

A Quasi Experimental Study to Evaluate the Effectiveness of Structured Teaching Program Regarding Prevention of Needle Stick Injuries with Regard to Infection Control Measures among Staff Nurses

Running title or short title: Effectiveness of structured teaching program regarding prevention of needle stick injuries with regard to infection control measures among staff nurses

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Abstract: *Quasi experimental study to evaluate the effectiveness of structured teaching program regarding prevention of needle stick injuries among staff nurses in terms of gain in knowledge scores. 60 staff nurses were selected by purposive sampling method 30 in each control and experimental group. Data was collected by Structured knowledge questionnaire & analyzed by using descriptive and inferential statistics. The pretest knowledge score varied from 8-25 with mean pretest knowledge score 13.07 in experimental group and 7-22 with mean pretest knowledge score 12.66 in control group. The post test knowledge score varied from 11-29 with mean posttest knowledge score 22.89 in experimental group and 8-26 with mean posttest knowledge score 14.5 in control group. It was evident that mean pretest knowledge scores of both group is almost equal but the mean post test knowledge scores of experimental group is more than that of control group. The difference between mean pretest and post test knowledge scores is 9.82. "t value"=10.66 was found to be greater than $p=3.36$ at the level of 0.001 which implies that the post test knowledge score was statistically highly significant. Findings revealed that structured teaching program has a positive impact on knowledge in terms of increase in scores.*

Keywords: Effectiveness, Structured teaching program, Needle stick injuries, Infection control measures, Staff nurses

1. Background

"Sleeping Threat to Health Care Workers" Needle Stick Injury

A Needle Stick Injury (NSI) is a percutaneous piercing wound commonly set by a needle point but can also be by other sharp instruments or objects. Nurses are much prone to get these injuries. It is an occupational hazard. Needle stick injuries are of concern because it can cause blood borne diseases such as Hepatitis-B,C and Human Immunodeficiency Virus (HIV).¹

During recent years, more concern about HIV, Hepatitis B and hepatitis C has prompted to perform research in identifying why these injuries occur and also in developing measures to prevent them. Needle Stick Injuries is still an ongoing problem despite the published guidelines and training programs. Injuries can occur when drawing blood, administering an intramuscular or intravenous drug or performing other procedures involving sharps, the needle can slip and injure the healthcare workers and most common during needle recapping and as a result of failure to place used needles in approved sharp containers.²

Nurses have the highest rate of Needle Stick Injuries among the health care workers. In India approximately 3 million health workers experience percutaneous exposure to blood borne viruses each year. Out of that 16,000 HCV, 66,000 HBV and 200-500 HIV infections occur annually.³

A cross sectional survey was conducted on occupational exposure and risk of blood borne virus infection among health care workers in North India Health Care Setting. The findings revealed that out of 266 health care workers, 63% reported at least one percutaneous injury. The study concluded that occupational exposure to blood needs an intervention to enhance their occupational safety to prevent unnecessary nosocomial transmission of blood borne viruses.³

Kim Y B (1996): A retrospective descriptive study was conducted on needle stick injuries among 630 health professionals in the university hospital South Korea. The result showed that out of 630 health professional, 521 (82.7%) reported needle stick injuries. 33.4% reported 3 or more episodes of needle stick injuries. It is concluded that needle stick injuries occurred before (19%), during (25%) and after (56%) client treatment.⁴

Keeping in view that most of the researches are conducted on assessment of knowledge regarding needle stick injuries. During clinical posting the researcher has observed that many nursing students and new staff nurses and other health care personals have lack of awareness regarding the use of preventive measures of needle stick injury, so the researcher opted to choose this study to organize a teaching program regarding the prevention of needle stick injuries.

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2. Material and Methods

A Quasi-Experimental research approach with Pre-test Post-test Control group design was used. The present study was conducted at different departments of tertiary care hospital of India. Total sample size was 60 nursing personnel. Tools used for the study consists of two parts.

Part-1- Sample characteristics: This part contain demographic data such as age, gender, educational status, working area, source of previous information and injuries experienced during working.

Part-2- Structured knowledge: A multiple choice questionnaire was developed based on the structured teaching to evaluate the pre-test and post-test knowledge scores. Each item had a score of one (1) mark for correct answer and zero (0) for incorrect answer. Reliability of the tool was established by spilt half method and Karl Pearson's

formula of co-efficient of correlation, $r = 0.82$, tool was found reliable for the study.

Description of Tool

Contents/aspects	Item distribution	No. of items	Total scores
Introduction of topic	1-8	8	8
Protection of health workers from NSI	9-10	2	2
Protocols to be followed after getting NSI	11-12	2	2
Incidence of NSI	13-15	3	3
Recommendation by WHO while dealing with sharp waste	16-18	3	3
Post exposure prophylaxis and management	19-26	8	8
Points to be followed under PEP	27-30	4	4

3. Results

Section I: Socio-demographic characteristics of subjects

Table 1: Frequency and Percentage Distribution of the Subjects according to their demographic variables
N=60

S.No.	Q. No.	Characteristics	Control group		Experimental group	
			Frequency (f)	%age	Frequency (f)	%age
1. Age (in years)	A	18-21 yrs	1	3.33%	3	10%
	B	22-25 yrs	5	16.66%	6	20%
	C	26-29 yrs	16	53.33%	16	53.33%
	D	>29	8	26.66%	5	16.66%
2. Gender	A	Male	3	10%	3	10%
	B	Female	27	90%	27	90%
3. Educational status	A	GNM	26	86.66%	24	80%
	B	B.Sc. Nursing	3	10%	6	20%
	C	Post Basics	1	3.33%	0	0%
4. Working Area	A	Medicine Ward	15	50%	9	30%
	B	Surgery Ward	7	23.33%	9	30%
	C	Special Area	6	20%	9	30%
	D	O.T.	2	6.66%	3	10%
5. Previous source of information	A	Mass Media	4	13.33%	4	13.33%
	B	Seminar	5	16.66%	3	10%
	C	In-service education	2	6.66%	7	23.33%
	D	Health Professionals	19	63.33%	16	53.33%
6. Type of injury	A	Needle-prick	9	30%	8	26.66%
	B	Broken Ampoules	0	0%	3	10%
	C	Sharp Instrument	3	10%	0	0%
	D	All of above	18	60%	19	63.33%

Data presented in **table 1** revealed that **in control group**, out of 30 maximum number of subjects 16 (53.33%) were in the age group 26-29 years, 27 (90%) were females, 26 (86.66%) were GNM. Half of them, 15 (50%) were working in the medicine area, 19 (63.33%) had information from health professionals, and 18 (60%) had injury from all types of needle stick injuries.

In experimental group, out of 30 maximum number of subjects 16 (53.33%) were in the age group of 26-29 years, 27 (90%) were females, 24 (80%) were GNM. With regard to their area of work out of 30 subjects, 9 (30%) were working in medicine, 9 (30%) were working in the surgery

area, 9 (30%) were in special area, and 3 (10%) were working in the operation theatre. With regard to their previous source of information, 16 (53.33%) had information from health professionals. 19 (63.33%) had injury from all types of needle stick injuries. Data presented further reveals that the obtained chi-square values regarding sample characteristics between control and experimental group were not significant ($p > 0.05$). Thus, it is established that both groups were homogeneous before the intervention.

Section II: Effectiveness of structured teaching program in terms of gain in knowledge scores regarding prevention of needle stick injuries among staff nurses.

Table 2: Frequency and percentage distribution of level of knowledge scores of staff nurses regarding prevention of needle stick injuries among control and experimental group.

Level of Knowledge	Control Group				Experimental Group			
	Pre-test		Post-test		Pre-test		Post-test	
	n	%	n	%	n	%	n	%
Inadequate	10	33.33	5	16.66	8	26.66	0	
Moderate	19	63.33	23	76.66	20	66.66	8	26.66
Adequate	1	3.33	2	6.66	2	6.66	22	73.33

The data presented in **Table 2** showed that in **control group**, out of 30 subjects during pre-test 19 (63.33%) have moderate knowledge, 1 (3.33%) had adequate knowledge and 10 (33.33%) had inadequate knowledge. In post-test 23 (76.66%) had moderate knowledge and 5 (16.66%) had inadequate knowledge and 2 (6.66%) had adequate knowledge. In **experimental group**, out of 30 subjects

during pre-test 20 (66.66%) had moderate knowledge, 2 (6.66%) had adequate knowledge and 8 (26.66%) had inadequate knowledge. During post-test after intervention 8 (26.66%) had moderate knowledge, 22 (73.33%) had adequate knowledge and no subject had inadequate knowledge.

Table 3: Comparison of pre-test and post-test mean knowledge score of staff nurses regarding prevention of needle stick injuries among control and experimental group.

n	Control Group					't'	Experiment Group					
	mean	SD	mean	SD	df		mean	SD	mean	SD	df	't'
30	12.66	4.21	14.5	4.25	29	1.46 ^{NS}	13.07	3.70	22.86	4.37	29	10.66 ^{***}

The data presented in the **Table 3** showed that the mean pretest knowledge score is 12.66 in control group and 13.07 in experimental group. The mean post-test knowledge score is 14.5 in control group and 22.89 in experimental group.

The data presented in the **Table-4** showed that the mean post-test knowledge score was 14.50 in control group and 22.89 in experimental group. In order to find out the significance of difference between mean post-test knowledge scores among experimental and control group, paired 't' value was computed. The obtained value of 't'=10.31 was found to be greater than the table value of p≥3.66 at the level of 0.001 which implies that the difference between the post-test knowledge score regarding prevention of needle stick injuries among control and experimental group was found statistically highly significant. This shows that the staff nurses exposed to the structured teaching program had higher knowledge in post-test.

In **control group** the obtained value of 't'=1.46 was found **non-significant** at level 0.05 where p≤ 2.05, inferred that there is no significant difference between pre-test and post-test knowledge scores regarding prevention of needle stick injuries in control group. In **experimental group**, the obtained value of 't'=10.66 was found to be greater than the table value p= 3.66 at the level of 0.001 which implies that the difference in pre-test and post-test knowledge scores was found **highly significant**.

Section III: Association between the post-test knowledge scores and selected socio-demographic variables among experimental group.

Table 4: Difference between mean post-test knowledge scores regarding prevention of needle stick injuries among staff nurses in control and experimental group

Control Group			Experiment Group			mean _d	df	't'
n	mean	SD	n	mean	SD			
30	14.50	4.25	30	22.89	4.37	8.39	29	10.31 ^{***}

*** =highly Significant at p<0.001

Table 5: Association between the post-test knowledge score regarding the prevention of needle-stick injuries with selected demographic variables among experimental group

S. No.	Q. No.	Characteristics	Post-Test Score		Degree of Freedom (df)	Chi-square (χ ²)
			Below Median	Above Median		
1. Age (in yrs.)	A	18-21 yrs	2	1	03	3.98 ^{NS} p> 0.05
	B	22-25 yrs	5	1		
	C	26-29 yrs	7	9		
	D	>29 yrs	4	1		
2. Gender	A	Male	3	0	01	2.21 ^{NS} p>0.05
	B	Female	15	12		
3. Educational Qualification	A	GNM	14	10	02	0.12 ^{NS} p>0.05
	B	B.Sc. Nursing	4	2		
	C	Post Basic	0	0		
4. Working Area	A	Medicine Ward	6	3	03	3.12 ^{NS} p>0.05
	B	Surgery Ward	7	2		
	C	Special Area	4	5		
	D	O.T.	1	2		
5. Previous source of	A	Mass Media	3	1	03	3.79 ^{NS}

information	B	Seminar	2	1		p>0.05
	C	In-service Education	2	5		
	D	Health Professional	11	5		
6. Types of Injury	A	Needle-Prick	7	1	03	3.36 ^{NS} p>0.05
	B	Broken Ampoules	2	1		
	C	Sharp Instruments	0	0		
	D	All of Above	9	10		

The obtained chi square values for age, gender, educational qualification, area of work, previous source of information, and type of injury was lesser than the table value of chi square ($p \leq 3.36$) at the level of 0.05, which indicates that there was no significant association between the post-test knowledge score of experimental group with selection demographic variables.

4. Conclusion and Recommendation

The pre-test knowledge score varied from 8 - 25 in experimental group and 7- 22 in control group. The mean pre-test knowledge score is 13.07 in experimental group and 12.66 in control group. The post-test knowledge score varied from 11 – 29 in experimental group and 8 – 26 in control group. The mean post- test knowledge score is 22.89 in experimental group and 14.5 in control group. Majority of staff nurses have gain in the knowledge regarding prevention of needle stick injuries after the structured teaching program.

It was evident from the results that though mean pre-test knowledge scores of experimental (13.07) and control group (12.66) is almost equal but the mean post-test knowledge scores of experimental group (22.89) are more than that of control group (14.5).

These findings revealed that structured teaching program has a positive impact on knowledge in terms of increase in knowledge of staff nurses regarding the prevention of needle stick injuries.

5. Financial Support and Sponsorship

Nil

6. Conflicts of Interest

There are no conflicts of interest.

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