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Pre-Experimental Study to Assess Effectiveness of Structured Teaching Program on Knowledge and Attitude Regarding Needle Stick Injuries Among Nursing Students

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Abstract

Background: For healthcare professionals, especially nursing students undergoing clinical training, needle stick injuries (NSIs) represent a serious occupational risk. The danger of contracting blood-borne illnesses is increased by ignorance and poor preventive measures. Developing a safety-oriented mindset and improving awareness may be facilitated by structured educational programs. Methods: A pre-experimental one-group pre-test and post-test design was opted in this study. A self-structured knowledge questionnaire and an attitude scale created and approved by specialists were used to gather data. The definition, causes, hazards, precautions, and post-exposure protocols for management of Needle stick injury (NSI) all were included in the Structured Teaching Program (STP). To assess the effectiveness of the intervention, paired t-tests were used to statistically examine pre- and post-intervention ratings. Results: The study revealed a significant improvement in both knowledge and attitude scores following the intervention. The mean pretest knowledge score was 17.65 with a standard deviation (S.D.) of 2.747 after intervention score significantly increased to 34.92, with a standard deviation of ±2.78, Where the mean pretest attitude score was 7.65 with a standard deviation (S.D.) of ±2.14 , following the interventions post-test attitude score significantly increased to 11.17, with a standard deviation of ±1.43.The mean post-test knowledge and attitude scores were substantially higher compared to pre-test scores ($p < 0.001$). This indicates that the STP had a positive impact on students' understanding and perception of NSI prevention and management. Conclusion: The structured teaching program was effective in enhancing the knowledge and improving the attitude of nursing students regarding needle stick injuries. The planned training program was successful in raising nursing students' awareness of needle stick injuries and improving their attitudes toward them. These instructional techniques need to be incorporated into curriculum for nurses in order to guarantee safety procedures and lower threats to occupational health during clinical exposure. Keywords: Needle stick injury, Structured Teaching Program, Occupational exposure, Knowledge, Attitude.

Keywords: Pre-experimental study, effectiveness of structured teaching programme, Needle Stick Injury, occupational health hazards, knowledge and attitude.

Introduction

In the healthcare industry, needlestick injuries (NSIs) are among the most prevalent and avoidable work-related risks, particularly for nurses and nursing students. The World Health Organization defines these injuries as the accidental puncture of the skin by a needle or other sharp item used during patient care.[1] Nursing students are especially vulnerable to NSIs because of their lack of clinical expertise and exposure to high-risk procedures during their training. According to studies, a substantial number of nursing students sustain at least one needlestick injury while enrolled in training.[2]

Hepatitis B virus (HBV), hepatitis C virus (HCV), and Human Immunodeficiency Virus (HIV) are the most dangerous including other more than 20 bloodborne diseases that can spread through NSIs.[3] According to WHO Worldwide, NSIs are thought to be responsible for 2.5% of HIV infections and 40% of hepatitis B and C infections among healthcare professionals.[1] Along with the possibility of infection, NSIs can cause severe mental pain, anxiety, and fear in those who are afflicted, which may have an impact on their confidence and future performance in clinical settings.

Several studies have highlighted the significance of preventive measures, including prompt post-exposure prophylaxis, wearing personal protection equipment, disposing of sharp objects safely, and following conventional procedures.[4] Nursing students still have a significant knowledge and attitude gap about these procedures, nevertheless. According to a 2003 study by Norsayani and Noor Hassim, many nursing students demonstrated poor adherence to safety protocols and little understanding of the hazards of NSIs.[5]

It has been claimed that Structured Teaching Programs (STPs) are successful educational interventions for enhancing knowledge and encouraging positive attitudes toward infection control procedures. Usually, the goal of these programs is to promote critical thinking through interactive teaching techniques and offer thorough, fact-based information.[6] Institutions can give nursing students the knowledge and abilities they need to reduce occupational risks and advance the culture of safety in healthcare settings by putting in place structured Teaching Program (STPs) that focus on NSI prevention.

Despite infection control training, research indicates that attitudes and understanding about NSI prevention are substantially inadequate. Nursing students frequently lack confidence while using sharp objects, are not familiar with common safety procedures, or may not completely understand the dangers of NSIs.[5]

The purpose of this study is to determine whether or not a structured training program could enhance nursing students' knowledge and attitudes toward preventing needlestick injuries. It is anticipated that the results will provide important new information about how focused training initiatives might improve infection control procedures among aspiring medical professionals.

- **Methodology**

A pre-experimental study was conducted over the 3 months period from August-October 2024 in Kamrup District Assam. The study aimed to determine the effectiveness of Structured Teaching Programs (STPs) on level of knowledge and attitude score regarding prevention and management of needle stick injury among Nursing students of selected Nursing colleges of District Kamrup Assam. Ethical clearance was taken from Research ethical committee of NEMCARE Institute of Nursing Sciences Mirza, Guwahati. Permission was taken for Principals of Nursing colleges where the pilot study and final research study was conducted.

- **Objectives :**

1. To assess the effectiveness of STP on level of knowledge and attitude score regarding needle stick injury among nursing students in selected nursing colleges.
2. To determine the association of pretest on level of knowledge and attitude score regarding needle stick injury with the socio-demographic variables of nursing students in selected nursing colleges.

- **Inclusion Criteria:** Students who were willing to participate in the study and were available at the time of data collection. The students who are didn't have any medical issue during the time of data collection were included as sample for this study.
- **Data collection tools:** Tools were prepared in three section which contains Socio-demographic questioners which contains age, professional course, clinical exposure, any needle stick injury history, any educational program on Needle Stick Injury (NSI) and Source of information , self-structure Knowledge questioners (Multiple choice questions) and self-structure attitude scale (Likert-scale). Tools were validated obtaining expert opinion of the field. Experts were requested to judge the items of tool for clarity, appropriateness, relevance for the purpose of the study.
- **Procedure of data collection:** The data collection period schedule of 24 October 2024- 30th October 2024. One 1st day Pre-test was conducted using interview technique and and after getting data from all the participants intervention Structured Teaching Programme (STP) was given, after 1 week of intervention i.e. on 30th October 2024 post-test was collected.
- **Statical Analysis:** It is planning that data to be entered prospectively and coded in a computerized data base and to analyse by using descriptive and inferential statistics. Analysis was based on the objective of the study using descriptive static.

Descriptive statistics including frequency, percentage, mean median and standard deviation. Paired T-test was applied to find out the significant difference between pre-test and post-test level of knowledge and attitude scale. To find out association between the pre-test level of knowledge and attitude score with selected sociodemographic data Chi-square was applied. Probability p value of less than 0.05 was considered as statically significant.

3. Results :

Total sample of 60 Nursing students were included in this study.

Section-A

SOCIODEMOGRAPHIC DATA

Variables	Options	Percentage	Frequency
Age	17-18 years	31.7%	19
	19-20 years	50.0%	30
	21-22 years	18.3%	11
	23 years and above	0.0%	0
Professional course	BSC nursing	0%	0
	GNM	100%	60
	Post BSC nursing	0.0%	0
	MSc. nursing	0.0%	0
Clinical exposure	Yes	100.0%	60
	No	0.0%	0

Any Needle Stick Injury in past	Yes No	21.7% 78.3%	13 47
Attended any education program on NSI	Yes No	53.3% 46.7%	32 28
Source information of	Mass media Peer group Family hospital staff Nursing college teacher	1.79% 0.00% 3.57% 14.29% 80.36%	1 0 2 8 45

TABLE 1 : FREQUENCY AND PERCENTAGE DISTRIBUTION OF SOCIO-DEMOGRAPHIC VARIABLES

SECTION-B

PRE-TEST & POST-TEST KNOWLEDGE SCORES

PRE-TEST KNOWLEDGE SCORES: 11 participant (18.33%) had inadequate knowledge before the intervention. 42 participants (70%) had moderate knowledge levels before the intervention. 11.66% had adequate knowledge levels before the intervention.

POST-TEST KNOWLEDGE SCORES:_After the intervention, none of the participants remained in the inadequate knowledge category (0%). 5 participants (8.33%) shifted from moderate knowledge to inadequate knowledge after the intervention.

55 participants (91.67%) achieved adequate knowledge levels after the intervention.

(N=60)

Paired t-test	**Mean ±S.D.**	**Paired t-Test**	**P value**	**Table Value at 0.05**
PRE-TEST KNOWLEDGE	17.65 ±2.74	32.216 *Sig	<0.00 1	2.00
POST-TEST KNOWLEDGE	34.92 ±2.78			

** Significance Level 0.05 Maximum=40 Minimum=0

TABLE NO. 2 : COMPARISON OF DESCRIPTIVE STATISTICS OF PRE-TEST AND POST-TEST SCORES OF KNOWLEDGE

Mean Pre-test & Post-test Knowledge Score: The mean pretest knowledge score was 17.65 with a standard deviation (S.D.) of 2.747.The mean post-test knowledge score significantly increased to 34.92, with a standard deviation of ±2.78 .The range of post-test knowledge scores ranged from 25% to 40%.

Paired T-Test Significance: The paired t-test showed a significant difference between pretest and post-test knowledge scores ($t = 232.216$, $p < 0.001$, degrees of freedom = 59).This indicates that the improvement in knowledge from pretest to post test was statistically significant.

Result depicts that "t" value is less then table value at 0.001 level of significance, hence Hypothesis H_{01} is rejected.

SECTION-C

PRE-TEST & POST-TEST ATTITUDE SCORE

- **Highly favourable (9-13)**: A small percentage (13.33%) of participants had pre-test scores indicating a highly favourable towards the subject or topic being assessed. after the intervention, representing 71.6 % of participants have highly favourable attitude, This reflects a substantial increase in highly favourable compared to the pretest, indicating that the intervention was successful in fostering highly favourable among the participants.
- **Favourable(5-8):** The majority (66.7%) of participants had pretest scores categorized as a unfavourable. This suggests a balanced or moderate level of agreement or positivity in their attitudes, without strong leanings towards either a positive or negative view point, after intervention 23.33%participants had favourable attitude This indicates a significant decrease in the number of participants with unfavourable compared to the pretest, showing that the intervention had an impact on shifting attitudes towards either positive or negative ends of the spectrum.
- **Unfavourable (0-4)**:A significant portion (20%) of participants demonstrated a highly favourable based on their pretest scores. These individuals likely exhibited high levels of agreement or positivity in their attitudes towards the subject or topic. After intervention only 5% participants had unfavourable attitude.

N= 60

Paired t-test	**Mean ±S.D.**	**Paired t-Test**	**P value**	**Table Value at 0.05**
PRE-TEST ATTITUDE	7.65 ±2.14	10.75 *Sig	<0.00 1	2.00
POST-TEST ATTITUDE	11.17 ±1.43			

** Significance Level 0.05 Maximum=13

TABLE – 3 : COMPARISON OF DESCRIPTIVE STATISTICS OF PRETEST AND POST-TEST SCORES OF ATTITUDE

The interpretation of these results is as follows:

Mean Pre-test & Post-test attitude Score: The mean pretest attitude score was 7.65 with a standard deviation (S.D.) of ±2.14. The mean post-test attitude score significantly increased to 11.17, with a standard deviation of ±1.43.The range of post-test knowledge scores ranged from 25% to 40%.

Paired T-Test Significance: The paired t-test showed a significant difference between pretest and post-test attitude scores ($t = 10.75$, $p < 0.001$, degrees of freedom = 59).This indicates that the improvement in knowledge from pretest to post test was statistically significant.

Result depicts that "t" value is less then table value at 0.001 level of significance, hence Hypothesis H_{02} is rejected.

SECTION-D

Association of pre-test knowledge score and pre-test attitude score with selected socio-demographic variables: association between pre-test knowledge score and pre-test attitude score with selected socio-demographic date was tested by using Chi-square test, result shows there is not any significant correlation between these two variables.

Hence H_{03} was accepted.

Discussion: This study evaluated how well a structured teaching program (STP) affected the knowledge and attitude scores of a representative group of nursing students about needle stick injuries (NSI). According to the results, nursing students' knowledge and attitude scores significantly improved after the intervention, suggesting that the STP was successful in raising awareness and encouraging a preventive mindset. Similar findings were reported in related studies: Kaur et al. (2021) conducted a quasi-experimental study to evaluate the effectiveness of an STP on knowledge regarding needle stick injuries (NSI) among nursing students in Punjab. The mean pre-test score was 10.23, and after intervention post-test score was 17.81 at $p<0.001$. finding show a statistically significant improvement in knowledge the effectiveness of structured teaching. [7] Joseph and Thomas (2019) conducted a quasi-experimental study to assess attitude of Nursing students towards needle stick injury prevention (NSI) among 80 nursing students in Kerala. Only 25% of students had a positive attitude toward NSI prevention in the pre-test, which improved to 78% in the post-test. There was a significant improvement in attitude scores ($p<0.001$), highlighting the effectiveness of structured educational programs.[8] With the aim to decrease the incidence of NSI, enhance safety behaviour, promote early reporting, and support proper post-exposure management among nursing students, these studies are in conformity with current results and support for the incorporation of structured training courses in the curriculum for nursing.

Conclusion:

The current study concluded that nursing students' attitudes and knowledge about needle stick injuries (NSIs) were significantly improved by the structured teaching program (STP). The educational intervention effectively raised students' awareness and encouraged a preventive approach toward NSIs, as seen by the statistically significant improvement in knowledge and attitude scores found in the post-intervention assessment. Those findings highlight the necessity of including planned, research-based educational programs in nursing curriculum to give prospective medical professionals the tools they need to avoid workplace dangers and ensure patient as well as own safety. Achieving such improvements in clinical settings requires ongoing training and reinforcement of harmless conduct.

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