

EFFECT OF A STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING NEEDLESTICK INJURY PREVENTION AMONG DIPLOMA NURSING STUDENTS AT A SELECTED NURSING SCHOOL IN GUWAHATI, ASSAM

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ABSTRACT

Background: Needlestick injuries are an important occupational risk for nursing students during clinical practice and may expose them to blood-borne infections. Adequate knowledge of prevention, safe handling and disposal of sharps, and post-exposure measures is therefore essential.

Objective: To assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding the prevention of needlestick injuries among Diploma Nursing students.

Methods: A one-group pre-test–post-test approach was used among 60 Diploma Nursing students in a selected nursing school at Lokhra, Guwahati, Assam. Students were selected by simple random sampling using the lottery method. Knowledge was assessed using a 30-item structured self-administered questionnaire. A Structured Teaching Programme was administered after the pre-test, and the post-test was conducted on the seventh day. Descriptive statistics and a paired t-test were used for analysis; association with selected socio-demographic variables was assessed using the Pearson chi-square test.

Results: The mean knowledge score increased from 8.8 ± 4.237 in the pre-test to 25.8 ± 3.74 in the post-test, with a mean difference of 17. The paired t-test showed a statistically significant improvement ($t = 23.81$, $df = 59$, $p < 0.001$). In the pre-test, 43 (71.67%) students had inadequate knowledge, whereas in the post-test, 57 (95.00%) students had adequate knowledge. No statistically significant association was observed between pre-test knowledge level and age, religion, type of family, year of study, or source of information ($p > 0.05$).

Conclusion: The findings demonstrate a substantial improvement in knowledge following the Structured Teaching Programme. The intervention may be useful as an educational strategy for improving awareness of needlestick injury prevention among nursing students.

Keywords: needlestick injury; nursing students; knowledge; structured teaching programme; occupational exposure; sharps safety.

1. INTRODUCTION

Nursing involves close patient contact and frequent performance of clinical procedures that may involve exposure to blood and other body fluids. Procedures such as injections, blood sampling, intravenous therapy, wound care and phlebotomy require the use of needles and other sharps. Consequently, nursing students may be exposed to needlestick injuries during clinical training.

Needlestick injuries may occur during clinical procedures, while handling contaminated needles, or during disposal of used sharps. Such injuries can expose healthcare personnel and students to blood-borne pathogens, including hepatitis B virus, hepatitis C virus and human immunodeficiency virus. Risk can be reduced through adherence to standard precautions, safe injection practices, appropriate use of personal protective equipment, safe handling and disposal of sharps, hepatitis B vaccination, immediate wound care and timely reporting and post-exposure management.

Nursing students may be particularly vulnerable because of limited clinical experience and inadequate knowledge of safe practices. Therefore, structured educational interventions may help strengthen knowledge and promote safer clinical practices. The present study was undertaken to evaluate the effectiveness of a Structured Teaching Programme regarding prevention of needlestick injuries among Diploma Nursing students in a selected nursing school at Lokhra, Guwahati, Assam.

2. OBJECTIVES

- To assess the pre-test level of knowledge regarding prevention of needlestick injuries among Diploma Nursing students.
- To assess the post-test level of knowledge regarding prevention of needlestick injuries among Diploma Nursing students.
- To compare the pre-test and post-test knowledge scores regarding prevention of needlestick injuries among Diploma Nursing students.
- To determine the association between pre-test knowledge level and selected socio-demographic variables among Diploma Nursing students.

3. METHODS

3.1 Study design

A one-group pre-test–post-test design was used to evaluate the effect of the Structured Teaching Programme on students' knowledge regarding prevention of needlestick injuries.

3.2 Study setting

The study was conducted among Diploma Nursing students in a selected nursing school at Lokhra, Guwahati, Assam.

3.3 Sample and sampling

Simple random sampling using the lottery method was used for participant selection.

3.4 Inclusion criteria

Diploma Nursing students studying at the selected nursing school who were willing to participate and were present during data collection were eligible for inclusion.

3.5 Exclusion criteria

Diploma Nursing students who were on leave or absent at the time of data collection were excluded.

3.6 Ethical Consideration

1. The principal of the NEF Institute of Nursing, located in Lokhra, Saukuchi, Guwahati-40, provided written consent.
2. Written informed consent was obtained from all participants.
3. The confidentiality of the collected data was maintained throughout the study.

3.7 Study instrument

Section A collected socio-demographic information on age, religion, type of family, year of study and source of information. Section B consisted of a 30-item self-administered structured knowledge questionnaire on prevention of needlestick injuries.

3.8 Content areas of the knowledge questionnaire

Content area	No. of items
Basic concepts and definition of needlestick injury	4
Causes and common situations leading to needlestick injury	3
Risk factors	3
Consequences	3
Standard precautions and safe handling	6
Safe disposal of needles and sharps	2
Immediate measures following needlestick injury	3
Reporting, post-exposure management and prevention	6
Total	30

3.9 Scoring system

Each correct response was assigned 1 mark and each incorrect or unanswered response was assigned 0 marks. The maximum possible score was 30. Knowledge scores were classified as inadequate (0–10), moderate (11–18), and adequate (19–30).

Knowledge level	Score	Percentage range
Inadequate	0–10	<33.33%
Moderate	11–18	36.67%–60.00%
Adequate	19–30	63.33%–100%

3.10 Validity of Tool

The tool, along with the problem statement and objectives, was submitted to three experts from the Department of Medical-Surgical Nursing for content validation. The experts evaluated the appropriateness, relevance and clarity of the items.

3.11 Data collection procedure

A pre-test was conducted using the structured knowledge questionnaire. Immediately after the pre-test, the Structured Teaching Programme was administered and covered causes, risk factors, preventive measures, safe handling and disposal of needles and sharps, and post-exposure management. A post-test using the same questionnaire was conducted seven days after the intervention.

3.12 Outcome assessment

The primary outcome was the change in knowledge score between the pre-test and post-test.

3.13 Statistical analysis

Frequency and percentage were used for socio-demographic characteristics and knowledge-level categories. Mean, median, mode, standard deviation and range were used to summarize knowledge scores. A paired t-test was used to compare pre-test and post-test scores. Pearson's chi-square test was used to examine the association between pre-test knowledge level and selected socio-demographic variables. Statistical significance was set at $p < 0.05$.

4. RESULTS

4.1 Socio-demographic characteristics

Among the 60 students, 45 (75.00%) were aged 20–22 years. Islam was reported by 37 (61.67%) students. 38 (63.33%) belonged to nuclear families. 22 (36.67%) were in the second year of study. The institution was the reported source of information for 55 (91.67%) students.

Table 1. Socio-demographic characteristics of participants (n=60)

Variable	Category	n	%
AGE	17–19 years	11	18.33
	20–22 years	45	75.00
	23–25 years	4	6.67
	≥26 years	0	0
RELIGION	Hindu	10	16.67
	Islam	37	61.67
	Christian	12	20.00
	Others	1	1.67
FAMILY TYPE	Nuclear	38	63.33
	Joint	16	26.67
	Blended	1	1.67
	Single	5	8.33
YEAR OF STUDY	1st year	18	30.00
	2nd year	22	36.67
	3rd year	20	33.33
SOURCE OF INFORMATION	Institution	55	91.67
	Peer	1	1.67
	Social	3	5.00
	Others	1	1.67

4.2 Association between pre-test knowledge level and selected socio-demographic variables

The Pearson chi-square test showed no statistically significant association between pre-test knowledge level and age, religion, type of family, year of study, or source of information (all $p > 0.05$). The chi-square value for year of study has been recalculated from the frequencies displayed in the original table and is reported below as $\chi^2 = 4.461$, $p = 0.347$.

Table 2. Association between pre-test knowledge level and selected socio-demographic variables

Variable	χ^2	df	p-value
Age	5.97	4	0.201
Religion	2.66	6	0.850
Type of family	8.68	6	0.193
Year of study	4.46	4	0.347
Source of information	3.65	6	0.723

Interpretation: None of the selected socio-demographic variables showed a statistically significant association with pre-test knowledge level at the 0.05 significance level.

4.3 Pre-test and post-test knowledge scores

The mean pre-test knowledge score was 8.8 ± 4.237 , with a median of 8, mode of 8 and range of 19. In the post-test, the mean score increased to 25.8 ± 3.74 , with a median of 27, mode of 29 and range of 16. The mean difference was 17 points.

Table 3. Descriptive statistics of pre-test and post-test knowledge scores (n=60)

Measure	Mean	Median	Mode	SD	Range
Pre-test	8.8	8	8	4.237	19
Post-test	25.8	27	29	3.74	16
Difference	17	17	21	5.53	22

4.4 Effect of the Structured Teaching Programme

The mean knowledge score increased from 8.8 ± 4.237 in the pre-test to 25.8 ± 3.74 in the post-test. The mean difference was 17. Based on the reported paired-difference standard deviation of 5.53 and $n=60$, the paired t-test was 23.81 ($df=59$), $p < 0.001$. This indicates a statistically significant improvement in knowledge following the intervention.

Table 4. Comparison of pre-test and post-test knowledge scores

Measure	Pre-test	Post-test	Mean difference	Paired t	df	p-value
Knowledge score	8.8 ± 4.237	25.8 ± 3.74	17	23.81	59	<0.001

4.5 Distribution of knowledge levels before and after the intervention

In the pre-test, 43 (71.67%) students had inadequate knowledge, 15 (25.00%) had moderate knowledge and 2 (3.33%) had adequate knowledge. In the post-test, 57 (95.00%) students had adequate knowledge, 3 (5.00%) had moderate knowledge and none had inadequate knowledge.

Table 5. Pre-test and post-test distribution of knowledge levels (n=60)

Knowledge level	Pre-test n (%)	Post-test n (%)
Inadequate (0–10)	43 (71.67)	0 (0.00)
Moderate (11–18)	15 (25.00)	3 (5.00)
Adequate (19–30)	2 (3.33)	57 (95.00)
Total	60 (100.00)	60 (100.00)

Discussion

The present study was conducted to assess the knowledge regarding the prevention of needlestick injuries among Diploma Nursing students and to evaluate the effectiveness of a Structured Teaching Programme (STP). A total of 60 students participated in the study. The study also examined the association between pre-test knowledge level and selected demographic variables such as age, religion, type of family, year of study and source of information. The findings revealed that the mean pre-test knowledge score was 8.8, with a median and mode of 8, standard deviation of 4.237 and range of 19. Following the Structured Teaching Programme, the mean post-test knowledge score increased to 25.8, with a median of 27, mode of 29, standard deviation of 3.74 and range of 16. The mean difference between the pre-test and post-test scores was 17, demonstrating a marked improvement in the knowledge of the students following the intervention.

The distribution of knowledge levels also demonstrated improvement after the intervention. In the pre-test, 43 (71.67%) students had inadequate knowledge, 15 (25.00%) had moderate knowledge and only 2 (3.33%) had adequate knowledge. In the post-test, none of the students had inadequate knowledge, 3 (5.00%) had moderate knowledge and 57 (95.00%) had adequate knowledge. Thus, the findings indicate a substantial shift from inadequate and moderate knowledge towards adequate knowledge after the Structured Teaching Programme. The paired t-test value was 23.81, indicating a substantial difference between the pre-test and post-test knowledge scores. The improvement in knowledge following the intervention suggests that structured teaching can be used as an educational approach to strengthen students' understanding of needlestick injury prevention.

The study further revealed that there was no statistically significant association between pre-test knowledge level and the selected demographic variables. The association was not significant for age ($\chi^2=5.97$, $p=0.201$), religion ($\chi^2=2.66$, $p=0.850$), type of family ($\chi^2=8.68$, $p=0.193$), year of study ($\chi^2=4.46$, $p=0.347$), or source of information ($\chi^2=3.65$, $p=0.723$). Since all p-values were greater than 0.05, the baseline knowledge level did not show a statistically significant association with these selected demographic characteristics. Overall, the findings of the present study demonstrate that the Structured Teaching Programme was associated with a marked improvement in knowledge regarding prevention of needlestick injuries among Diploma Nursing students.

Conclusion

The study concluded that the majority of Diploma Nursing students had inadequate knowledge regarding prevention of needlestick injuries before the intervention. In the pre-test, 43 (71.67%) students had inadequate knowledge, whereas only 2 (3.33%) had adequate knowledge. Following the Structured Teaching Programme, knowledge improved considerably, with 57 (95.00%) students attaining an adequate level of knowledge and none remaining in the inadequate knowledge category.

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References

1. Singh N, Bano S, Nandhana KS, Parvathy B, Nihal M. A Study to Assess the Effectiveness of a Structured Teaching Program on Prevention of Needle Stick Injuries among Nursing Students. *European Journal of Medical and Health Research*. 2025;3(S1):103–108. DOI: 10.59324/ejmhr.2025.1.16.
2. Lamani G, Bhupali P, Vinay PM, Gejji S. A study to assess the effectiveness of structured teaching programme [STP] on knowledge regarding prevention of needle sticks injuries among the internship students at selected institute of nursing, Belgaum. *International Journal of Advance Research in Medical Surgical Nursing*. 2023;5(2):37–45. DOI:10.33545/surgicalnursing.2023.v5.i2a.137.
3. World Health Organization. WHO best practices for injections and related procedures toolkit. Geneva: World Health Organization; 2010. 55 p. ISBN: 978-92-4-159925-2.
4. Polit DF, Beck CT. *Essentials of nursing research: appraising evidence for nursing practice*. 10th ed. Philadelphia: WoltersKluwer; 2021.
5. Burns N, Grove SK, Gray JR. *Understanding nursing research: building an evidence-based practice*. 6th ed. St. Louis: Elsevier Saunders; 2015.
6. Sharma S. *Nursing research and statistics*. 5th ed. New Delhi: Elsevier; 2025. ISBN: 978-81-312-7119-3.

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