

# Assessing Awareness, Attitude, and Practice of Food Safety Among the Population of Quetta, Pakistan

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**Abstract:** Foodborne diseases are increasing at an alarming rate in Pakistan. An increase in gastrointestinal disorder outbreaks has demanded implementation of hygiene and quality practices. Food can initiate epidemics and serves as a growth substrate for bacterial and other food poisoning agents. This study evaluates knowledge, attitudes, and practices among food handlers in maintaining food hygiene in Quetta city. A questionnaire-based survey was conducted to highlight gaps in food safety knowledge among the population. Survey results reveal the need for consumer education regarding safe food handling practices. Respondents belonging to every sphere of life participated in this survey. Food safety knowledge, practices, and attitudes of food handlers indicate that food-handling problems are needed to be addressed. Our research showed that respondents were aware of hygienic practices before preparing and eating food. However, more than half of the respondents were unaware that *Salmonella typhi* is a foodborne pathogen. We found 74% of the male and 26% female food handlers were unaware of proper hygienic practices. More than 65% of respondents had poorly developed sewage system which floods during rainy seasons causing a rise in these diseases. Our survey revealed the need for consumer education regarding safe food handling practices from purchasing food to dealing with home. Unhygienic food preparation standards, unavailability of clean water as major factors of food poisoning in third world countries. Microbiologists should take the lead to ensure proper knowledge about food pathogens. Continuous education and training can strengthen food handler's knowledge in required areas.

**Keywords:** Food Safety, Consumer Knowledge, Hygiene, Foodborne Outbreaks

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## 1. Introduction

Foodborne diseases are considered a significant downside worldwide. Foodborne illness is infections of gastrointestinal (GI) tract caused by consumption of food that has been contaminated with microorganisms [1]. Such food contains enough microorganisms or toxins to cause disease in an individual. These illnesses usually arise due to the consumption of unhygienic food due to improper handling, preparation, or storage of food. Good hygienic practices in food preparation can reduce the chances of contracting diseases. However, some people are more likely to develop foodborne illnesses than others due to weak immune systems. The common symptoms that arise due to unhygienic measures or consumption of contaminated food include

diarrhea, fever, abdominal pains, cramps, vomiting, bloody diarrhea, etc [2].

According to WHO gastrointestinal infections are responsible for 2.2 million annual deaths worldwide [3]. Increase in outbreaks of gastrointestinal diseases has demanded implementation of hygienic practices. Improper food handling contributes 97% of foodborne diseases in food outlets and homes. Food handlers may transmit pathogens passively from a contaminated source. Data on risk factors for foodborne diseases imply that most outbreaks result from improper food handling practices [4]. Foodborne epidemics of *Salmonella*, *Listeria*, and *Escherichia coli* 0157 has brought awareness among the public regarding the consumption of unhygienic food [5]. The hands of food service employees serve as a vector in the spread of

foodborne diseases because of poor personal hygiene or cross-contamination [6]. Poor sanitary practices in food storage, handling, and preparation can create an environment in which bacteria such as *Campylobacter*, *Salmonella*, and other infectious agents are more easily transmitted [7]. Moreover, food handlers who are symptomatically ill may present a real hazard for a foodborne outbreak [8].

In Pakistan, a large proportion of the public is deprived of proper sanitation, infrastructure that magnifies the risk of foodborne illnesses. Typical factors that contribute to foodborne illnesses include unhygienic living, humid and warmer temperature, below poverty areas, open sewage, and poor sanitation. Lack of awareness regarding foodborne pathogens has boosted mortality and morbidity rates in Pakistan [9]. The population-based data pertaining to awareness and prevention of foodborne diseases in Pakistan are rare. Several hospital-based studies from different parts of the country have consistently shown a high incidence of foodborne diseases. No awareness based research has been conducted previously to access the knowledge of food safety among the population of Quetta, Balochistan. To provide a better approach emphasizing to eradicate the foodborne disease from our society we need to determine baseline awareness of food-related hygiene. This study aims to evaluate knowledge, attitudes, and food hygienic practices among food handlers in preventing foodborne diseases in Quetta, Pakistan.

## 2. Methodology

This cross-sectional study was designed to access awareness using questionnaire-based survey among the population of Quetta city. This study was conducted during the month of August 2018. The study population comprised of 300 participants including both men and women. The participants were randomly sampled from the population with age older than 16 years. Participant from various professions was included in the study such as students, shop keepers, street vendors, housewives—people who handled food in one way or the other. Questions were explained to illiterate individuals and their responses were recorded accordingly.

### 2.1. Questionnaire

The questionnaire took approximately 5 minutes to be completed. The questionnaire comprised of three main categories such as “practice”, “attitude” and “safety knowledge”. The demographic section comprised of gender, age, occupation, education and socio-economic status of the participants. Practice-based questions emphasized to determine food handling methods in daily routine. Similarly, attitude related questions evaluated hygienic approaches. Safety knowledge section estimated awareness regarding food handling and consumption leading related to foodborne diseases.

### 2.2. Data Processing and Analysis

The questions were labeled and answers were evaluated on the basis of the correct answer. The wrong answers were considered “unaware,” while correct answers were identified as “aware.” The data were analyzed using frequencies, and crosstabs using SPSS version 20.

## 3. Results and Discussion

### 3.1. Demographics

The questionnaires were distributed among 150 females and 150 males. The respondents belonged to different professions such as street vendors, lecturers, students, and housewives. Among respondents about 59% belonged to 21-30 years of age, while 26% were between 16-20 years of age and 13% were of 31-40 in age, remaining 2% were 40 years old or above. Among respondents 42% were university graduates, 12% were college graduates, 10% had studied high school, and 36% of the respondents were illiterate. Approximately, 61% were unemployed such as students, and housewives, while food handlers accounted for 39% of this survey. The socio-economic status showed that approximately 21% of the employed food handlers had incomes around PKR 40,000 and only 10% had wages around PKR 20,000 (Figure 1).

### 3.2. Safety Knowledge

The limited research related to food safety knowledge, practices, and attitudes of food handlers indicates that food-handling problems are needed to be addressed. Around, 74% of men and 26% of women were unaware of food handling procedures, while the rest of the individuals showed profound knowledge. To reduce foodborne illnesses we urge to gain an understanding of food safety knowledge and practices among food handlers [3]. Our results showed that a high proportion (90%) of food handlers were aware of the necessity of hand washing before consuming food. Similar research conducted in Australia showed that participants positively responded to questions related to maintaining good hygiene, thus, representing knowledge about personal hygiene [10]. We found that approximately 83% were aware that hot and humid weather contributes to food-borne illnesses. Whereas, 56% responded that reheating cooked food can cause food contaminations, roughly 43% were unaware that reheating causes foodborne diseases (Table 1). A cross-sectional study determined hygiene practices and attitude among the street food vendors surrounding hospitals in Kolkata, India showed that the street vendors were aware of hygiene practices, but the practice was not reflected on their daily routine. [11] Previous research on risk factors for foodborne diseases implies that most outbreaks result from improper food handling practices. A study in the USA suggested that improper food handling practices contributed to approximately 97% of foodborne illnesses in food-service establishments and homes [4]. In a contrasting research

conducted by Baser and colleagues [12] determined food safety knowledge among hotel staff in Turkey concluded that food safety knowledge is not correlated with food safety behavior. Thus, proper training sessions to educate the hotel workers can ensure food safety. Around 77% of respondents were oblivious that pasteurized milk is more beneficial than boiled milk for consumption. However, heating milk reduces the nutrient contents and makes it less beneficial for consumption. Whereas, 60% of respondents consider food from street vendors safe for consumption. Barjaktarović-Labovic [13] determined lack of food safety knowledge among the consumers and compared the effect of intervention (education) on food hygiene knowledge and practices at Montenegro. The consumers were significantly unaware of proper food storage conditions before

intervention. However, post intervention results showed significant increase in basic food safety awareness—indicating that foodborne diseases can be controlled by educating food handlers and consumers. Around, 59% of the respondents were aware that they don't have access to clean drinking water and 41% were unaware if they are drinking clean water. In developing countries, unhygienic food and contaminated water are highly responsible for food and water-related outbreaks. In developing countries sewage water is occasionally used for crop irrigation. Mhongo and his colleagues isolated *Salmonella spp* from wastewater and its antimicrobial resistance pattern. There results suggest strong role of wastewater in crop irrigation in eliciting foodborne diseases [14].

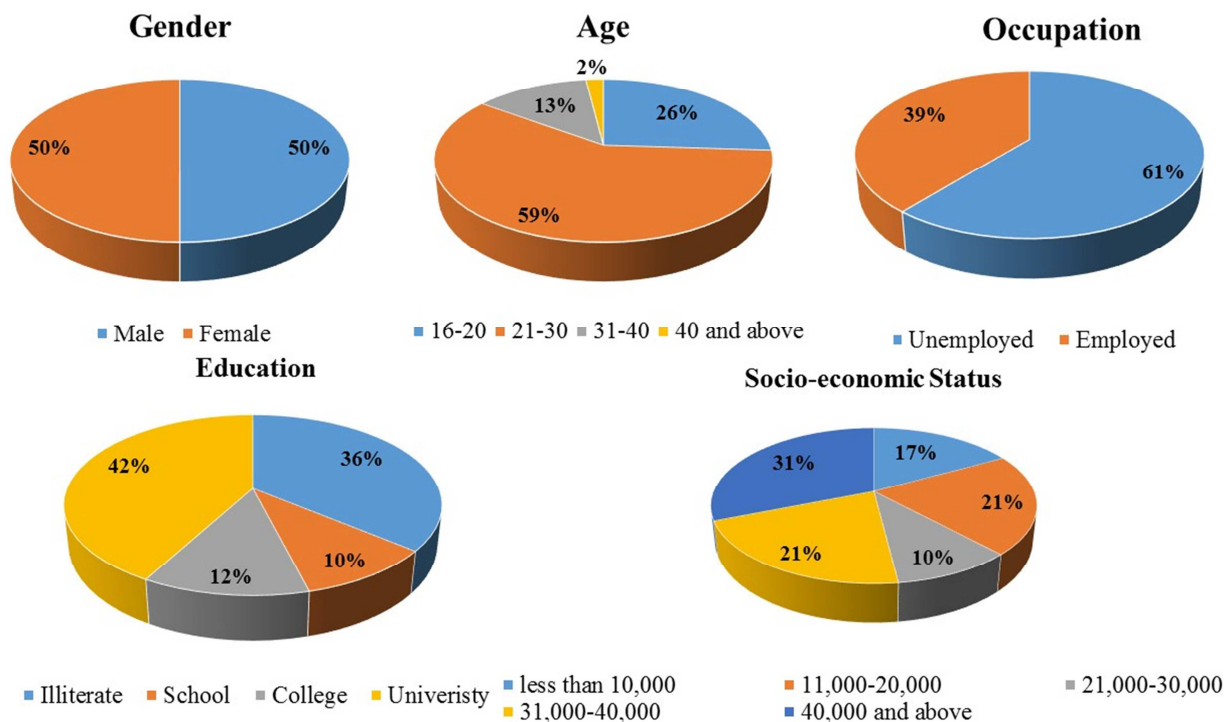


Figure 1. Demographic characteristics of food handlers.

Around 71% of respondents were aware that refrigeration stops food spoilage. However, refrigerating and reheating food causes microbes to thaw and actively multiply to produce toxins responsible for food spoilage and related outbreaks. More than half (55%) of the respondents were ascertained regarding the role of *Salmonella typhi* is a food contaminant. We found that a high ratio of respondents were aware that pathogens are responsible for foodborne outbreaks throughout the world. Although, lack of practice was observed among the respondents. Recent study evaluated the hygiene challenges by isolating microbes from traditionally fermented cereal beverage called Obushera. Around 50% of the samples failed to fulfil the safety requirement, while *E.coli*, *Staphylococcus spp* and thermos tolerant species were detected in the flour and beverage sample [15]. More than 65% of respondents had poorly developed sewage system which floods during rainy seasons causing a rise in these diseases.

Majority of street vendors in developing countries don't have access to basic infrastructure for hygiene. A survey conducted in cape town showed that 71% of food vender lack washing basin, around 85.7% lacked surface cleaner and soap, while 75% did not had drying cloth [16]. General public depends on street food on daily basis, while lack of food hygiene and regulation offers potential threat to the society. Diseases peaks each year between May to August usually in the presence of poor sewerage system [17]. Here 85% responded that homemade food is safe, but unhygienic conditions may cause homemade food unsafe. In a study in South Wales, 79% of consumers perceive that they are unlikely to get food poisoning at home [18]. Therefore, the attitude scored toward the prevention and control of foodborne diseases was poor. Similarly, the food safety practice scored of food handlers were low.

**Table 1.** Awareness of food safety knowledge.

Statements	Male	Female	Total
Hot and humid weather contributes to food-borne illnesses.			
Aware %	39	44	83
Unaware %	11	6	17
Reheating cooked food can cause food contaminations			
Aware %	26	31	57
Unaware %	24	18	43
Refrigeration prevents food spoilage			
Aware %	39	32	71
Unaware %	13	16	29
Typhoid is caused by contaminated food?			
Aware %	25	20	45
Unaware %	25	30	55
Learning about food safety procedures (sanitation) is important.			
Aware %	39	44	83
Unaware %	11	6	17
Are you drinking pure and safe water?			
Aware %	24	35	59
Unaware %	21	20	41
Do you think boiled milk is healthier/safer than pasteurized milk?			
Aware %	8	15	23
Unaware %	42	35	77
Do you use food after its expiry date?			
Aware %	40	36	76
Unaware %	11	13	24
Expired food can harm your health?			
Aware %	39	38	77
Unaware %	10	13	23
Food poisoning is due to uncooked food?			
Aware %	13	12	25
Unaware %	37	38	75
Do you think food from street vendors causes typhoid?			
Aware %	26	34	60
Unaware %	24	16	40
Do you avoid eating food from street vendors knowing that it is harmful?			
Aware %	20	25	45
Unaware %	31	24	55

### 3.3. Practice

Personal hygienic practices are significantly vital to ensure safe consumption of food. Food safety awareness is correlated to its practice and impacts food safety behavior and attitude accordingly. Only 39% of the respondents wash their vegetables before cooking food. Previous research conducted to determine the prevalence of *Campylobacter* on food items showed that raw meat, fruits, vegetables, cheese, and milk are an important source of pathogens [19]. About, 40% of the respondents always wash their hands before eating food, while 24% sometimes, and 11% rarely washes their hands. A food hygiene survey conducted to evaluate awareness, practice and attitude of food handler at Lebanese hospitals demonstrated that respondents with significant experience in food handling showed positive attitude in maintaining hygiene. Moreover, male employees practiced food hygiene at a great extent than female employees [20]. Codex Alimentarius Commission [21] reported that poor hygiene and food handling increases the risk of food contamination that leads to foodborne diseases. Moreover infected individuals or carrier for particular disease also assist in the transfer of pathogens into food items. Around 45%

of the respondents were aware that street food is unsafe for health, yet found it difficult to avoid it. Food handlers in developing countries lack awareness and ignore safety measures to ensure the safe distribution of food. Similar an international survey determined significant difference in consumer food safety knowledge among African and Asian population. Where, African population lack basic knowledge, and have poor food safety practices than Asian population [22]. Moreover, street vendors having stalls on streets are directly exposed to dust, microbes, and pollution that contaminate the food items at various stages of handling, packaging, and distribution. We found that females (45%) were more aware of food safety to pursue proper food handling in routine than males (Table 2). A similar study conducted by Murray and coworkers [23] determine level of food safety knowledge among Canadian consumers. The results showed that women follow packaging instructions better than men to prevent cross contamination. Moreover, young food handlers were reluctant to follow instruction to prevent cross contamination and were unaware of risk associated with under cooked meat [23]. Ovca [24] compared food safety knowledge and attitudes among professionals and amateurs not enrolled in food related programs. The results

revealed that food safety knowledge is not associated with formal education. However, food-related hazards were lower in non-educated group. Therefore, conducting formal awareness sessions can alleviate foodborne diseases specifically caused due to poor hygienic conditions [24].

We found that approximately 44% of the respondents “often” use gadgets (mobile phones, tablets) while preparing food. Microbes residing on gadgets are a common factor to contribute to dissemination of diseases among the population. The frequency of washing hands before food preparation and eating was satisfactory as the respondents were well aware.

More than 65% said that their community is undeveloped with open sewage that floods during rainy seasons causing an increase in these diseases. A recent study conducted at Haiti compared food safety awareness and practice among consumer and food handlers. The results showed that the food handlers were more aware of food hygiene than consumer. However, 60% of the food handler failed to maintain hygiene at the stall. Majority serve food without proper hand wash, whereas, infrastructure for waste disposal and sewage was inadequate [25].

**Table 2.** Respondents answers regarding food practice.

Question asked	Response	Female %	Male %	Total %
Eating food without washing hands is the cause of food poisoning.	Yes	45	45	90
	Don't know	5	5	10
	All of the time	25	20	45
Do you wash your hands with soap before preparing food?	Most of the time	11	10	21
	Sometimes	8	12	20
	Rarely	7	7	14
Does contaminated food cause food poisoning?	Yes	39	31	70
	Somewhat	6	13	19
	No	8	3	11
Do you wash your hands before eating food?	Always	24	16	40
	Most of the time	12	13	25
	Sometimes	8	16	24
	Rarely	4	7	11
Do you wash raw meat or vegetables before cooking?	Always	39	39	78
	Often	4	5	9
	Rarely	5	4	9
	Never	2	2	4
Is sanitation conditions of your community well developed?	Yes	20.3	12.0	32
	No	28.6	37.6	66
	No response	0.8	0.8	2
	Always	11	8	19
Do you use gadgets while preparing food?	Often	21	23	44
	Rarely	10	15	25
	Never	8	4	12

### 3.4. Attitude

Attitude is an essential feature that can diminish the occurrence of foodborne diseases and other health hazards with proper food safety approach and practice (Table 3). A reduction in the incidence of food-borne illnesses is strongly influenced by the attitudes of food-handlers towards the implementation of food safety plans. Approximately, 46% of the female respondents believed that homemade food is free from pathogens, but unhygienic conditions may cause contamination of homemade food. While only 87% had a

firm believe that raw and cooked food must be placed separately. Thus, the general attitudes of the food-handlers toward food safety were satisfactory on issues relating to raw and cooked food. Moreover, 80% of respondents agreed that one's own actions can impose risk on foodborne illnesses. Large number of people eat their food outside home, these street food are potential cause of food borne illnesses particularly in developing countries. Rahman and his colleagues suggested that induction of formal food safety education is required to control food related morbidity and mortality [26].

**Table 3.** Food safety attitudes of food-handlers.

Statements	Aware %	Unaware %
Homemade food is free from pathogens?		
Male	39	11
Female	46	4
Total	85	15
Raw and cooked foods should be separate to reduce the risk of food contamination?		
Male	44	6
Female	43	7
Total	87	13
Do your decision and actions impact your risk for foodborne illness?		

Statements	Aware %	Unaware %
Male	37	13
Female	43	7
Total	80	20

## 4. Conclusion

Our study suggests that though the knowledge, attitude and practice level of food handlers and consumers was satisfactory. The key pathogens responsible for foodborne illnesses are persistently developing resistance. Basic safety knowledge among illiterate man and women especially housewives are requisite. We conclude that respondents were not acquainted with their role in food safety and allow numerous opportunities for pathogenic contamination of food. The results obtained from our survey revealed the need for consumer education regarding food safety practices from purchasing food to cooking homemade food. Implementation of proper evaluation methods is required to ensure public health and safety. A proper system is required to report the gaps in food hygiene and food safety related issues to reduce the burden of foodborne illnesses. Food safety workshops must be conducted to craft awareness and positive attitudes to maintain food hygiene and prevent foodborne outbreaks.

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