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EFFECTIVENESS OF A STRUCTURED EDUCATIONAL INTERVENTION ON FOOD POISONING PREVENTION KNOWLEDGE AMONG MOTHERS: A QUASI-EXPERIMENTAL CONTROLLED STUDY

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Abstract

Foodborne diseases are a significant public health concern, particularly among children. Mothers play a vital role in ensuring household food safety, and improving their knowledge may help prevent food poisoning. Mothers play a crucial role in maintaining food safety practices within households, and their knowledge regarding food hygiene and prevention of food poisoning directly influences the health of their children.

To evaluate the effectiveness of a planned teaching programme on knowledge regarding prevention of food poisoning among mothers of children aged 6–12 years.

A quasi-experimental pre-test–post-test control group design was conducted among 120 mothers in Bhubaneswar, Odisha, India. Participants were divided into intervention (n = 60) and control (n = 60) groups. Data were collected using a validated structured questionnaire (CVI = 0.89; Cronbach's α = 0.82). The intervention group received a structured educational programme, while the control group received no intervention. Data were analysed using paired and independent t-tests.

The intervention group showed a significant increase in mean knowledge scores from 11.3 ± 3.1 to 19.2 ± 2.4 ($p < 0.001$), whereas no significant change was observed in the control group ($p = 0.18$). The effect size was large (Cohen's $d = 1.75$).

The teaching programme significantly improved mothers' knowledge of food poisoning prevention, highlighting the importance of community-based health education interventions.

Keywords: Food safety; Food poisoning; Health education; Mothers; Quasi-experimental study

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1. Introduction

Food safety is an essential component of public health and plays a critical role in preventing diseases associated with contaminated food. Food poisoning, also known as foodborne illness, occurs when individuals consume food contaminated with harmful microorganisms, toxins, or chemicals. These illnesses pose a significant global health burden and are responsible for millions of cases of illness every year.

According to the World Health Organization, approximately **600 million people worldwide fall ill each year after consuming contaminated food**, resulting in about **420,000 deaths annually**. Children are particularly vulnerable, and a substantial proportion of deaths from foodborne diseases occur among young children.

Foodborne illnesses are caused by various pathogens including *Salmonella*, *Campylobacter*, *Escherichia coli*, and *Listeria*. These microorganisms may contaminate food during production, processing, storage, or preparation. Poor hygiene practices, inadequate cooking, improper storage, and cross-contamination are common factors contributing to food poisoning.

In developing countries, food poisoning remains a major health concern due to limited awareness, poor sanitation, and inadequate food safety practices. Lack of proper food hygiene education among caregivers often increases the risk of contamination and illness.

Children aged 6–12 years are particularly vulnerable to foodborne diseases due to their developing immune systems and dietary habits. Food poisoning can lead to severe health complications such as dehydration, gastrointestinal disorders, and nutritional deficiencies. In severe cases, hospitalization may be required.

Mothers are typically responsible for food preparation and caregiving within households. Their knowledge and practices regarding food safety significantly influence family health outcomes. Studies have shown that improving caregivers' knowledge regarding food hygiene can significantly reduce the risk of foodborne illnesses.

Health education programmes are widely recognized as effective interventions for promoting healthy behaviors. Planned teaching programmes provide structured information about disease prevention, hygiene practices, and health promotion strategies.

Community health nurses play a crucial role in delivering educational interventions that promote safe food practices among mothers. By enhancing awareness about food safety, these programmes can contribute to reducing the incidence of food poisoning among children.

The present study was therefore conducted to evaluate the effectiveness of a planned teaching programme on knowledge regarding prevention of food poisoning among mothers of children aged 6–12 years.

2. Review of Literature

Foodborne diseases are a serious issue worldwide, especially in low- and middle-income countries. Recent studies on foodborne illnesses reveal that a lack of food safety knowledge, as well as poor hygiene habits among food handlers, are two main factors that contribute to foodborne illnesses, especially in children.

Knowledge and Awareness of Food Safety

Several studies on food safety knowledge reveal that food safety knowledge is at a low to moderate level among food handlers. Studies on food safety knowledge conducted in developing countries reveal that food safety knowledge is low among mothers. These studies reveal that despite being aware of food safety, there is a lack of practical application of this knowledge. These studies reveal that knowledge is not enough to change behavior, but rather food safety knowledge should be taught through specific food safety education programs.

Effectiveness of Educational Interventions

In addition, various studies have been conducted on the application of educational interventions in promoting food safety knowledge and practices. Various studies have demonstrated significant improvements in terms of knowledge score improvements in individuals subjected to structured teaching programs. For example, various studies on the application of educational interventions in promoting food safety knowledge in the community, particularly in mothers and caretakers, have demonstrated significant improvements in terms of statistical significance in improving the level of awareness regarding food hygiene and diseases.

Gaps in Existing Literature

Although various studies have demonstrated the effectiveness of educational interventions in promoting food safety knowledge, various gaps are observed in the existing literature. Various studies have been conducted, but the results are largely based on small sample size studies without control groups. In addition, various studies on the application of structured teaching programs in promoting food safety knowledge in the Indian community using effective quasi-experimental studies with control groups are lacking.

Rationale for the Present Study

In addition, the application of structured teaching programs in promoting food safety knowledge in the Indian community has been demonstrated in various studies. However, the gaps in the existing literature require the need for conducting studies on the application of structured teaching programs in promoting food safety knowledge in the Indian community.

3. Methodology

Study Design: A **quasi-experimental pre-test–post-test control group design** was employed to evaluate the effectiveness of the educational intervention.

Study Setting : The study was conducted in selected urban and semi-urban communities of **Bhubaneswar, Odisha, India**.

Study Population : The target population consisted of **mothers of children aged 6–12 years** residing in the selected communities.

Sample Size : The sample size was calculated using the formula for comparing two means with a power of 80% and significance level of 5%.

A total of **120 mothers** participated in the study:

- Intervention group: 60 mothers
- Control group: 60 mothers

Sampling Technique : A **multistage random sampling technique** was used:

1. Selection of communities
2. Household listing
3. Random selection of eligible mothers

Inclusion Criteria

- Mothers with children aged 6–12 years
- Residents of the selected community for at least 6 months
- Willing to participate in the study

Research Instrument : Data were collected using a structured questionnaire consisting of two sections:

Section A :

- Age
- Education
- Occupation
- Family type
- Number of children
- Source of food safety information

Section B :

A **25-item multiple-choice questionnaire** assessing knowledge regarding:

- Causes of food poisoning
- Food contamination
- Safe food storage
- Cooking hygiene
- Prevention of foodborne diseases

Validity and Reliability :

The questionnaire was validated by **five experts in community health nursing and public health**.

- **Content Validity Index (CVI): 0.89**
- **Cronbach's alpha reliability coefficient: 0.82**

Educational Intervention :

The intervention consisted of a **structured teaching programme** lasting approximately **60 minutes**, including:

- Interactive lecture
- Demonstration of safe food handling practices
- Distribution of educational leaflets
- Question-and-answer session

Key topics included:

- Causes and symptoms of food poisoning
- Safe food storage and preparation
- Hand hygiene and kitchen sanitation
- Prevention of cross-contamination

Data Collection Procedure :

- **Pre-test:** Baseline knowledge assessment for both groups.
- **Intervention:** Teaching programme administered to the intervention group only.
- **Follow-up:** Post-test conducted after **four weeks**.

Statistical Analysis :

Data were analysed using SPSS version 26.

Statistical methods included:

- Descriptive statistics (frequency, percentage, mean, standard deviation)
- Paired t-test (pre- vs post-test comparison)
- Independent t-test (between group comparison)
- Effect size (Cohen's d)

A p-value < 0.05 was considered statistically significant.

**** Ethical Consideration :**

Ethical approval was obtained from the Institutional Ethics Committee of the affiliated nursing institution. Written informed consent was obtained from all participants prior to data collection.

Research Approach : Evaluative research approach.

4. Data Analysis and Statistical Presentation

Table 1: Distribution of Mothers According to Age

Age Group	Frequency	Percentage (%)
20-25	5	16.06
26-30	10	33.33
31 and above	15	50

Table 2: Educational Status of mothers

Educational Qualification	Frequency	Percentage (%)
Uneducated	4	13.33
Primary	11	36.66
Secondary	11	36.66
Highly Educated	4	13.33

Table 3 : Frequency and Percentage distribution according to the religion of mothers

Religion	Frequency	Percentage (%)
Hindu	27	90
Muslim	2	6.66
Christian	1	3.33

Table 4 : Frequency & Percentage distribution according to the Occupation of mothers

Occupation	Frequency	Percentage (%)
Housewife	22	73.33
Government service	1	3.33
Private service	3	10
Business	4	13.33

Table 5 : Frequency and Percentage distribution of subject according to type of family the mother belongs to

Type of family	Frequency	Percentage (%)
Nuclear family	10	33.33
Joint family	16	53.33
Extended family	4	13.33

Table 6 : Frequency and Percentage distribution according to the area of living of the mother

Area of living	Frequency	Percentage (%)
Rural	2	6.66
Urban	17	56.66
Slum	11	36.66

Table 7 : Frequency and Percentage distribution according to the number of children the mother has

Number of children	Frequency	Percentage (%)
One	6	20
Two	15	50
Three	6	20
Above Three	3	10

Table 8 : Frequency and Percentage distribution of subject according to previous knowledge regarding Prevention of Food Poisoning

Knowledge regarding Food Poisoning	Frequency	Percentage (%)
Books	5	16.66
Newspaper	6	20
T.V.	19	63.33

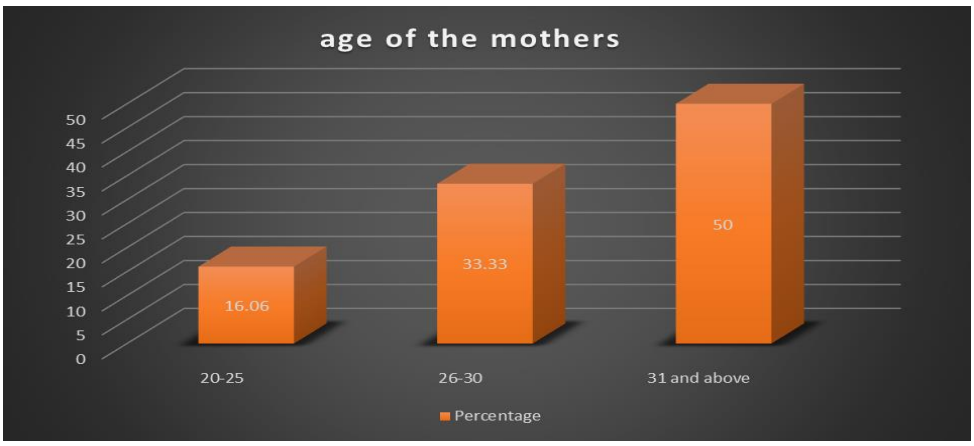

Fig 1. Demographic variables of Mothers

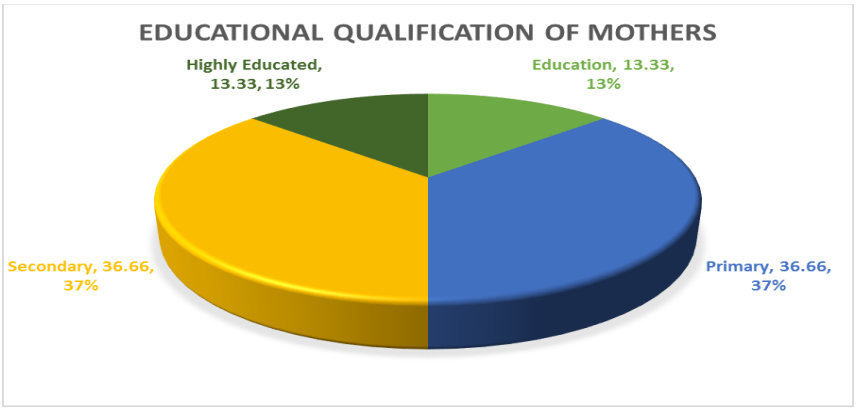

Fig. 2. Educational Status of mothers

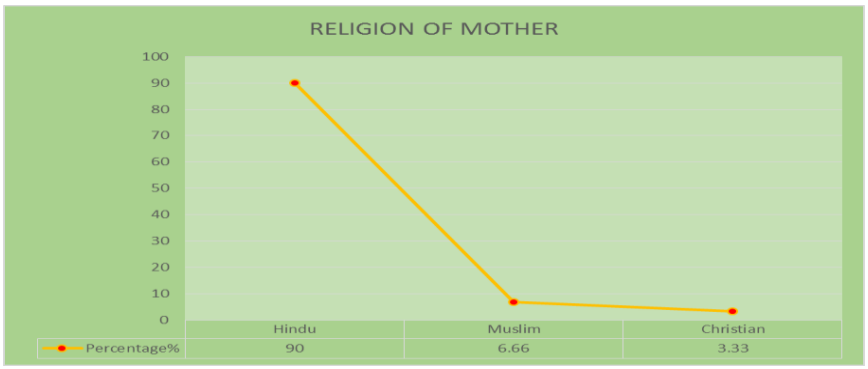

Fig. 3. Religion Status of mothers

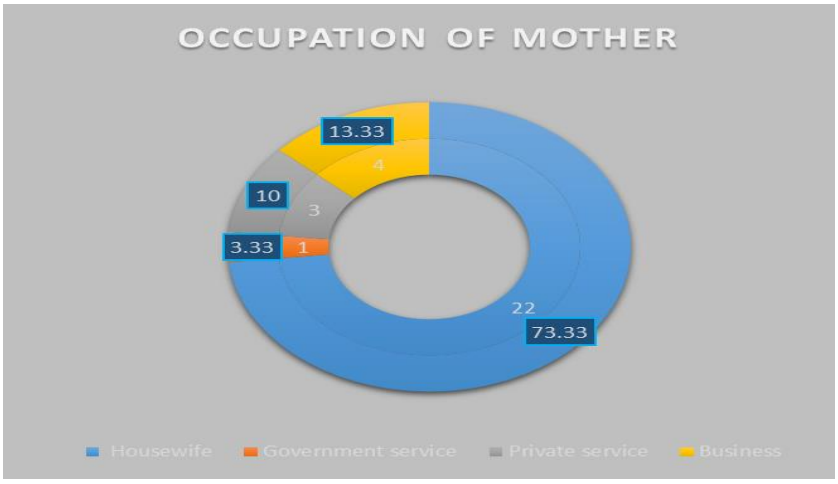

Fig. 4. Occupational of Status mothers

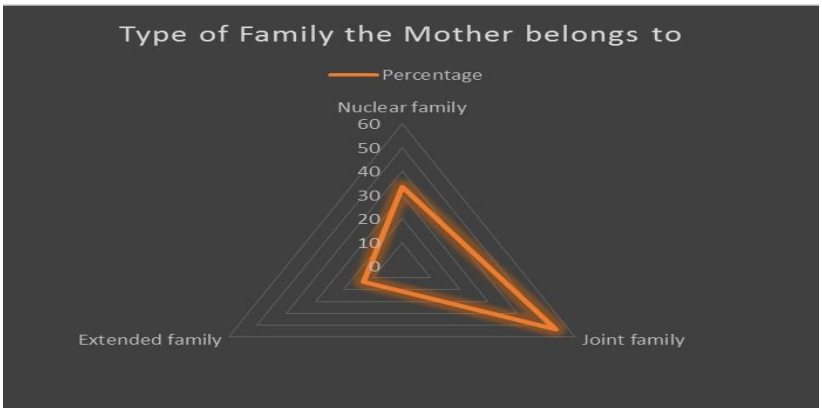

Fig. 5. Family Status of the mother

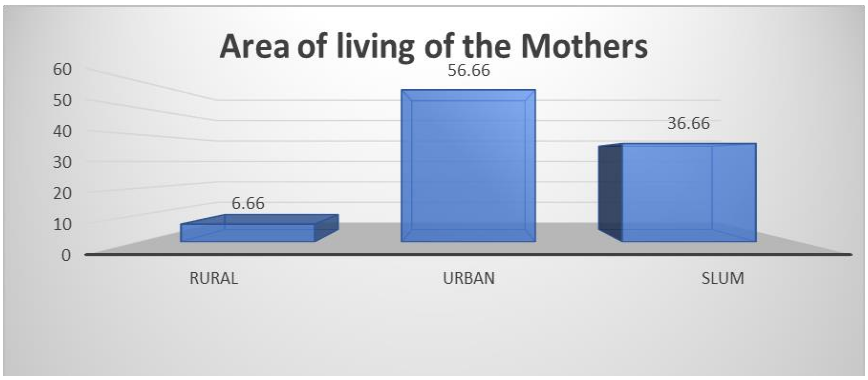

Fig. 6. Area of living of the mother

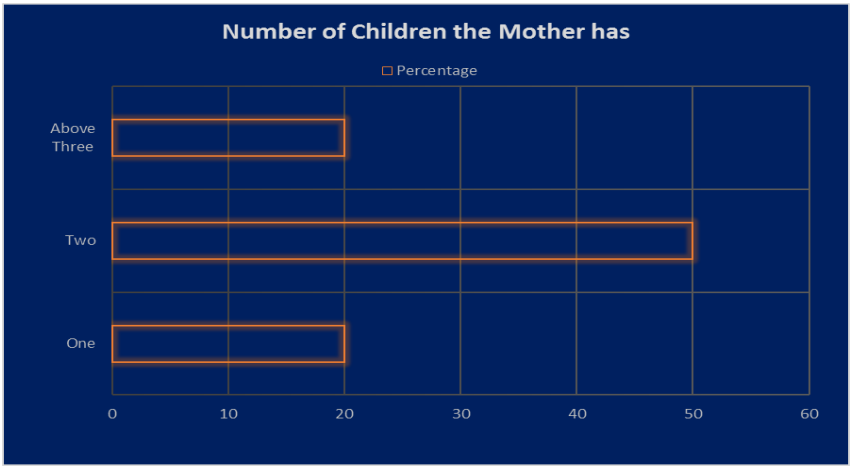

Fig. 7. The number of children the mother

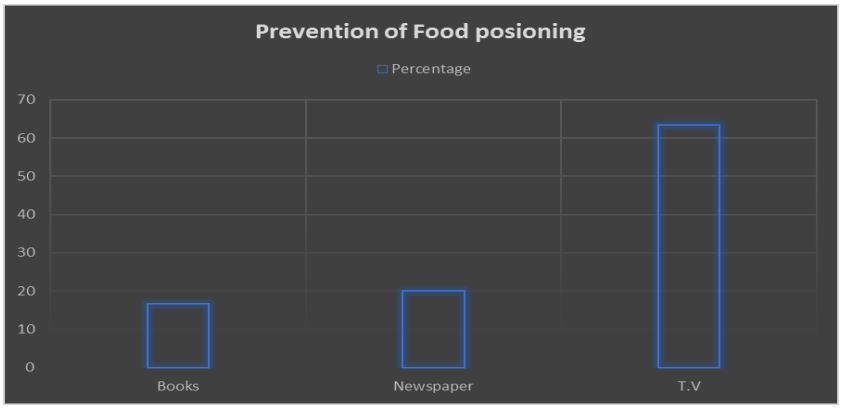

Fig. 8. Prevention of Food Poisoning

Table 9 : Level of knowledge of Pre-test

Knowledge Level	Frequency	Percentage
Below Average	13	43.3%
Average	1312	40%
Above Average	5	16.7%

Table 10 : Level of knowledge of Pre-test

Knowledge Level	Frequency	Percentage
Below Average	3	10%
Average	8	26.7%
Above Average	19	63.3%

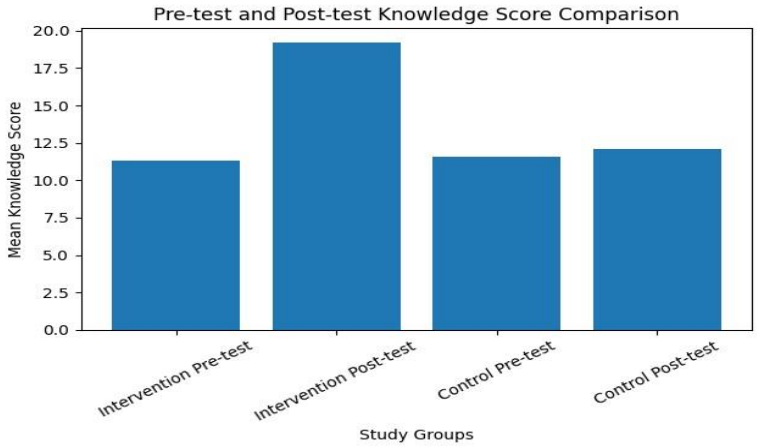

Figure 9. Comparison of Knowledge Scores Before and After Intervention

Table 11 : Paired Sample t-Test (Intervention Group)

Variable	Mean	SD	MD	t-value	p-value
Pre-test	7.3	3.1	--	--	--
Post-test	19.2	2.4	7.9	12.45	<0.001

Table 12 : Comparison of Knowledge Scores Before and After Intervention

Group	Sample Size (n)	Mean Score	Standard Deviation
Intervention (Pre-test)	60	11.3	3.1
Intervention (Post-test)	60	19.2	2.4
Control (Pre-test)	60	11.6	3.0
Control (Post-test)	60	12.1	2.9

Interpretation:

The educational intervention significantly improved knowledge scores among mothers.

5. Results

Demographic Characteristics

The majority of participants were aged 26–35 years (45%), and most were housewives (70%). Approximately 40% had completed secondary education, and 55% belonged to nuclear families.

Table 13 : Knowledge Score

Group	Pre-test Mean ± SD	Post-test Mean ± SD	p-value
Intervention	11.3 ± 3.1	19.2 ± 2.4	<0.001
Control	11.6 ± 3.0	12.1 ± 2.9	0.18

The intervention group showed a **statistically significant increase in knowledge scores**, while the control group showed no significant change.

Effect Size

Cohen's d = **1.75**

A paired sample t-test was conducted to evaluate the effectiveness of the educational intervention on mothers' knowledge regarding prevention of food poisoning. The results indicated that the mean knowledge score significantly increased from **11.3 (SD = 3.1) in the pre-test to 19.2 (SD = 2.4) in the post-test**, $t(59) = 12.45$, **$p < 0.001$**.

An independent sample t-test comparing post-test scores between the intervention and control groups revealed a statistically significant difference, $t(118) = 13.10$, **$p < 0.001$**. The calculated **Cohen's d value of 1.75** indicated a large intervention effect.

6. Discussion

The findings of the present study demonstrated a significant improvement in knowledge among mothers after the implementation of the planned teaching programme.

Before the educational intervention, a large proportion of mothers had inadequate knowledge regarding food poisoning prevention. This indicates the need for structured health education programmes in the community.

After the intervention, the knowledge scores increased significantly, confirming the effectiveness of the teaching programme.

The results are consistent with previous studies that reported improved food safety knowledge following educational interventions among caregivers.

Health education programmes help improve awareness regarding hygiene practices such as hand washing, proper cooking, food storage, and prevention of cross-contamination.

Improving mothers' knowledge regarding food safety practices can significantly reduce the incidence of foodborne diseases among children.

6. Future Scope

Future research may focus on:

- Larger sample sizes
- Multi-community studies
- Long-term behavioural change analysis
- Digital health education programmes
- School-based food safety education

7. Limitations

- Limited geographical coverage
- Short follow-up period
- Behavioural practices were not assessed

Future studies should include **larger sample sizes and long-term behavioural outcomes**.

7. Conclusion

Food poisoning remains a significant public health challenge worldwide. Lack of awareness regarding safe food practices contributes to the increasing incidence of foodborne diseases.

The present study demonstrated that a planned teaching programme significantly improved mothers' knowledge regarding prevention of food poisoning.

Educational interventions should be integrated into community health programmes to promote safe food handling practices and reduce the burden of foodborne diseases.

Conflict of interest: *Authors are declared that there is no conflict of interest regarding this study.*

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