

Exploring Food Safety Knowledge: A Questionnaire-Based Study on Food Handling and Preparation Practices Among University Students

Muhammad Zeeshan¹,
Haroon Shah², Yasser
Durrani² Mohammad Ayub²

¹Agriculture Research Institute, D.I. Khan, Pakistan

²Department of Food Science and Technology, University of Agriculture, Peshawar, Pakistan

Abstract

Introduction: This study aimed to evaluate the food safety handling knowledge and practices of undergraduate students at the University of Agriculture Peshawar. The research also investigated the correlation between participants' knowledge and practices with socio-demographic and academic characteristics.

Methodology: Undergraduate students participated in the study, responding to a questionnaire comprising six food safety questions categorized into food microbiology/cross-contamination and food storage (chilling) sections.

Results: Students enrolled in health-related programs consistently demonstrated superior food safety knowledge during food preparation practices compared to their counterparts in humanity-sciences programs. Gender differences were notable, with females scoring significantly higher in food-handling practices than males. The study identified an educational background relevant to food safety as a crucial predictor for accurate responses to a broad spectrum of study questions.

Implications: The findings underscore the necessity for targeted educational initiatives aimed at enhancing the food safety knowledge and food-handling practices of students at the University of Agriculture Peshawar.

Keywords: Food safety; Socio-demographic characteristics; Gender; University students; Food handling practices; Educational initiatives.

Corresponding author:

Muhammad Zeeshan, Agriculture Research Institute, D.I. Khan, Pakistan. E-mail: zeeshanf7@gmail.com

Citation: Zeeshan M. (2023) Exploring Food Safety Knowledge: A Questionnaire-Based Study on Food Handling and Preparation Practices Among University Students. *J Nutr Diet Nutraceuticals*. Vol 1(1): 103.

Received: April 06, 2023; **Accepted:** April 25, 2023; **Published:** May 03, 2023

Copyright: © 2023 Zeeshan M. This open-access article is distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

Food safety, defined as the assurance that food will not cause harm or illness when prepared, served, and consumed as intended, is a global concern. A substantial proportion of foodborne diseases stems from unsafe food handling practices, impacting over 30% of the population in developed countries, with a potentially more severe impact in developing nations according to the World Health Organization (WHO) [1]. The need to enhance consumer knowledge of safety rules is crucial to minimizing pathogenic microorganisms in food, prompting significant academic interest in investigating global food safety knowledge and practices [1].

In many societies, consumers appear unfamiliar with the ideal refrigeration temperature, often neglecting thermometer use

during food preparation. Limited awareness exists regarding different bacteria classes, particularly pathogenic ones. Undesirable compounds in foods encompass a wide range, from natural elements like mycotoxins to environmental contaminants such as dioxins, and agrochemicals like pesticides and veterinary drug residues [2]. Food safety has emerged as a major public concern due to bacterial outbreaks, leading to reduced consumer confidence in the healthiness of food products. Restoring confidence in food safety has become a significant commercial challenge for the food industry.

Even in societies with highly developed food safety systems like

the European "farm-to-fork" and the American "farm-to-table" approaches, a single weak link can result in significant morbidity and mortality from foodborne illnesses [3].

Five major pathogen control factors are crucial in consumer food safety education programs, emphasizing personal hygiene, preventing cross-contamination, avoiding foods from unsafe sources, cooking foods adequately, and maintaining safe temperatures. Limited research on food safety handling and practices among young adults in universities has been conducted. A recent study revealed that over 50% of Saudi college participants consumed raw eggs and raw white cheese, with 34% believing there is no risk of food poisoning from eating cooked food kept at room temperature for one day if covered.

Food safety comprises both objective measures, where scientists identify reasons for risks associated with specific foods, and subjective perception, representing consumer behavior toward the safety of specific foods. These measures are often interconnected. Established countries, particularly in Europe, prioritize health risks related to food safety and maintain proper hygienic standards [4].

Consumer studies on food safety knowledge and practices indicate that while consumers are aware and concerned about food safety, there are notable gaps that may lead to foodborne diseases [5]. Despite public concerns about food-related risks, the increasing incidence of food poisoning cases suggests that individuals still make suboptimal decisions regarding food consumption, storage, and preparation [6].

Ensuring safe food is a fundamental human right, crucial for disease prevention and human health improvement, especially in developed societies. This is essential for both governments, industries, and consumers themselves. Consequently, the primary focus of this study was to assess the self-reported food safety practices and knowledge of university participants across various fields of study and explore relationships between food safety awareness and demographic characteristics.

Material and Methods

Research Design

A cross-sectional study was carried out to assess food safety knowledge and handling practices between September and December 2014. Undergraduate participants from various departments, including food-related (Food Science and Technology, Human Nutrition, Food Chemistry, Biotechnology, and Animal Nutrition) and non-food-related (Plant Protection, Plant Pathology, Entomology, Agronomy, Horticulture, and Soil Science) departments of the University of Agriculture Peshawar, participated in the study. The participants' ages ranged between 21-26 years.

Development of Questionnaire

To evaluate food safety knowledge and handling practices among university participants, a questionnaire was developed. The questionnaire underwent preliminary validation to assess clarity, wording suitability, and the average time required for completion. Modifications were made based on the pilot study, with the final survey excluding pilot results. The questionnaire took approximately 5 minutes to complete.

Demographic Characteristics Surveyed

- Gender
- Age
- Field of Study
- Maternal Status
- Residential Status

Questionnaire Structure

The questionnaire comprised six questions grouped into two sections: food microbiology/cross-contamination and food storage (chilling). All questions were presented as multiple-choice, true/false, or yes/no statements, offering 2-4 possible answer choices.

Data Collection

Data collection involved three interviewers, each distributing over 100 questionnaires. The interviewers, who were in their graduation studies, visited selected departments at the University of Agriculture Peshawar, Pakistan. With the assistance of class teachers, the interviewers randomly distributed survey forms, which were collected after the end of the class period. Respondents were briefly briefed on the study objectives [7].

Results and Discussion

Profile of Respondent

A total of 355 questionnaires were distributed, with 311 collected (154 respondents from food-related departments and 157 from non-food-related departments). Approximately 53.5% (165) of respondents were male, and 46.95% (146) were female. The majority of respondents were aged 23 to 24 (42.76%), followed by ages 21 to 22 (35.04%) and 25 to 26 (22.18%). Hostel residents constituted 55% of participants, while 45% were home residents. Regarding maternal status, 80.38% belonged to families with housewives, and 19.61% belonged to families with working women (Table 1).

Food-related participants scored significantly better than non-food-related participants (54% vs. 46%). Females outperformed males (69.4% vs. 46.1%), and participants with housewives

Table 1: Demographic characteristics of the study population.

Demographic variables	Variables	Respondents	Percentage
Gender	Male	165	53.05%
	Female	146	46.94%
Age	21-22 years	109	35.04%
	23-24 years	133	42.76%
	25-26 years	69	22.18%
Department	Food related	154	49.5%
	Non-food related	157	50.5%
Maternal status	House wife	250	80.38%
	Working woman	61	19.61%
Residential status	Boarder	140	45%
	Day scholar	171	55%

scored higher than those with working women (58% vs. 50%). There was no significant difference between hostel residents and home residents (64% for both).

In terms of knowledge about freezing, 34% of food-related and 31% of non-food-related participants correctly recognized the maximum safe freezing temperature (-18°C). Males performed better than females (51% vs. 41%), and hostel residents outscored day scholars (52% vs. 41.5%).

Both food-related and non-food-related participants demonstrated similar knowledge about the importance of refrigeration in avoiding foodborne diseases. However, regarding the recommended temperature for a freezer, male participants outperformed females (51% vs. 41%), and hostel residents scored higher than day scholars (52% vs. 41.5%) [8-13].

Participants were informed that raisins do not need refrigeration, with food-related participants scoring better than non-food-related participants (43% vs. 33%). Females scored higher than males (39% vs. 37%), and participants with housewives scored better than those with working women (36.8% vs. 32%). Hostel residents performed better than those living with families (39% vs. 37%), and participants aged 23-24 scored higher (53%).

Knowledge about bacterial growth temperatures showed food-related participants scoring better than non-food-related participants (46% vs. 41%). Females outperformed males (62% vs. 55%), and participants with working women as mothers scored higher than those with housewives (68.8% vs. 56%). Participants living with families had better knowledge than hostel residents (63% vs. 53%).

Regarding bacterial growth temperature, food-related participants performed better than non-food-related participants (52% vs. 44%). Males and females demonstrated similar knowledge (50% for both), as did hostel residents and those living with families (49% for both). Participants with housewives scored higher than those with working women (45% vs. 41%) [14-19].

Limitation of the Study

The study's sample size was limited, making it challenging to generalize the results to all university students or Peshawar city residents.

Social desirability bias may affect the accuracy of self-reported practices.

Future research should consider more diverse student profiles and a larger sample size, involving collaboration with relevant government agencies.

Conclusion

The study reveals a significant lack of awareness among respondents about their role in the food safety chain and the critical importance of maintaining a cold chain. It highlights numerous opportunities for microbiological contamination of food. Key issues include inadequate knowledge regarding refrigeration temperatures, limited understanding of cross-contamination and its control, and insufficient awareness of hand hygiene. Notably, the results indicate that women exhibit safer food-handling practices compared to men.

Recommendations

1. **Educational Programs:** Develop and implement comprehensive food safety education programs targeted at individuals involved in food handling, emphasizing refrigeration temperatures, cross-contamination control, and proper hand hygiene.
2. **Gender-Specific Initiatives:** Recognize the gender-based differences in food handling practices and tailor educational efforts to address specific gaps. Implement initiatives to improve men's awareness and adherence to safe food handling practices.
3. **Local Adoption of Successful Programs:** Adopt successful food safety education programs employed by developed countries, such as "Fight BAC" and "Home Food Safety." Local adaptation can enhance the effectiveness of these programs.
4. **Community Engagement:** Encourage food safety agencies to actively engage with the community, providing educational materials on Good Housekeeping Practices through various accessible channels. Focus on reaching younger individuals with educational programs and relevant training.
5. **Teacher Training:** Prioritize the proper education and training of teaching staff to effectively transmit food hygiene principles to children. By educating the younger generation, there is an opportunity to create safety-conscious consumers who, in turn, influence their parents' food safety practices.

References

1. Farber CR, Bennett BJ, Orozco L, Zou W, Lira A, et al. (2011) Mouse genome-wide association and systems genetics identify *Asxl2* as a regulator of bone mineral density and osteoclastogenesis. *PLoS Genet* 7: e1002038.
2. Andersen AS, Hansen PH, Schaffer L, Kristensen C (2000) A new secreted insect protein belonging to the immunoglobulin superfamily binds insulin and related peptides and inhibits their activities. *J Biol Chem* 275: 16948-16953.
3. Medeiros LC, Hillers VN, Chen G, Bergmann V, Kednall P, et al. (2004) Design and development of food safety knowledge and attitude scales for consumer food safety education. *J Am Dietetic Assoc* 104: 1671-1677.
4. Jevšnik M, Hlebec V, Raspor P (2007) Consumers awareness of food safety from shopping to eating. *J Food Control* 19: 737-745.
5. Angelillo IF, Foresta MR, Scozzafava C, Pavia M (2001) Consumers and foodborne diseases: knowledge, attitudes and reported behaviour in one region of Italy. *International J Food Microbiol* 64: 161-166.
6. Byrd-Bredbenner C, Maurer J, Wheatley V, Schaffner D, Bruhn C, et al. (2007) Food safety self-reported behaviors and cognitions of young adults: results of a national study. *J Food Protect* 70: 1917-1926.
7. Byrd-Bredbenner C, Maurer Abbot J, Quick V (2010) Food safety knowledge and beliefs of middle school children: implications for food safety educators. *J Food Sci* 9: 19.
8. Christine MB, Howard GS (1999) Consumer food safety knowledge and practices. *J Food Safety* 19: 73-87.
9. Comfort OC (2010) Food safety and hygienic practices of street food vendors in Owerri. *Nig Stud Sociol Sci* 1: 50-57.
10. Aygen FG (2012) Safe Food Handling: Knowledge, Perceptions, and Self-Reported Practices of Turkish Consumers. *Int J Business Manag* 7: 24.
11. Annor GA, Baiden EA (2011) Evaluation of food hygiene knowledge attitudes and practices of food handlers in food businesses in Accra, Ghana. *J Food Nutr Sci* 2: 830-836.
12. Gettings MA, Kiernan NE (2001) Practices and perceptions of food safety among seniors who prepare meals at home. *J Nutr Edu* 33: 148-154.
13. Hassan HF, Dimassi H (2015) Food safety and handling knowledge and practices of Lebanese university students. *J Food Control* 40: 127-133.
14. Haapala I, Probart C (2004) Food safety knowledge, perceptions, and behaviors among middle school students. *J Nutr Educ Behav* 36: 71-76.
15. Kennedy J, Jackson V, Blair IS, McDowell DA, Cowan C, et al. (2005) Food safety knowledge of consumers and the microbiological and temperature status of their refrigerator. *J Food Protect* 68: 1421-1430.
16. Sharif L, Obaidat MM, Al-Dalalah MR (2013) Food Hygiene Knowledge, Attitudes and Practices of the Food Handlers in the Military Hospitals. *J Food Nutr Sci* 4: 245-251.
17. Langeveld LPM, Cuperus F (1980) The relation between temperature and growth rate in pasteurized milk of different types of bacteria which are important to the deterioration of that milk. *Milk Dairy J* 34: 106-125
18. Lazou T, Georgiadis M, Pentieva K, McKeivitt A, Iossifidou E (2012) Food safety knowledge and food-handling practices of Greek university students: a questionnaire-based survey. *J Food Control* 28: 400-411.
19. Soares LS, Almeida RCC, Cerqueira ES, Carvalho JS, Nunes IL (2012) Knowledge, attitudes and practices in food safety and the presence of coagulase-positive staphylococci on hands of food handlers in the schools of Camaçari Brazil. *Food Control* 27: 206-213.