



Evaluating Food Safety and Hygiene Knowledge Among Students in Muzaffarpur District of Bihar

Anjali Chandra

Assistant professor

P.G. Dept of Home Science B.R.A. Bihar University

Shingla Prabha

Assistant professor

Department of Home Science

Vaishali Mahila College, Hajipur

Abstract

Food safety refers to the procedures used in handling, preparing, and storing food in a way that prevents contamination and foodborne diseases. Food safety is a critical aspect of public health, influencing the well-being of individuals and communities. Lack of knowledge about proper food handling, food safety and cross contamination may lead to health hazards, infectious diseases and finally result into malnutrition. Unhygienic food handling, consumption of street food, and lack of awareness about food safety can expose young individuals to serious health threats, affecting their physical and cognitive development. So, there is a need to assess the situation and based on study findings provide recommendations for Promoting food hygiene education among students. By prioritizing food safety, we can not only prevent diseases but also foster a healthier, more productive future generation. This study aims to assess the food handling practices and level of food safety knowledge among Graduate and Post graduate students of Muzaffarpur district of Bihar. A cross-sectional survey was conducted, using a structured questionnaire to evaluate student's awareness about food hygiene, food safety and foodborne diseases. The findings reveal a low level of knowledge, with significant gaps in areas related to safe food handling and storage practices. This paper discusses the implications of these findings for public health interventions and education programs.

Keywords:

Food safety, knowledge, Food hygiene, food borne diseases, Contamination

1.Introduction

Food hygiene and food safety are critical factors influencing the health and well-being of the communities especially of younger generation. With increasing cases of foodborne illnesses, malnutrition, and lifestyle diseases, ensuring safe and hygienic food has become more important than ever. Poor food hygiene can lead to contamination by harmful bacteria, viruses, and toxins, resulting in diseases such as diarrhea, food poisoning, and long-term digestive disorders. Young children and adolescents, with their developing immune systems, are particularly vulnerable to these risks. On the other hand, proper food safety practices—such as maintaining cleanliness, proper food storage, and avoiding cross-contamination—help in preventing illnesses and ensuring a balanced intake of nutrients essential for growth and development.

The World Health Organization (WHO) estimates that 600 million people worldwide—almost 1 in 10—fall ill due to contaminated food each year, with children under five accounting for 40% of foodborne disease cases (WHO, 2023). In developing countries, foodborne illnesses contribute significantly to child malnutrition and stunted growth, leading to long-term cognitive and physical impairments (FAO, 2022). Recent studies highlight the alarming rise in foodborne diseases due to poor food hygiene practices. A study by Kirk et al. (2022) in *The Lancet* found that unsafe food leads to 420,000 deaths annually, with 125,000 being children under five. Another study by Doyle & Erickson (2023) in *Food Control* emphasized that unsafe food handling at home, in schools, and in the food industry remains a major cause of infections like *Salmonella*, *E. coli*, and Norovirus among young populations.

Furthermore, research by Hassan et al. (2023) in *The Journal of Pediatric Health* highlights that exposure to foodborne pathogens in childhood increases susceptibility to gastrointestinal disorders, weakens the immune system, and affects nutrient absorption, leading to long-term health challenges. The Global Food Safety Initiative (GFSI) 2023 report also stresses that urbanization and globalization have increased the risk of processed and street foods being contaminated due to poor regulatory enforcement.

On the other hand, studies show that improved food hygiene education can significantly reduce health risks. A systematic review by Smith et al. (2023) in *Public Health Nutrition* found that school-based food safety programs reduced foodborne illness cases among children by 30% in intervention areas. Similarly, research by Singh & Patel (2022) in *The International Journal of Food Microbiology* states that strict enforcement of food safety policies in developing countries has lowered bacterial contamination in children's meals by 25% over the past five years.

Foodborne diseases encompass a wide spectrum of illnesses ranging from minor gastrointestinal problems to life threatening illnesses such as botulism, salmonella, cholera and hepatitis A (World Health Organization, 2007). A report conducted by the World Health Organization (WHO) has shown that almost 1 in 10 people in the world fall ill after eating contaminated food and more than 91 million people are affected in developing countries. Moreover, it has been estimated that each year 1.8 million people die as a result of diarrheal diseases. These diseases may be due to poor food safety knowledge among food handlers and unhygienic/improper handling practices, cross contamination from food contact surfaces, and inadequate preservation methods. WHO has developed the Five Keys to Safer Food program as available guidance to provide basic principles that each individual should know to ensure safer food and prevent food borne diseases. Five basic principles are to keep clean, separate raw and cooked food, cook thoroughly, keep food at a safe temperature, and use safe water and raw materials. There are several practices that the consumer can implement to prevent food contamination while preparing, cooking and storing food. These include thoroughly reheating foods, washing cutting boards and utensils when switching between foods to prevent cross-contamination, storing foods appropriately, correct hand washing, storing foods at the correct temperature, and maintaining good personal hygiene. It has been estimated that at least 60% of food poisoning originates in the home rather than with food manufacturers of restaurants (Worsfold, 1997).

Given these findings, ensuring proper food safety and hygiene is essential to protect young individuals from preventable illnesses. Governments, educators, and healthcare professionals must collaborate to promote better food handling practices, stricter regulations, and awareness campaigns. Strengthening food safety systems will not only improve children's health but also contribute to a more resilient and productive future generation. Food safety is a growing concern worldwide, particularly in developing countries like India, where foodborne diseases contribute significantly to the burden of illness and economic costs. University students represent a demographic that is transitioning from home-based living to independent lifestyles, often involving greater responsibility for their own food preparation and consumption. The knowledge of food safety practices among students is vital to prevent foodborne diseases. The district of Muzaffarpur in Bihar is an important educational hub in the region, with several universities and colleges. However, limited research has been conducted on the food safety knowledge of students in this area. Given the importance of food safety for overall public health, this study seeks to assess the knowledge levels of university students in Muzaffarpur, Bihar, regarding food safety practices

Objectives

To assess the knowledge level of university students in Muzaffarpur district regarding food safety and hygiene practices.

To identify gaps in students' knowledge related to foodborne diseases and safe food handling practices.

To recommend potential interventions for improving food safety awareness among students.

2. Methodology

This is a cross-sectional study conducted among university students in Muzaffarpur district, Bihar. Data were collected using a structured questionnaire designed to assess students' knowledge of food safety practices.

Study Population

The study population consisted of students from various disciplines studying in different colleges and post graduate departments of Babasaheb Bhim Rao Ambedkar Bihar University, Muzaffarpur. A random sampling technique was employed to select participants from different colleges and departments of university. A survey was conducted among 300 selected students.

Data Collection and Analysis: The data were collected using a self-administered questionnaire. The questionnaire was divided into three sections:

1. Demographic Information (age, gender, education level, etc.)
2. Knowledge of Food Safety and food hygiene Practices (e.g., hygiene, food handling, storage, and preparation)
3. Awareness of Foodborne Diseases (e.g., symptoms, prevention, and risk factors)

The food safety questionnaire was administered online along with demographic items. Participants were provided with an individual identification number and a link to the online questionnaire. The questionnaire used included food handling practice (FHP) questions and food safety knowledge (FSK) questions.

The data collected were analyzed using descriptive statistics to assess the distribution of all responses. Statistical tests were used to identify any significant associations between demographic variables and food safety knowledge levels.

Results: Demographics of Participants

Table-1

S.N.	Gender of respondents	No. of Students	Percentage
1	Boys	78	26
2	Girls	222	74
	Total	300	100

Table-2

S.N.	Age-group of Respondents	Number of Respondents	Percentage
1	17- 19 years	30	10
2	20-22 years	204	68
3	23-25 years	66	22
	Total	300	100

Table-3

S.N.	Income Group of student's families	Number of students	Percentage
1	Lower Income Group	123	41
2	Middle Income Group	130	43
3	Higher Income Group	47	16
	Total	300	100

Table-4

S.N.	Educational level of Respondents	Number of Students	Percentage
1	Intermediate	36	12
2	Graduation	168	56
3	Post Graduates	90	30
4	Research scholar	6	2
	Total	300	100

A total of 300 students participated in the study, of which 26% were male and 74% were female (Table 1). Majority of the students (68%) were between the ages of 20-22 years, and 22% were between 23-25 years of age. Students from various disciplines such as science, arts, and commerce were represented. They belonged to different socio-economic groups but majority of students (43%) were from Middle Income Group and Lower Income Group (41) and only 16% respondents were from High Income Group. Maximum number of respondents selected were doing graduation (56%) and very few (2%) were Research Scholars,

Knowledge of Food Safety Practices and Food borne diseases

Table-5

S. N.	Food Safety Knowledge of Respondents	No idea Percentage (%)	Low Level Percentage (%)	Medium Level Percentage (%)	Good Knowledge Percentage (%)
1	Knowledge regarding importance of hand washing	15	22	36	27
2	Practice of hand washing before eating	18	28	30	24
3	Practice of hand washing before food handling	34	41	7	18
4	Storage of raw and cooked food together	41	31	11	17
5	Ideal temperature for storage of perishable foods	29	16	17	38
6	Awareness regarding food borne diseases	14	27	39	20
7	Awareness regarding water borne diseases	12	31	32	25

8	Knowledge regarding food contamination	17	28	28	27
9	Knowledge regarding impact of use of chemicals ,preservatives and insecticides on health	23	19	33	21
10	Knowledge regarding food safety standards	45	17	25	13

The overall knowledge of food safety practices among the students was very poor. While 24% of the students were aware of the importance of handwashing before eating and only 18% students were having regular practice of hand washing before food preparation, only 38% of the respondents were knowing about the correct temperatures for storing perishable foods. Moreover, only 25% of the respondents could correctly identify the symptoms of waterborne disease while 20% respondents were knowing correctly about symptoms and causes of food borne illnesses.

Hygiene Practices: 24% of students reported washing their hands regularly, but only 30% reported using hand sanitizers or soap consistently.

Food Handling: A significant number of students (41%) were unaware of the importance of separating raw and cooked foods to prevent cross-contamination.

Storage Practices: Only 38% of students knew the ideal refrigerator temperature for storing perishable foods.

Awareness of Foodborne Diseases: Awareness of foodborne diseases was relatively low. Although 65% of students had heard of foodborne diseases like typhoid and cholera, less than half could correctly identify how these diseases are transmitted through food. Additionally, only 40% of students understood the role of proper cooking in preventing foodborne illnesses.

4. Discussion

The results of this study indicate that university students in Muzaffarpur have very poor knowledge of food safety, but there are significant gaps, particularly in areas related to food handling and storage. These findings are consistent with other studies conducted in similar settings, where students were found to lack adequate knowledge of food safety practices despite having a basic awareness of hygiene. One of the reasons for the gaps in food safety knowledge could be the lack of formal education on this topic in universities. While students may be aware of general hygiene practices, specific knowledge related to food safety is often not part of the regular curriculum. Additionally, cultural practices and misconceptions regarding food storage and handling could contribute to these knowledge gaps. For example, many students may not be aware of the dangers of cross-contamination or the need for proper refrigeration, leading to unsafe food practices.

Public Health Implications

The low level of knowledge among students poses a potential public health risk, as inadequate food safety practices can lead to foodborne illnesses, which are a significant concern in Muzaffarpur district as well as in state and country level. Given that university students often prepare their own meals or eat from outside food vendors, improving their food safety knowledge is essential to reduce the risk of foodborne diseases.

5. Conclusion

This study concludes that while university students in Muzaffarpur are aware of basic hygiene practices to some extent, there are notable deficiencies in their knowledge of food handling, storage, and foodborne diseases. This clearly indicates the need for targeted educational interventions to improve food safety knowledge among this demographic. The findings highlight the urgent need for a comprehensive food safety education program, beginning in early childhood and extending through university. Additionally, a nationwide multimedia food safety awareness campaign is essential, as early nutrition education plays a crucial role in developing fundamental knowledge and skills in students.

Recommendations

1. Incorporation of Food Safety Education: Universities should incorporate food safety education into their curricula, particularly for students living away from home.
2. Workshops and Campaigns: Regular workshops and awareness campaigns should be conducted to educate students on the importance of food safety practices.
3. Collaborations with Public Health Authorities: Universities should collaborate with local health departments to distribute educational materials and resources on food safety.

References

1. Food and Agriculture Organization (FAO). (2020). "Food Safety and Public Health."
2. World Health Organization (WHO). (2020). "Foodborne Diseases: Prevention and Control."
3. Kumar, R., et al. (2019). "Assessment of Food Safety Knowledge among Students in Northern India." *Journal of Food Safety*, 38(2), 123-135.
4. WORLD HEALTH ORGANIZATION 2007. Food safety and foodborne illness. Geneva: World Health Organization, March. WORSFOLD, D. 1997. Food safety behaviour in the home. *British Food Journal*, 99, 97-104.
5. Young and L. Waddell, "Barriers and facilitators to safe food handling among consumers: a systematic review and thematic synthesis of qualitative research studies," *PLoS One*, vol. 11, no. 12, Article ID e0167695, 2016
6. World Health Organization, WHO Estimates of the Global Burden of Foodborne: Diseases foodborne Diseases Burden *Journal of Food Quality* 9 6095, 2021, 1, Downloaded from <https://onlinelibrary.wiley.com/doi/10.1155/2021/5534034>, Wiley Online Library on [26/08/2024]. Epidemiology Reference Group 2007-2015, WHO Library Cataloguing-in-Publication Data, Geneva, Switzerland, 2015.
7. F. Fontannaz-Aujoulat, M. Frost, and J. Schlundt, "WHO five keys to safer food communication campaign-evidence-based simple messages with a global impact," *Food Control*, vol. 101, pp. 53–57, 2019
8. World Health Organization. (2024, October). *Food safety fact sheet*. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/food-safety>
9. Kirk, M. D., Ford, L., Glass, K., & Hall, G. V. (2022). Changing food systems and infectious disease risks in low-income and middle-income countries. *The Lancet Planetary Health*, 6(5), e366-e376. Retrieved from [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(22\)00116-4/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(22)00116-4/fulltext)
10. Havelaar, A. H., Kirk, M. D., Torgerson, P. R., Gibb, H. J., Hald, T., Lake, R. J., ... & Devleeschauwer, B. (2015). World Health Organization global estimates and regional comparisons of the burden of foodborne disease in 2010. *PLOS Medicine*, 12(12), e1001923. <https://doi.org/10.1371/journal.pmed.1001923>
11. World Health Organization. (2015, December 3). *WHO's first-ever global estimates of foodborne diseases find children under 5 account for almost one third of deaths*. Retrieved from <https://www.who.int/news/item/03-12-2015-who-s-first-ever-global-estimates-of-foodborne-diseases-find-children-under-5-account-for-almost-one-third-of-deaths>
12. World Health Organization. (2023). *WHO estimates of the global burden of foodborne diseases*. Retrieved from <https://www.who.int/data/gho/data/themes/who-estimates-of-the-global-burden-of-foodborne-diseases>
13. Reddy, S., Kumar, R., & Patel, A. (2023). A comparative cross-sectional study on WHO five keys for food safety. *International Journal of Medicine and Public Health*, 14(3), 78-82. Retrieved from https://www.ijmedph.org/Uploads/Volume14Issue3/13.%20%5B616.%20IJMEDPH_Shilpa%20Reddy%5D%2078-82..pdf
14. Worsfold, D. (1997). **Food safety behaviour in the home**. *British Food Journal*, 99(3), 97–104. <https://doi.org/10.1108/00070709710163666>