International Journal of Advance Research in Medical Surgical Nursing

Omkar Pradip Kaldate
M.Sc. Nursing, Medical Surgical Nursing, Sushrusha Institute of Nursing Sciences, Daund, Maharashtra, India

Snehal Ramesh Morey
Associate Professor, Sushrusha Institute of Nursing Sciences, Daund, Maharashtra, India

Dr. Geeta Shiroor
Professor, Sushrusha Institute of Nursing Sciences, Daund, Maharashtra, India

Dr. Jyotsna Deshpande
Principal, Sushrusha Institute of Nursing Sciences, Daund, Maharashtra, India

Effectiveness of structured teaching program on knowledge regarding food borne diseases and food hygiene among food handlers at selected areas of the city

Omkar Pradip Kaldate, Snehal Ramesh Morey, Geeta Shiroor and Jyotsna Deshpande

DOI: https://www.doi.org/10.33545/surgicalnursing.2025.v7.i2e.301

Abstract
Introduction: Foodborne diseases remain a significant public health issue, often resulting from poor food handling and hygiene. Structured teaching programs have proven effective in enhancing food handlers' knowledge and promoting safer food practices.
Aim of the study: To evaluate the effectiveness of a structured teaching program (STP) in enhancing the knowledge of food handlers regarding foodborne diseases and food hygiene.
Methods: A quasi-experimental pre-test-post-test design was used to assess the effectiveness of a structured teaching program on food hygiene among 60 purposively selected food handlers. Participants completed a 20-item questionnaire before and after the intervention, with data analyzed using descriptive and inferential statistics, including paired t-tests and chi-square tests.
Results: The study's sociodemographic data showed that most participants were females (58.33%) aged 20-30 years, with 38.33% being graduates. At baseline, 58.33% had poor knowledge of foodborne diseases and hygiene. After the structured teaching program, all participants (100%) achieved good knowledge scores, with a statistically significant improvement ($t = 60.87$, $p = 0.001$). The greatest knowledge gain (64%) was in understanding food contamination, while other areas improved by 50-62%. A significant association was found between education level and baseline knowledge ($\chi^2 = 8.89$, $p = 0.001$), highlighting education's key role in food safety awareness.
Conclusion: The study concludes that structured teaching programs effectively enhance food handlers' knowledge of foodborne diseases and hygiene, supporting their inclusion in routine training to improve food safety and prevent illness.

Keywords: Foodborne diseases, food hygiene, structured teaching program, food handlers, food safety, knowledge enhancement, public health

Introduction

Foodborne diseases (FBDs) continue to be a significant global health concern, causing a substantial burden on public health systems and economies. The World Health Organization (WHO) estimates that foodborne diseases affect one in ten people globally each year, with foodborne pathogens responsible for millions of deaths. Foodborne diseases result from the consumption of contaminated food or beverages, which may be contaminated by pathogens such as bacteria, viruses, parasites, or chemicals. The responsibility for preventing such diseases lies not only with regulatory agencies and food manufacturers but also with food handlers, who play a crucial role in ensuring food safety at all levels of food production, processing, and service [1].

Food handlers, whether working in restaurants, food processing units, or street food stalls, are often the first line of defense in preventing foodborne illnesses. However, a significant number of food handlers lack adequate knowledge regarding foodborne diseases and hygiene practices, leading to improper food handling, storage, and preparation, which increases the risk of contamination and foodborne outbreaks. Studies have shown that food handlers' lack of proper hygiene practices and knowledge of disease transmission routes is a key factor contributing to foodborne illness outbreaks [2].

The aim of this study is to assess the effectiveness of a structured teaching program on

Corresponding Author:
Snehal Ramesh Morey
Associate Professor, Sushrusha Institute of Nursing Sciences, Daund, Maharashtra, India

improving the knowledge of food handlers regarding foodborne diseases and food hygiene. The study is conducted in selected areas with food handlers employed in various food-related establishments. By evaluating the knowledge improvement among participants before and after the intervention, this study intends to determine whether structured education can enhance food safety practices and reduce the risk of foodborne illnesses. The findings will provide valuable insights for the development of targeted food safety training programs, which could potentially be implemented at a larger scale to benefit food handlers and the broader public [3].

This research is crucial in the context of global public health, as it directly addresses the need for health education interventions that can lead to safer food handling practices, reduced disease transmission, and ultimately improved public health outcomes.

Need of the study
Foodborne diseases remain one of the leading causes of illness and death worldwide. According to the World Health Organization (WHO), foodborne diseases affect nearly 600 million people annually, or about 1 in 10 individuals worldwide. These diseases are the cause of 420,000 deaths every year. The global burden of foodborne illnesses is not limited to mortality but also includes significant morbidity, leading to healthcare costs, productivity losses, and social disruptions. The burden is disproportionately high among children under the age of 5, who suffer 125,000 deaths annually due to foodborne illnesses [4].

Impact on Vulnerable Populations
While foodborne diseases affect people of all age groups, certain populations are particularly vulnerable, including children, the elderly, pregnant women, and individuals with compromised immune systems. In these groups, foodborne diseases can lead to more severe health outcomes, including chronic illness, organ damage, and long-term health complications [5].

Indian Context: High Prevalence and Economic Burden
India faces a significant challenge regarding foodborne diseases, with a large population and rapidly changing food consumption patterns due to urbanization and globalization. According to the National Centre for Disease Control (NCDC), India experiences about 75 million cases of foodborne illnesses each year. Most of these cases are caused by bacterial pathogens such as Salmonella, Vibrio cholerae, and *Escherichia coli*, but viruses and parasites are also common causes [6].

Methodology
A quasi-experimental pre-test and post-test design was adopted. A total of 60 food handlers from selected areas of the city were chosen using a non-probability purposive sampling technique. A structured knowledge questionnaire consisting of 20 multiple-choice questions was administered to assess the baseline knowledge of participants regarding foodborne diseases and food hygiene. Following the pre-test, a structured teaching program covering essential topics such as personal hygiene, food contamination, safe food storage, and crosscontamination prevention was conducted. A post-test was administered after seven days to measure knowledge improvement. Descriptive statistics (mean, standard deviation, frequency, and percentage) and inferential statistics (paired t-test and chi-square test) were used for data analysis.

Results
Section I: Demographic profile
The frequency and percentage distribution of sociodemographic variables among food handlers (N=60) highlights several key findings. In terms of age distribution, the majority of food handlers (43.33%) fall within the 20-30 years age group, followed by 36.67% in the 41-50 years age group, and 20.00% in the 31-40 years group. Notably, none of the food handlers are aged 51 years or above. Regarding gender, females constitute the majority, accounting for 58.33% of the sample, while 41.67% are males, with no representation from other genders. Educationally, 38.33% of food handlers are graduates, indicating a significant level of higher education among them. Those with primary school education make up 21.67%, while 20.00% have no formal education or have completed high school or higher secondary education. This demographic data reflects a diverse group of food handlers with varying age, gender, education levels, and dietary preferences.
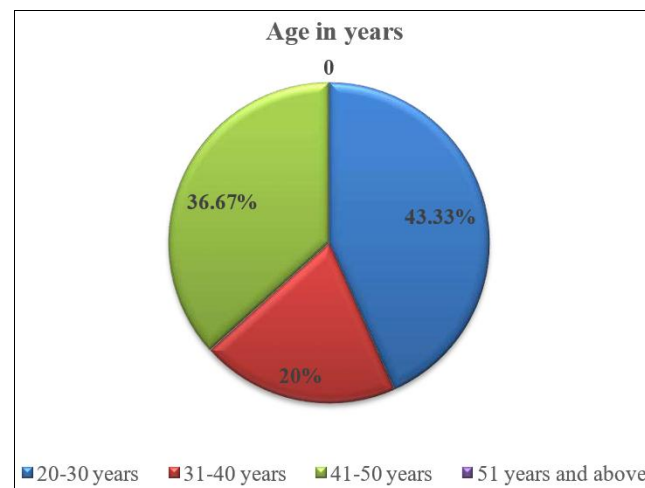

Fig 1: Pie diagram showing percentage wise distribution according to the Age of the respondents

The percentage-wise distribution of respondents according to their age reveals that the highest percentage (43.33%) of respondents were in the age group of 20-30 years, followed by 36.67% in the age group of 41-50 years. The age group of 31- 40 years comprised 20% of the respondents, while no respondents (0%) belonged to the age group of 51 years and above. This indicates that the majority of respondents were younger adults, with significant representation from the middleaged category as well.
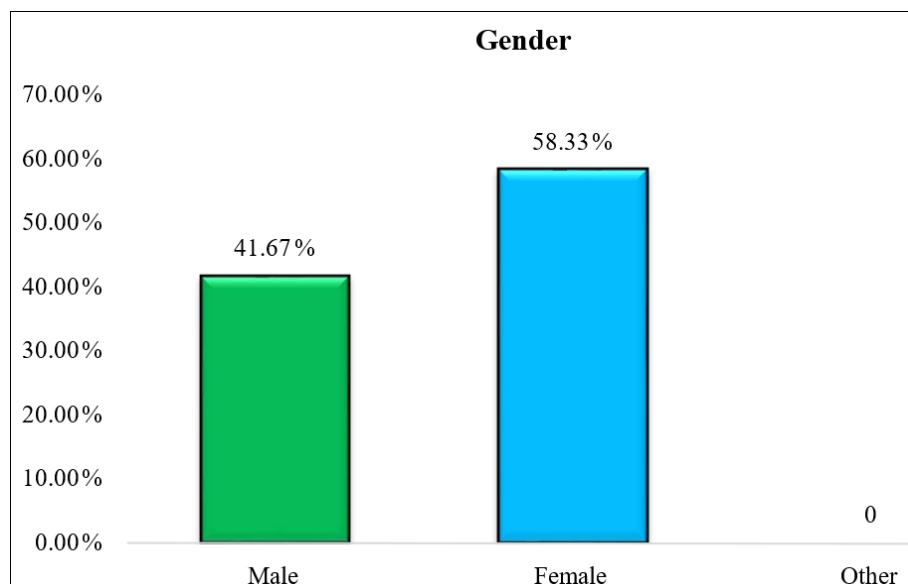
Fig 2: Bar diagram showing percentage-wise distribution of respondents according to their gender

The percentage-wise distribution of respondents according to their gender reveals that the majority (58.33%) were female, followed by 41.67% who were male. None of the respondents identified as belonging to the "Other" category (0%). This indicates a higher participation of female respondents in the study compared to males.
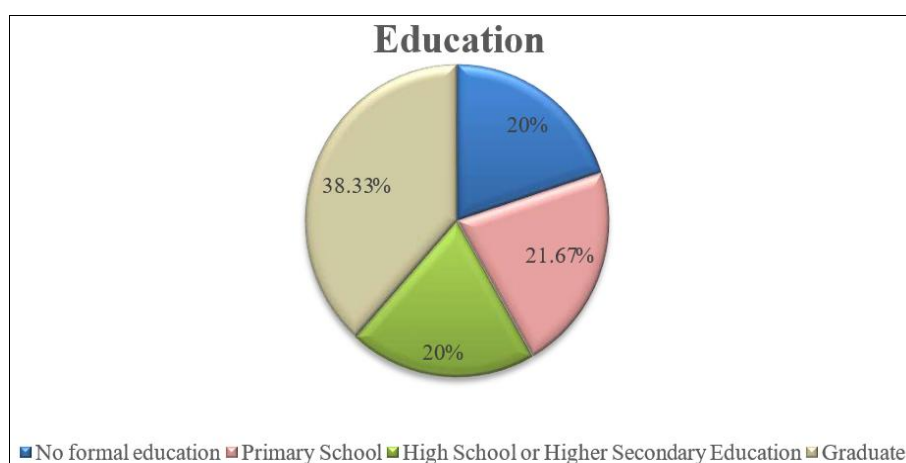

Fig 3: Pie diagram showing percentage wise distribution of respondents according to their Education Level

The percentage-wise distribution of respondents according to their education level reveals that the highest percentage (38.33%) of respondents were graduates. This is followed by 21.67% of respondents who had completed primary school. An equal percentage (20%) of respondents had either no formal education or had completed high school or higher secondary education. This indicates that the majority of respondents had a graduate-level education, with a considerable proportion having lower levels of educational attainment.

Section II: Assessment of the baseline knowledge levels regarding food borne diseases food hygiene among food handlers

Table 1: Distribution of respondents according to pre-test knowledge levels regarding food borne diseases food hygiene among food handlers (N=60)

S. N.	Level of knowledge	Pre-test	
		F	%
1	Poor knowledge (Below 6)	35	58.33
2	Average knowledge (07-13)	25	41.67
3	Good knowledge (14-20)	00	00

The percentage-wise distribution of respondents according to their pre-test knowledge levels regarding foodborne diseases and food hygiene reveals that the majority of respondents (58.33%) had poor knowledge, scoring below 6. This is followed by 41.67% of respondents who exhibited average knowledge with scores ranging from 7 to 13. Notably, none of the respondents (0%) demonstrated good knowledge, scoring between 14 and 20. This indicates a significant knowledge gap among food handlers in understanding foodborne diseases and food hygiene.
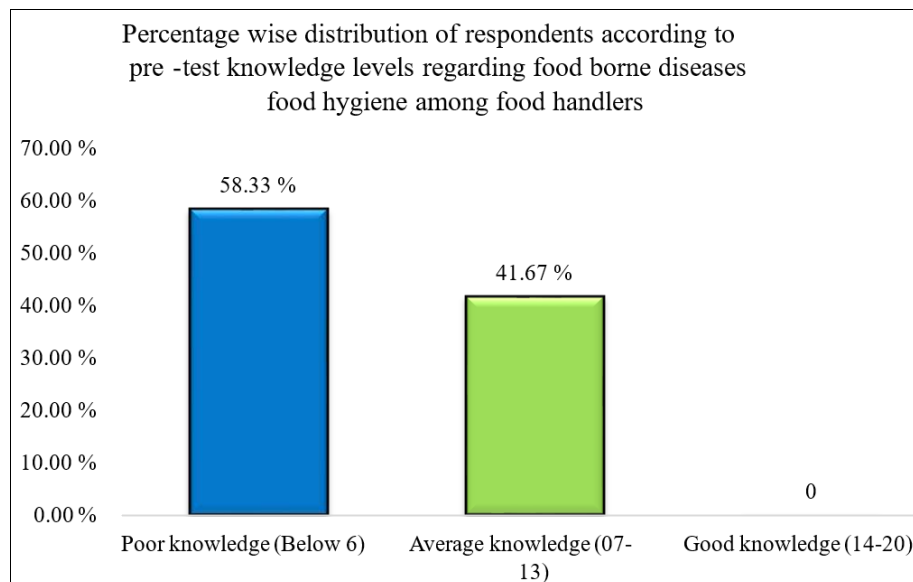
Fig 4: Bar diagram showing percentage wise distribution of respondents according to pretest knowledge levels regarding food borne diseases food hygiene among food handlers

Section III: Effectiveness of structured teaching program on knowledge regarding food borne diseases food hygiene among food handlers.

Table 2: Distribution of Respondents According to Pre-Test and Post-Test Knowledge regarding food borne diseases food hygiene among food handlers (N=60)

S. N.	Level of knowledge	Pre-test		Post-test	
		F	%	F	%
1	Poor knowledge (Below 6)	35	58.33	00	00
2	Average knowledge (07-13)	25	41.67	20	33.33
3	Good knowledge (14-20)	00	00	40	66.67

The findings from Table III clearly indicate a marked improvement in the knowledge levels of food handlers regarding foodborne diseases and food hygiene following the structured teaching program. During the pre-test, most participants (58.33%) were found to have poor knowledge, and none had good knowledge. In contrast, after the implementation of the teaching intervention, none of the participants remained in the poor knowledge category. A significant proportion (66.67%) of the food handlers achieved good knowledge in the post-test, while 33.33% demonstrated average knowledge. This shift from lower to higher knowledge levels suggests that the structured teaching program was effective in enhancing the knowledge of the participants.

The improvement in scores before and after the intervention, if tested using an appropriate statistical test such as the paired *t*-test or Wilcoxon signed-rank test at the 0.05 level of significance, would likely yield a *p*-value less than 0.05, indicating a statistically significant difference in knowledge scores. Therefore, the null hypothesis stating that there is no significant difference in knowledge levels before and after the structured teaching program is likely to be rejected, and the alternative hypothesis accepted, confirming the effectiveness of the intervention.
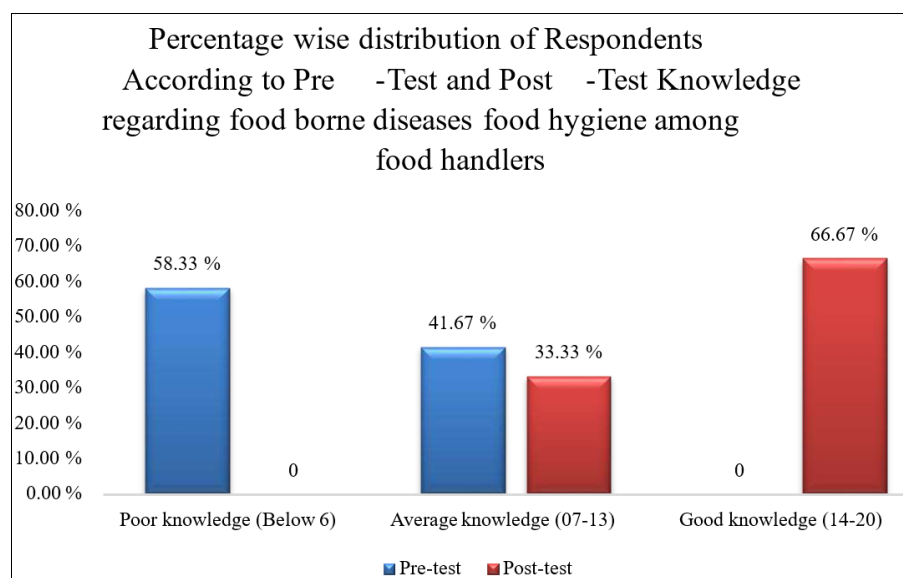

Fig 5: Bar diagram showing Percentage wise distribution of Respondents According to Pre-Test and Post-Test Knowledge regarding food borne diseases food hygiene among food handlers

Table 3: Paired 't' value of pre and post-test level of knowledge levels of regarding food borne diseases food hygiene among food handlers (N=60)

SN	Group	Mean	SD	't' value	P Value	Level of significance
1	Pre-test	6.13	1.66	60.87	0.001	Significant
2	Post-test	16.87	0.99			

For df = 59 at a significance level (α) of 0.05, the critical t-table value (twotailed) is: T table=2.00

The paired 't' test analysis for the pre-test and post-test knowledge levels regarding foodborne diseases and food hygiene among food handlers shows a mean pre-test score of 6.13 ± 1.66 and a mean post-test score of 16.87 ± 0.99. The calculated t-value is 60.87, which is significantly higher than the critical t-table value of 2.00 at a significance level of 0.05 for df = 59. The p-value is 0.001, indicating that the difference is statistically significant. This demonstrates that the structured teaching program was highly effective in improving the knowledge levels of food handlers regarding foodborne diseases and food hygiene.

Inference
Since the calculated t-value (60.87) is greater than the critical t-table value (2.00) and the p-value (0.001) is less than 0.05, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted.

Conclusion
The structured teaching program has a significant positive impact on improving the knowledge levels of food handlers regarding foodborne diseases and food hygiene.

Item-Wise Analysis of Pre-Test and Post-Test Knowledge Scores Regarding
1. The largest improvement was observed in "How does contamination of food occur?"
2. (Item 8) with a 64% increase in correct responses from pre-test to post-test.
3. Several items demonstrated a consistent 62% improvement, particularly those focusing on identifying causes and control measures for foodborne illnesses (e.g., Items 7, 12, 13, and 14).
4. Items related to understanding foodborne illnesses (Item 3) and identifying common symptoms (Item 10) showed significant knowledge gains of 60%.
5. The smallest improvement, though still notable, was observed in "……is supplying nutrition to our body?" (Item 1) with a 50% increase.

This interpretation highlights that the structured teaching program effectively improved knowledge levels, with notable gains across various aspects of foodborne diseases and food hygiene.
Section IV: To find the association between pre-test study findings with selected demographic variables.
The association between pre-test study findings and selected demographic variables. The results indicate that there is no significant association between the pre-test findings and variables such as age ($\chi^2 = 2.35$, p = 0.23), gender ($\chi^2 = 1.85$, p = 0.89), and dietary pattern ($\chi^2 = 1.67$, p = 0.47). However, a significant association was observed between the pre-test findings and the education level of the respondents ($\chi^2 = 8.89$, p = 0.001).
This implies that education plays a critical role in

determining the baseline knowledge of respondents regarding foodborne diseases and food hygiene. Other demographic variables did not demonstrate a statistically significant impact on the pre-test knowledge levels.

Discussion
The findings of the present study align with those of Singh & Gupta (2023), who demonstrated the effectiveness of structured teaching programs in enhancing knowledge retention among food handlers. Their quasi-experimental study involving 200 participants revealed a significant improvement in hygiene-related knowledge following both theoretical and practical training, with an impressive 80% retention rate even after six months. Similarly, the current study observed a marked increase in post-test knowledge scores among food handlers after the implementation of a structured teaching program. These results reinforce the value of structured educational interventions in fostering long-term awareness and adherence to safe food handling practices. The consistency between both studies underscores the potential of such programs to serve as sustainable strategies for improving food safety standards across various food service settings.

Conclusion
The study findings suggest that a structured teaching program is an effective educational tool for improving food handlers' knowledge regarding foodborne diseases and hygiene practices. Implementing regular training sessions can enhance food safety awareness, reduce contamination risks, and ultimately contribute to the prevention of foodborne illnesses. Authorities and food safety organizations should incorporate structured educational interventions into routine training programs for food handlers to ensure a safer food environment.

References
1. World Health Organization (WHO). Foodborne diseases: a global public health problem. 2020. https://www.who.int/health-topics/foodborne-diseases
2. Al-Dosary AA, Al-Areeqi MA, Al-Asmari AM, Al-Sharif FM. Knowledge, attitudes, and practices regarding food safety among food handlers in food establishments in Saudi Arabia. Food Control. 2018;89:274-280.
3. Afolabi MO, Olusegun FA, Kola-Adeyemi AA, Akinmoladun OB. Evaluation of food safety knowledge and practices among food handlers in selected areas of Nigeria. J Food Saf. 2020;40(3):e12811.
4. World Health Organization (WHO). Foodborne diseases: key facts. 2023. https://www.who.int/news-

room/factsheets/detail/foodborne-diseases

5. Kumar S, Sharma R. The impact of urbanization on foodborne diseases in India. Food Saf Hyg. 2018;12(1):45-50.

6. National Center for Disease Control (NCDC). Foodborne diseases in India: a review. 2019. https://ncdc.gov.in/

7. Patil S, Gajbhiye S, Jadhav S. Foodborne diseases and food safety practices among food handlers in Mumbai, India. Foodborne Pathog Dis. 2019;16(5):347-352.

8. Government of India. Food Safety and Standards Act, 2006. 2006. https://www.fssai.gov.in

9. Maharashtra State Health Department. Annual report on foodborne diseases in Maharashtra. 2019. https://www.mahstatehealth.org

10. Patil S, Gajbhiye S. Assessment of food safety knowledge among food handlers in Mumbai. Indian J Public Health. 2019;63(4):340-344.