

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF FOOD SAFETY FROM STREET FOOD HANDLERS**

Sana Hussain¹, Muhammad Imran Hussain², Saira zaman³, Haram Irfan⁴, Mahnoor Amjad⁵, Hamda Omar⁶, Ilsa kanwal⁷

ABSTRACT

BACKGROUND: The Assessment of Knowledge, Attitude, and Practice of Food Safety from Street Food Handlers aims to investigate the safety measures taken by vendors in the crowded city of Lahore, where street food is a staple. The goal of this study is to learn more about street food handlers' knowledge, attitudes, and practices regarding food safety. By examining these factors, the research seeks to identify potential gaps and areas for improvement in ensuring the well-being of consumers. The goal is to inform policymakers and health authorities about critical areas that require intervention, ultimately contributing to Lahore's safer and healthier street food culture. **METHODOLOGY:** It is a cross-sectional study, and the participants were selected using a convenient sampling technique. A study was carried out in Lahore between March and June of 2022 at Anarkali Street Food and Garhi Shahu Bazaar. Two hundred responders who were street food handlers and willing to participate in the research were included. Informed consent forms were obtained from all street food handlers. We were present to answer their doubts about any point during the completion of the questionnaire, and questions were verbally translated into Urdu. Responses were gathered using a structured questionnaire that included questions about demographic details and KAP statistics of food handlers. The SPSS software was used to get the mean scores from the data. To statistically evaluate the responses of food handlers, descriptive statistics were utilized. **RESULTS:** The findings revealed that a considerable percentage of food handlers had poor FSK (4.63±2.71, 43.6%) but with low values of FSA (11.09±2.63, 68.7%) and FSP (6.78±3.01, 61.6%) with acceptance level. **CONCLUSION:** Food handlers need training to learn more about food safety, change their attitudes and intentions, and help them become more committed to putting what they've learned into practice. Knowledge that explains how to complete their tasks must be emphasized in training. The Punjab Food Authority, food service management, and food safety trainers will benefit from this study's information on the level of food safety knowledge, attitude, and practice among food handlers at street food outlets in Lahore. **KEYWORDS:** Attitudes, Foodborne diseases, Food handlers, Food safety, Practices, Knowledge.

1. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
2. Assistant Professor RCRAHS Department of Human Nutrition and Dietetics Riphah International University, Lahore.
3. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
4. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
5. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
6. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
7. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.
8. Post Graduate Students Department of Human Nutrition and Dietetics Riphah International University, Lahore.

Corresponding Author: Muhammad Imran Hussain, Assistant Professor RCRAHS Department of Human Nutrition and Dietetics Riphah International University, Lahore.
Imran.hussain@riphah.edu.pk

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INTRODUCTION

With the evolution of human existence, the street food selling industry has grown in importance throughout the world.¹ Street food has become popular among consumers in the last three decades. The food service sector's development has changed mainly due to the influence of changes in consumers' habits and lifestyles. The consumption of food by consumers involves many global trends, including economic and socio-economic changes and consumer knowledge growth.² People are more liable towards the consumption of ready-to-eat street foods than fresh food home cooking because people think it is easy to place an order from outside without even being conscious of the underlying safety concerns.¹ As a result, in last few years, individuals in underdeveloped countries have used much of their earning on food, turning street foods into healthier alternatives.³ Throughout the manufacturing, processing, storage, and final preparation chain, food handlers play an important role in ensuring food safety and preventing food contamination. 97% of foodborne illnesses in restaurants were linked to food handling errors.⁴ According to studies, almost 2.5 billion people consume street food worldwide. This widespread use of street food increases the significance of food safety and its relationship to health.³ Food safety remains a primary interest all over the world. Every year, millions of individuals worldwide are hospitalized and even die after swallowing poisoned food (World Health Organization, 2015). Among these foodborne illnesses, 70% were associated with catering establishments and hospitals were thought to have a threefold increased risk of death during a pandemic compared to other settings.⁴ In Pakistan, recent studies revealed that the fast food industry has become the second largest, with 169 consumers accounting for 16% of employment opportunities in the manufacturing sector.⁵ Street food and vendors have become historically famous in developing countries and low and middle-wage-earning classes of people.² In many developing nations, food safety regulations are not strictly adhered to due to inadequate implementation, inadequate personal hygiene, and poor food handler

practices. As the population grows rapidly, so do the risks of food-borne illnesses.⁶ Consequently, this study means to overview the appraisal of information, demeanor and practice of sanitation from road food controllers.

METHODOLOGY

Study Setting and Participants: This study was conducted in food streets, i.e., Anarkali Food Street and Garhi Shahu Bazar of Lahore. These locations were chosen because they represented the target population and visitors well. Data was collected from street vendors. Both adult male and female street vendors were included in the study.

Sampling Technique and Study Design: This was a cross-sectional study. Survey research was chosen because it is the evaluative constituent of the calculation and helps gather data from street food handlers quickly. A convenient sampling technique was employed to collect the sample. It provided qualitative information to select individuals, but the variability and bias cannot be measured.

Sample Size: The sample size was 200 by convenient sampling technique. The target population was both adult male and female street food sellers. Three hundred small-scale street food stalls, hotels, and canteens were visited. Although, only 250 street food vendors willing to take part in the study.

Data Collection Procedure: All questionnaires were filled, and data was acquired from food vendors at Anarkali Food Street and Garhi Shahu Bazar, Lahore. While completing the questionnaire, we were available to clarify their doubts about any point, and questions were verbally translated into Urdu for better understanding.

Inclusion Criteria and Exclusion Criteria: The inclusion criteria were based on the physical and mental fitness of food handlers (cooks, kitchen helpers, servers, cleaners, and managers) of Anarkali Food Street and Garhi Shahu Bazar, Lahore were included in this study. Mentally and physically unfit participants and those who do not meet the inclusion criteria were excluded from the study. Similarly, those participants who refused to participate were also excluded.

Data Collection Tool: The structured questionnaire assessed street food handlers' knowledge, attitude, and practice of food safety. There were 43 questions in the survey, including a demographic profile question, ten questions about food safety knowledge, 16 questions about food safety attitude, and 11 food safety practice questions about food handlers. For assessing street food sellers' knowledge, attitude, and practice of food safety, the questionnaire was valid, reliable, and accurate.⁶

Data Variables and Statistical Analysis

The reliant factors were information, demeanor, and sanitation practice. Additionally, the food safety of street food was the independent variable. Data entry and analysis were done with the SPSS software. A descriptive statistical analysis was done on the interviewees' demographic information, as well as their food safety knowledge, attitude, and practice. The frequency and percentage

analysis produced the output of the descriptive statistic. The interviewees' mean scores on the questions about food safety, knowledge, and practice were determined. The data was encrypted in binary, and each correct answer was given a score of 1, and each false answer was given a score of 0.

RESULTS: Table 1 shows the demographic characteristics of food handlers. The age group of 19-35 has a significant proportion (41%) than other age groups. Fifty years and above shows minimum contribution. Males (88%) contributed more than females (12%). The primary level of education had a significant proportion (31.5%) than other education levels. University level only contributed 5%. Cook as a professional degree had substantial proportion (30%) than manager, cleaner, helper and server. Data shows that 1-3 years had a more significant proportion (37%) in the current workplace and the food industry (32%).

TABLE1. DEMOGRAPHIC CHARACTERISTICS OF FOOD HANDLERS.

Sr# Question statement	Variables	Percentage	Frequency
D1) What is your age	Under 18	23.0	46
	19-35 years	41.0	82
	36-50 years	27.5	55
	50 years and older	8.5	17
D2) What is your Gender?	Male	88.0	176
	Female	12.0	24
D3) What is your Level of Education?	No formal education	19.0	38
	Primary School	31.5	63
	Middle School	23.5	47
	Technical/Vocational Education	6.5	13
	High School	14.5	29
	University	5.0	10
D4) Which Professional Category are you in?	Cook	30.0	60
	Kitchen Helper	22.0	44
	Server	23.5	47
	Cleaner	9.0	18
	Manager	15.5	31
D5) How much experience do you have at your current workplace?	Less than 1 year	27.5	55
	1 to 3 years	37.0	74
	3 to 5 years	15.0	31
	More than 5 years	20.5	41
D6) How much total experience do you have in the food service industry?	Less than 1 year	19.0	38
	1 to 3years	32.0	64
	3 to 5 years	17.0	34
	More than five years	32.0	64

The evaluation of food handlers' knowledge of food safety is shown in Table 2. About half had received no food handling and protocol training. Proficient ensured coaches were just (13.5%). Back (76%) agreed that improperly handled food can spread food-borne illness. 66 percent of respondents have personal experience with the information source regarding foodborne illness. Diarrhea is the most common symptom of food-borne illness (41.5 percent), while vomiting is the least

common (26.5 percent). Food handling hygiene (30%) is the most effective way to reduce the risk of foodborne illness caused by expired food, which accounts for 46 percent of cases. 74% of respondents agree that practices that are not followed can lead to food contamination. Poor handling can contaminate the majority of food, or 31%, with germs. Foodborne illness is the most common consequence of eating unsafe food (25 percent). 41 percent of the time, germs thrive in foods that are either warm or cold.

TABLE2. EVALUATION OF FOOD SAFETY KNOWLEDGE OF FOOD HANDLERS.

Sr# Question statement	Variables	Responses (n)%
K1 Have you ever undergone any training regarding food handling and food safety protocols?	No training	99 (49.5%)
	Basic Informal Training	74 (37.0%)
	Professional Certified Training	27 (13.5%)
K2 Food-borne illness can propagate through mishandled, unsafe food.	Yes	152 (76%)
	No	45 (22.5%)
	Not Certain	3 (1.5%)
K3 What is your origin of information regarding foodborne illnesses?	Personal Experience.	132 (66%)
	Job Training	49 (24.5%)
	Media (Print, Electronic, Social)	16 (8.0%)
	Government Agencies	3 (1.5%)
K4 Which of the following is the most prevalent symptom of foodborne illness?	Diarrhea	83 (41.5%)
	Headache	50 (25.0%)
	Nausea	14 (7.0%)
	Lack of cleanliness and sanitation in the cooking area	27 (13.5%)
	Using clean water, raw materials, and utensils	21 (10.5%)
	All of the above	92 (46.0%)
K7 Germs can pollute food if food safety practices are not observed.	Yes	148 (74%)
	No	48 (24.0%)
	Not Certain	4 (2.0%)
K8 Germs can contaminate food through which of the following ways?	Poor Handling of Food	62 (31.0%)
	Use of unsafe water and improperly cleaned utensils	29 (14.5%)
	Lack of cleanliness and sanitation in the cooking area	27 (13.5%)
	All of the above	82 (41.0%)
K9 The most common effect of ingestion of unsafe food is:	Food wastage	46 (23.0%)
	Foodborne illness	50 (25.0%)
	Damage to the food business	21 (10.5%)
	All of the above	83 (41.5%)
K10 Germs proliferate effectively in which of the following types of food?	Cold food	82 (41.0%)
	Hot food	43 (21.5%)
	Warm food	54 (27.0%)
	The temperature of food does not affect the growth of germs	21(10.5%)

In Table 3, food handlers' characters related to food safety are evaluated. A little over 60% of

the contributors knew that food should be refrigerated at 4 C and that hot, ready-to-eat

meals should be hoarded above 60 ° C. About 75% of people knew quite well that making meals ahead of time increases the likelihood of bacterial development. The majority of food handlers agree that it is OK to smoke (28%) and wear jewelry and have long nails (42%) in places where food is prepared. Food handlers concur that increasing their knowledge of food safety is both mandatory for their jobs (86%) and may improve them (76%). Approximately 84.7 percent of responders concurred that hand washing should be done with antibacterial soap. 54.5 percent of subjects said that food should

not be refrozen once it has defrosted, and 63.5 percent said that raw and cooked food should be kept apart. Food employees with cuts or abrasions on their hands should abstain from handling unwrapped food, according to 74% of respondents, and over 66% of respondents think that refrigerator and freezer temperatures should be evaluated on a frequent basis. When asked whether food should be kept in a refrigerator to eradicate bacteria and germs, the majority of food handlers (76.5%) knew that this was not a wise suggestion. Of those asked, about 53.5 percent appropriately answered.

TABLE3. EVALUATION OF FOOD SAFETY ATTITUDE OF FOOD HANDLERS.

Sr# Question statement	Variables	Response (n)%
A1) Very warm, readymade meals should be hold on at a high degree (60°C).	Yes	120(60.0)
	No	52(26.0)
	Not Certain	28(14.0)
A2) Cooked meals should be kept in acold places at 4°C to keep it away from any hazards.	Yes	118(59.0)
	No	53(26.5)
	Not Certain	29(14.5)
A3) Meals are vulnerable to the widening of microorganisms if it is cooked excessively up to date.	Yes	150(75.0)
	No	40(20.0)
	Not Certain	10(5.0)
A4) It is secure to do smoking where meals are cooked.	Yes	56(28.0)
	No	141(70.5)
	Not Certain	3(1.5)
A5) Employees working on meals can have jewels on hands and can have lengthy nails. it does not effect and cooked meals.	Yes	84(42.0)
	No	116(58.0)
	Not Certain	0(0)
A6) Handling food safely is an important part of my job responsibility. Employees are in charge of to provide security to food.	Yes	172(86.0)
	No	24(12.0)
	Not Certain	4(2.0)
A7) Learning more about food safety is important to me and it can help me do my job better. Education more on safety of meals will be beneficial for me and my work.	Yes	152(76)
	No	24(12)
	Not Certain	24(12)
A8) Wellness of employees should be assessed before giving them job opportunity.	Yes	178(89.0)
	No	12(6.0)
	Not Certain	10(10.0)
A9) cooked and uncooked food should be kept apart	Yes	127(63.5)
	No	41(20.5)
	Not Certain	32(16.0)
A10) Dangerous chemicals and purifying liquids should be placed at a safe area where food is not cooked nearby.	Yes	172(86.0)
	Not	24(12.0)
	Not Certain	4(2.0)
A11) food should not be refrozen once it has defrosted	Yes	109(54.5)
	No	56(28.0)
	Not Certain	35(17.5)

A12) Refrigerator and freezer temperatures should be evaluated on a frequent basis.	Yes	132(66.0)
	No	33(16.5)
	Not Certain	35(17.5)
A13) Food workers with abrasions or cuts on their hands should abstain from handling unwrapped food	Yes	149(74.5)
	No	42(21.0)
	Not Certain	9(4.5)
A14) Employees suffering from an illness should not be permitted to work in the food preparation area.	Yes	153(76.5)
	No	39(19.5)
	Not Certain	8(4.0)
A15) hand washing should be done with antibacterial soap	Yes	168(84.0)
	No	30(15.0)
	Not Certain	2(1.0)
A16) food should be kept in a refrigerator to eradicate bacteria and germs.	Yes	107(53.5)
	No	57(28.5)
	Not Certain	36(18.0)

Table 4 shows that handlers always wash their hands before cooking (71%), and most agree they wash their hands with antibacterial soap (64.5%). Before food preparation A significant proportion of handlers (71.5%) uses antibacterial soap to clean food preparation items like chopping boards, tables, and knives, and (65.5%) utilize different cooking tools for raw and cooked food. When asked do you keep on working when you are sick? Most (56.5%)

did not agree with it. Around (75.5%) said they check food products' expiration dates before using them, and 59.0% said they defrost food at room temperature. Most handlers wear a uniform when they are dealing with food (50%) and change and launder the uniform daily (40%) they use while working. Most handlers (76.5%) use disposable tissues when they cough or sneeze followed by immediate handwashing

TABLE4. EVALUATION OF FOOD SAFETY PRACTICES OF FOOD HANDLERS.

Sr# Question statement	Variables	Responses (n)%
P1) Before cooking or serving food I always wash my hands	Yes	(142) 71.0%
	No	(45) 22.5%
	Not Certain	(13) 6.5%
P2) Do you cleanse your hands with antibacterial soap?	Yes	(129) 64.5% %
	No	(63) 31.5%
	Occasionally	(8) 4.0%
P3) Do you wash food preparation tools like chopping boards, tables, and knives with antibacterial soap before food preparation?	Yes	(143) 71.5%
	No	(54) 27.0%
	Occasionally	(3) 1.5%
P4) Do you use different kitchen utensils for raw and cooked food?	Yes	(131) 65.5%
	No	(57) 28.5%
	Occasionally	(12) 6.0%
P5) Do you keep on working if you are sick?	Yes	(59) 29.5%
	No	(113) 56.5%
	Occasionally	(28) 14.0%
P6) Do you defrost food at room temperature?	Yes	(118) 59.0%
	No	(67) 33.5%
	Occasionally	(15) 7.5%
P7) Do you check the expiration dates of food items before utilizing them?	Yes	(151) 75.5%
	No	(17) 8.5%

	Occasionally	(32) 16.0%
P8) Do you inspect the condition of the food packaging before using the food items?	Yes	(146) 73.0%
	No	(51) 25.5%
	Occasionally	(3) 1.5%
P9) Do you wear a uniform when dealing with food?	Yes	(100)50.0%
	No	(78) 39.0%
	Occasionally	(22) 11.0%
P10) How frequently do you change and launder the uniform you wear during your work?	Daily	(60) 30.0%
	Twice a week	(41) 20.5%
	Once a week	(19) 9.5%
	Uncertain	(80) 40.0%
P11) Do you utilize disposable tissues when you cough or sneeze, followed by immediate handwashing?	Yes	(153) 76.5%
	No	(12) 6.0%
	Occasionally	(35) 17.5%

Table 5 shows that the average score for knowledge about food safety was 4.63 ± 2.71 (43.6%), which is regarded as a poor score (less than 50%). The average score for attitudes toward food safety was 11.09 ± 2.63 (68.7%),

regarded as a low score with an acceptable level (50-70%). The average rating for food safety practice was 6.78 ± 3.01 (61.63%), considered a low score with a good level (50-70%).

TABLE 5: Report of Descriptive statistics of KAP			
Descriptive Stats	FSK	FSA	FSP
Mean	4.6350	11.0900	6.7800
N	200	200	200
Std. Deviation	2.71267	2.63946	3.01614

DISCUSSION

The primary objective of this study is to assess street food vendors in Lahore's understanding, perspective, and actions regarding food safety. The study involved a total of 200 participants who work as food handlers, with 176 being males and 24 being females. Based on the findings, it was observed that street food vendors had limited knowledge and moderate attitudes and practices toward food safety. However, a different study conducted in Malaysia showed that food handlers with low knowledge scores had higher practice scores due to their experience in the food industry⁷. In this current study, the attitude score was relatively quiet but still acceptable. Another similar study concluded that food handlers generally had unsatisfactory attitudes and practices regarding food hygiene⁸. Our study found that 42% of the food handlers had never received official food safety training. Only 15% had received professional training from a certified institution, while 43% had received informal basic training. The majority of respondents gave incorrect answers when tested on their knowledge. Additionally, a large

portion (86%) of the food workers had good knowledge about foodborne diseases, which could be attributed to their experiences with poor food handling practices. These findings align with similar results seen in previous studies⁹.

Another study conducted in Qatar found that providing food handlers with proper and certified hygiene instruction is crucial in preventing and controlling food contamination in food facilities¹⁰. Our study discovered that 82% of the respondents practiced adequate hand washing. However, the remaining participants were not required to do so because they lacked sufficient information. It's worth noting that similar findings were observed in a study conducted in Kolkata, India, where 84.90% of participants practiced proper hand washing. Regarding cleaning the food storage area, 81.0% of respondents in our study knew how to do it adequately before storing products, which is encouraging. However, in contrast to the study conducted in Kolkata, India, only 34.90% of the food storage areas were appropriately cleaned. As a result of neglecting

this activity, many participants were unaware of the importance of cleaning food storage areas¹¹. Another study found that various aspects contribute to food safety, such as selecting suitable raw materials, using proper cooking techniques, ensuring adequate food storage, regulating food temperature, and, most importantly, effectively managing waste¹². Training and providing information to food workers about sanitary procedures and food handling is crucial for their job. The majority of studies have consistently shown the importance of this training. It's essential for maintaining a safe and healthy environment in the food industry¹³.

Food-borne sicknesses & contaminations are really substantial fear for health of community¹⁴. An additional investigation observed information, performs, & exercise concerning nourishment care amongst workforces in Ireland. It was noticed that 25% of everyone who took part indicated they had never attended a food safety training session, showing a lack of compliance with court orders. Specifically, 1% of all canteen employees were taken into account for the poll on lack of training. The study highlighted the significance of participating in food safety training and provided insights on potential areas for improvement.¹⁵

According to a declaration by the World Health Organization in 1998, food handlers are indeed required to receive proper training on food safety principles¹⁶. Public health courses and training programs for food handlers must cover these principles, specifically focusing on cooking food properly and maintaining appropriate temperatures. Since many participants in the study lacked sufficient information, it's crucial to give them extra attention. Regularly repeating these classes could be a practical approach. Managers should provide training and encourage food handlers to actively practice food safety and go beyond just meeting the hygiene criteria. Additionally, food workers should take the initiative to enhance their understanding of food safety practices and be open to adopting policies¹⁷.

CONCLUSION

The findings revealed that a considerable percentage of food handlers had poor FSK (4.63±2.71, 43.6%) but with low values of FSA

(11.09±2.63, 68.7%) and FSP (6.78±3.01, 61.6%) with acceptance level Training is required to improve food handlers' knowledge of food safety, impact their attitudes and behaviour intentions, and support them in becoming more devoted to putting what they have learned into practice. Training must emphasise knowledge that explains how to do their tasks.

This study provides information regarding food handlers' levels of food safety knowledge, attitude, and practice at street food outlets in Lahore. Which is helpful for the Punjab Food Authority, food service management, and food safety trainers.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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