2)
6	Do you use cleansing products when washing vegetables and fruits	25 (12.3)	10 (4.9)	24 (11.8)	50 (24.6)	94 (46.3)
7	Do you use foods with past expiration dates when the food is unaltered in its smell and taste	191 (94.1)	4 (2)	1 (0.5)	-	7 (3.4)
8	Do you use the same cutting board and knife to prepare raw foods and cooked foods	93 (45.8)	26 (12.8)	39 (19.2)	31 (15.3)	14 (6.9)
9	Do you check if the food is well cooked before it is served	-	-	5 (2.5)	53 (26.1)	145 (71.4)
10	When you store food in the refrigerator, do you put it in the refrigerators covered or in covered containers	-	10 (4.9)	36 (17.7)	61 (30)	96 (47.3)

Appendix D. Questionnaire link

YONSEI UNIVERSITY, GRADUATE SCHOOL OF PUBLIC HEALTH (GSPH), SEOUL, SOUTH KOREA

Questionnaire for Evaluation of Food Safety Knowledge, Attitude and Practice of Food Handlers.

By: Bushu, Elias Girma

*Required

Consent

This voluntary survey is for Mr. Elias Girma Bushu partial fulfillment of Masters of Global Health Policy and Financing in Yonsei University, Graduate school of public health, Seoul, South Korea.

The purpose of this research is to evaluate food safety knowledge, attitude and practice of food handlers, the to look at relationship between the three variables and according to the gap to plan for capacity building training. Your personal data shall be processed for this research only.

In order to ensure that we cannot identify you and to keep your responses confidential, we do not collect your name or any other personal data from you.

Published results will be aggregated and will not identify you individually or your responses.

1. You understand the above and consent to take part in this survey run by Mr. Elias Girma Bushu?

   ◯ Yes ◯ No

2. You must be 18 years or older to take this survey. Are you 18 years or older? Mark only one oval.

   ◯ Yes ◯ No

SOCIODEMOGRAPHIC CHARACTERISTICS

3. Gender *

- ◯ Female
- ◯ Male

4. Age *

- ◯ 18-19
- ◯ 20-24
- ◯ 25-29
- ◯ 30-34
- ◯ 35-39
- ◯ 40-44
- ◯ 45-49
- ◯ 50-54
- ◯ 55-59
- ◯ 60 years and over

5. Level of Education

- ◯ Elementary School
- ◯ High School
- ◯ College Certificate
- ◯ College Diploma
- ◯ University Degree

6. Work experience of food preparation.

- ◯ Less than one year
- ◯ 1-5 Years
- ◯ 6-10 Years
- ◯ 11-15 Years
- ◯ >15 Years

7. Do you have had previous training related to food safety?

- ☐ In the last three month
- ☐ In the last six month
- ☐ One year or more
- ☐ None

8. How many times did you participate in food safety training?

- ☐ Once
- ☐ Two times
- ☐ Three times
- ☐ 4 times and above
- ☐ None

KNOWLEDGE ABOUT FOOD CONTAMINATION, DISEASES TRANSMITTED BY FOODS AND GOOD HANDLING PRACTICES

1. Hand hygiene, which consists of washing hands gently with neutral detergent under running water and drying with a paper towel, can prevent food contamination.

- ☐ Yes
- ☐ No
- ☐ I don't know

2. A food handler with diseases, such as diarrhea, influenza, and sore throat, poses a risk of food contamination.

- ☐ Yes
- ☐ No
- ☐ I don't know

3. The use of adornments, such as earrings, rings, and watches, can cause food contamination.

   - ⬭ Yes
   - ⬭ No
   - ⬭ I don't know

4. Water can be a vehicle for disease transmission, but once it becomes ice, the risk of disease transmission is reduced.

   - ⬭ Yes
   - ⬭ No
   - ⬭ I don't know

5. Contact between raw and cooked foods, such as lettuce, which is used in the presentation of fried/cooked food, can contaminate the cooked food.

   - ⬭ Yes
   - ⬭ No
   - ⬭ I don't know

6. Foods unfit for consumption always have a bad smell and taste spoiled? * Mark only one oval.

   - ⬭ Yes
   - ⬭ No
   - ⬭ I don't know

7. Using food one day after the expiration date, even when there is no change in smell and/or flavor, is a health risk.

   - ⬭ Yes
   - ⬭ No
   - ⬭ I don't know

8. Washing vegetables in running water and soaking them in water with vinegar is sufficient for making this food safe for consumption.

   ○ Yes
   ○ No
   ○ I don't know

9. Defrosting can be performed in a basin with or without water in the sink or on a table or countertop that is not refrigerated (room temperature).

   ○ Yes
   ○ No
   ○ I don't know

10. Consumption of undercooked food can lead to diseases that cause vomiting and diarrhoea.

    ○ Yes
    ○ No
    ○ I don't know

EVALUATION OF THE ATTITUDES OF FOOD HANDLERS

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Raw foods should be stored separately from cooked foods.					
Thawed foods can be refrozen.					
Wearing necklaces,, earrings and rings makes food contamination possible.					
Foods with past expiration dates should not be consumed even when there are no changes in their smell and taste.					
Food handlers with injuries, bruises,, or hand injuries should not touch or handle food.					
The best way to defrost meats is in a bowl with water.					
It is important that I learn more about					

the safe handling of food to avoid contamination and diseases a part of my professional responsibilities.					
Always wash hands thoroughly before handling food.					
Checking the expiration date of the products and checking that the packaging is in good condition is necessary.					
Proper hygiene of utensils and equipment that come into contact with food is necessary to reduce the risk of contamination.					

EVALUATION OF SELF-RELATED PRACTICES OF FOOD HANDLERS

1. Do you clean your hands properly before handling food?

   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

2. Do you keep your nails short and unpolished and remove all adornments (earrings, rings, wedding rings, watches and bracelets) before handling food?

   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

3. Do you handle food when you have diarrhoea or another illness or unprotected hands?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

4. Do you thaw foods outside of refrigerated areas (room temperature)?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

5. Do you check the shelf life of the food at the time of receipt?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

6. Do you use cleansing products when washing vegetables and fruits?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

7. Do you use foods with past expiration dates when the food is unaltered in its smell and taste?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

8. Do you use the same cutting board and knife to prepare raw foods and cooked foods?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

9. Do you check if the food is well cooked before it is served?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

10. When you store food in the refrigerator, do you put it in the refrigerators covered or in covered containers?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always