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RESEARCH ARTICLE

A Study to Assess the Effectiveness of Information, Education and Communication on Needle Stick Injury Among B. Sc Nursing Students

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Abstract: Needle stick injuries are among the most common accidents reported by healthcare workers, including doctors, nurses and non-clinical staffs. Objectives: The primary objectives of the study are to 1) assess the level of knowledge on needle stick injury, 2) evaluate the effectiveness of IEC on needle stick injury, and 3) determine the association between knowledge on needle sticks injury among B. Sc Nursing students with the selected demographic variables. Methods: In this non-experimental research study descriptive research approach is used. Non-probability convenient sampling technique was used to select samples. Pre-test data were collected through structured questions about needle stick injury. The students' knowledge was assessed and given IEC on needle stick injury post-test data collected through structured questions. Students' knowledge was categorized into three levels such as inadequate, moderate, and adequate. Results: Preliminary results indicate the frequency and percentage distribution of level of pre-test knowledge and post-test knowledge regarding Needle stick injury among B.Sc Nursing students. Pre-test knowledge of students 29 (58%) were inadequate, 17 (34%) were moderate, and 3 (6%) were adequate. Post-test knowledge of students 4 (8%) were inadequate, 4 (8%) were moderate, 42 (84%) were adequate. Conclusion: Needle stick injury remains a significant occupational hazard for nursing students, particularly those with limited knowledge and awareness about prevention and post-exposure protocols. The lack of proper training, inadequate adherence to safety practices, and insufficient knowledge about standard precautions increase the risk of such injuries.

Keywords: Needle stick injury, Demographic variables, Descriptive research approach, Information, Education, and Communication.

INTRODUCTION

The World Health Organization (WHO) defined safe injection as one that is given using appropriate equipment and does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for other people[2,3]. Unsafe injection is important cause of transmitting blood-borne diseases such as Hepatitis B (HBV), Human Immune-deficiency Virus (HIV), Hepatitis C virus (HCV).[4] These diseases put the patient, health workers at great risk by causing reduced life a expectancy, productivity and also create burden on communities and health-care systems in the form of high treatment costs. The burden of diseases from Needle Stick Injuries (NSIs) in Health Care Workers (HCWs) which showed that there were 3 million accidental needle-stick injuries leading to 37% of all new HBV, 39% of new HCV cases and around 5.5% of new HIV cases . Health care providers and care consumers are exposed to hazards of needle stick injuries from inadequate supply of appropriate sharp containers, unsafe practices such as recapping of needles, manipulating used sharps (bending, braking, or cutting hypodermic needles), passing of sharps from one health care worker to another, sharps carelessly left in unexpected places. The WHO estimates that 501,000 deaths have occurred because of unsafe injection practices. These deaths could have been prevented by injection safety practices which include reduction of injections, ensuring safe injection practices. Unsafe injections also carry socio-economic and psychological consequences on the individual and the health system. Safe injection practices reduce a great burden on health system by breaking the chain of transmitting blood-borne diseases and their consequences. In the developing countries, unsafe injection practices exist substantially and are associated with the transmission of blood-borne pathogens. A comparative study carried out in two hospitals in Nigeria showed that participants knowledge level was high 70.4% associated unsafe injection with blood-borne infection, 55.9% had correct information that two handed recapping is not a safe injection practice, 84.4%claimed that contaminated sharps predisposes the community to bio-hazards, and 293(76.1%) had correct information that used syringes and needles should be discarded in a sharp waste box. However, regarding to practice about half of them (50.4%) of the participants recently sustained sharp injury through intramuscular and subcutaneous injections. Only 15.6% of this number reported the injuries to their institution.[7] A study done in south-east Nigeria only 67.2% had previously any form of training on injection safety and only 54% (81/150) had heard or seen color coded bins. The standard needle and syringe is still widely used and 45% still recap needles or syringes after use. Half (50.6%) of the respondents had a

previous needle prick injury. Only 25.6% with previous needle prick injury had post-exposure prophylaxis.[8]

Needle stick injuries (NSIs) pose a serious occupational hazard, especially for healthcare workers, exposing them to blood borne pathogens such as HIV, hepatitis B, and hepatitis C. Understanding the causes, prevalence, and preventive strategies for NSIs is crucial for ensuring the safety of healthcare environments. This study is significant because it can help raise awareness, promote adherence to standard precautions, and encourage the implementation of safer medical devices and better training programs. By highlighting the impact of NSIs, this research can also influence policy development, aiming to reduce the incidence rate and protect the physical and mental well-being of healthcare providers. Furthermore, the findings can contribute to creating a culture of safety, encouraging incident reporting, and ultimately improving patient care outcomes.[9]Another important significance of this study is its potential to influence educational curriculum and training modules for nursing and medical students. By integrating NSI prevention strategies into healthcare education, future professionals can be better equipped with the knowledge and skills necessary to protect themselves and their colleagues. Emphasizing practical training, such as proper handling of sharps and immediate response to injuries, can lead to a long-term reduction in occupational exposures. In this way, the study not only addresses current risks but also helps to build a safer future workforce.[10] Additionally, this research can provide valuable data for hospital administrators and policymakers to justify investments in safer needle technologies and effective surveillance systems. With evidence-based findings, healthcare institutions can implement targeted interventions, such as vaccination programs, post-exposure prophylaxis, and regular monitoring of compliance with safety protocols. As a result, organizations may experience lower rates of staff turnover, reduced healthcare costs due to occupational infections, and improved morale among employees, all contributing to a healthier and more efficient work environment.

MATERIALS AND METHODS

Research methodology is one of the vital sections of research .since the success of any research is mostly dependent upon the methodological issues that are followed the execution of research work The role of methodology consists of procedure and technique for conducting the study. Cortty (2018) defined research methodology which as the strategy, plan of action, processor design lying behind the choices and use of particular methods and linking the choices and use of methods to the desired outcomes. This chapter deals with the methodology which was followed in this study to assess the knowledge regarding needle stick injury among B.Sc Nursing students. This chapter deals with research design , variables, setting of the study, population , sample size, sampling technique, development and description of tool, content validity, reliability of the tool, procedure for data collection and analysis.

Research approach and design

Quantitative research approach is used by the investigator to assess the knowledge and practice regarding needle stick injury among B.Sc nursing students. Research design is a blueprint to conduct a research study, which involves the description of research approach, study setting, sample size, sampling technique, tools and methods of data collection and analysis to answer specific research questions or for testing research hypothesis**.** In this study descriptive research design was adopted for conducting this study to assess the knowledge regarding needle stick injury among B.Sc nursing students. In this study setting is in Arulmigu Meenakshi College of Nursing at Kanchipuram.

Variable:

Independent variable: Independent variable of the study is IEC on weaning.

Dependent variable*:* Dependent variable of the study is level of knowledge of B.Sc Nursing students on needle stick injury.

This study student the entire set of individuals or objects having some common characteristic selected for a research study. The sample size was 50 B.Sc Nursing students in Arulmigu Meenakshi College of Nursing in Kanchipuram.

Sampling technique

Sample technique refers to the process of selecting portion of population to represent the entire population. In present study the sampling technique was non probability sampling technique.

Criteria for sample selection

Inclusion criteria:

Nursing students who are available at the data collection, and are willing to participate.

Exclusion criteria

Nursing students who are not under this study involved. This study was carried out in Arulmigu Meenakshi College of Nursing in Kanchipuram.

Description of the tool

Section - A: **Demographic variable.**

It is deal with demographic variables such as age of students, sex, education, residence, religion, and family type.

Section - B: Semi structured questionnaire

The questions were selected and four options were given below each question. The semi structured questionnaire consisted of 20 multiple choice questions, and each

questions had four options which included correct answers. The participants were free to choose any one option for each question. The score was calculated by dividing the total number of obtained scores by the total number of maximum score and expressed in percentage. Based on the scores the knowledge was graded.

Scoring technique = (Number of correct answers / Total questions) x 100%

Table 1. Scoring technique of knowledge questionnaires

S. No	Score	Percentage	Level of knowledge
1.	1 - 7	< 35%	Inadequate
2.	8 - 14	> 36-70%	Moderately adequate
3.	15 - 20	> 71%	Adequate

Data collection

A prior permission obtained from the institution for the data collection procedure. The study was conducted in Arulmigu Meenakshi College of Nursing at Kanchipuram. The 50 B.Sc Nursing students were selected during available the data collection procedure. After obtaining consent from the study samples, the samples were selected by using non probability convenient sampling technique. The researchers collected the demographic data of the sample and administer the pretest questionnaire to assess the level of knowledge regarding needle stick injury and given IEC on needle stick injury and conducted post test on needle stick injury to know the effectiveness of IEC.

RESULTS AND DISCUSSION

Table 1. Frequency and percentage of demographic variables

S. No	Demographic Profiles	Components	Frequency	percentage
1	Age in year	17 18 20 above	6 30 14	12% 60% 28%
2	Gender	Male Female Others	3 47 0	6% 94% 0%
3	Type of family	Nuclear family Joint family	39 11	78% 22%
4	Place of residence	Rural Urban	32.3 17.7	64.6% 35.5%
5	Occupation of the father	Government job Business Daily wages	8.15 7.15 34.7	16.3% 14.3% 69.4%
6	Family monthly income in rupees	8.000 10.000 11.001 15.000 16.001 20.000 Above 20.000	25 7 5 13	50% 14% 10% 26%
7	Source of information	Television Newspaper Mass media	25 18 7	50% 36% 14%

Table 1 depicts the frequency and percentage distribution of demographic variables among B.SC Nursing student based on demographic variables. This table consists of Age, Gender, Type of Family, Place of residence, Occupation, Monthly income and Source of information.

Table 2. Frequency and percentage distribution of level of IEC regarding needle stick Injury

S. No	Level of knowledge	Pre-test		Post-test	
		Frequency	Percentage	Frequency	Percentage
1.	Inadequate (1-7)	29	58%	4	8%

2.	Moderate (8-14)	17	34%	4	8%
3.	Adequate (15-20)	3	6%	42	84%

Table 3 depicts percentage distribution of B.Sc Nursing student according to their level of knowledge 4 (8%) were belongs to inadequate, 4 (8%) were belongs to moderate and 42 (84%) were belongs to Adequate.

Figure 1. Frequency and percentage distribution of Level of IEC regarding Needle stick injury

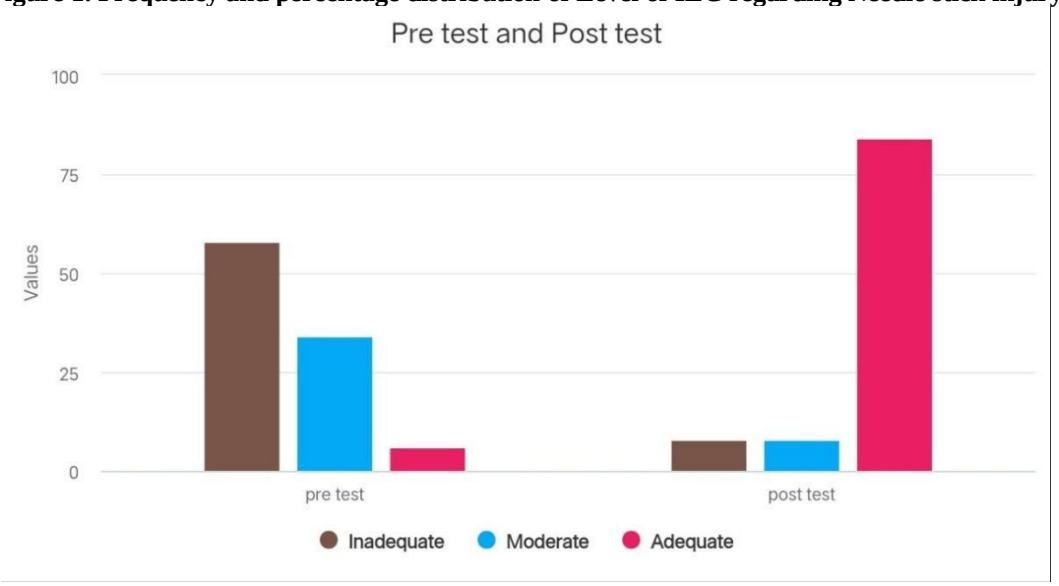

Table 3. Comparison between Pre-test and Post-test level of IEC regarding needle stick injury.

S.No	Pre-test mean value	Post-test mean value	Mean difference	*P*-value
1.	6.98 3.74	16.39 3.77	9.41	0.035 *P* < 0.05 (S)

This table 3 represents the pre-test mean value was 6.98 along with standard deviation of 3.74 and post-test mean value was 16.39 along with standard deviation of 3.77 and the mean difference was 9.41 and the P value is 0.035 which is less than <0.05 and which is statistically significant. The data collected for the study was analyzed to evaluate the effectiveness of the Information Education Communication (IEC) program on Needle stick injury among B.Sc Nursing students in Arulmigu Meenakshi college of Nursing. The results demonstrated a significant improvement in needle stick injury knowledge after the IEC intervention. The mean pre-test knowledge score was 6.98, which increased to 16.39 in the post-test and the mean difference is 9.41 which indicates a considerable gain in knowledge among the participants. The calculated t-value was 10.99, which is statistically significant at p<0.05, and the overall difference in score was to be highly significant at p<0.001.

Table 4. Association between levels of information education communication regarding Needle stick injury selected demographic variables among B.sc Nursing students.

S.No	Demographic Variables	Inadequate	moderate	Adequate	Significant
1.	Age 17 18 20 Above	 0 4 0	 0 1 3	 5 26 11	Df-4 Chi-7.092 *P* = 0.07 *P* < 0.05 (Significant)
2.	*Gender* Male Female	 0 4	 0 4	 3 39	Df-2 Chi-0.607 *P* = 0.435 *P* < 0.05 (Significant)
3.	*Family* Nuclear Joint	 4 0	 4 0	 27 15	Df-2 Chi-4.081 *P* = 0.043 *P* < 0.05 (Significant)
4.	*Place of residence*				Df-2

	Rural Urban	1 3	2 2	24 18	Chi-1.547 *P* = 0.213 *P* < 0.05 (Significant)
5.	*Occupation* Government Business Daily wages	 0 0 4	 1 1 2	 4 5 33	Df-4 Chi-3.005 *P* = 0..083 *P* < 0.05 (Significant)
6.	*Income* 8,000-10,000 11,001-15,000 15,001-20,000 Above 20,000	 2 1 0 1	 0 1 0 3	 21 7 4 10	 Df-6 Chi-6.453 *P* = 0.01 *P* < 0.05 (Significant)
7.	*Information* Television Newspaper Mass media	 1 1 2	 1 0 3	 17 9 16	Df-4 Chi-2.567 *P* = 0.01 *P* < 0.05 (Significant)

P < 0.05 = significant, > 0.05 = Not significant.

Table 4 showed that there Age, Gender, significant Type of family, Place of residence, Occupation, Income and source of information association between demographic variable of knowledge on Needle stick injury among B.sc Nursing Student at AMCON . Hence research hypotheses H3: There will be a between post test knowledge of needle stick injury selected demographic variable significant association. Totally, 50 samples were selected for this study. The B.sc Nursing students knowledge assessed by using self-structured questions. In this study, the demographic variables of B.Sc Nursing students in Arulmigu Meenakshi college of Nursing at Kanchipuram were assessed. Among them, 6(12%) were belongs to age group of 17, 30 (60%) maximum belongs to age, sex is female 47 (94%), Male 3(6%) 11 (36.6%). Type of Family nuclear family 39 (78%), place of residence rural 32.3 (64.6%), urban 17.7 (35.5%). Source of Information Television 25 (50%), Newspaper 18 (36%), Massmedia 7 (14%) was noticed. Data analysis shows that percentage distribution of B.Sc Nursing student according to their level of knowledge 4(8%) were belongs to inadequate, 4 (8%) were belongs to moderate and 42(84%) were belongs to Adequate. H1: There will be a significant difference in pre test and post test level of knowledge score on needle stick injury among B.sc Nursing students. Similarly, Al-Mugheed et al. (2023) assessed the effectiveness Needle stick injuries constitute the greatest threat to nursing students during clinical practice because of accidental exposure to body fluids and infected blood. Methodology: Descriptive study, convenient sampling. Results: The majority, 65.1%, reported one incidence in the last year, while (24.4%) 15 students reported two incidents of needle stick injuries. Recapping was the most prevalent (74.1%), followed by during injection (22.3%). Students who had needle stick injuries more than three times last year reported a lower level of all needle stick injury domains than other groups (Mean =1.5, SD = 1.1; Mean = 19.5, SD = 1.1; Mean=9.5, SD = 1.1, respectively).

The posttest mean value was 6.98 along with standard deviation of 3.77 and post-test mean value was 16.39 along with standard deviation of 3.77 and the mean difference was 9.41 and the P value is 0.035 which is less than <0.05 and which is statistically significant. There will be a significant association between instructional media on knowledge on needle stick injury among B.Sc Nursing students in selected college. Ahmed and Khan (2020) was conducted a study to assess the effectiveness of IEC on needle stick injury prevalence and response to needle-stick injuries in a tertiary care hospital. Methodology: One hundred and ninety three healthcare workers were recruited, including doctors, medical students, nurses, student nurses and paramedics. Results: There were 60(31.1%) health care workers reported needle stick injury. Majority of the injuries 51(85%) occurred during contact with patients who were assessed as not high-risk and 9(15%) when exposed to high-risk patients. Most of responders 49(81.7%) reported that the injury was self- inflicted and 11(18.3%) reported that it was caused by someone else. About 45(75%) injuries were caused by hollow bore needle and 15(25%) by a solid needle. There is a significant between demographic variable of age, gender, types of family, place of residence, occupation of father, family monthly income, and source of information. H3: There will be a significant effectiveness between post-test levels of knowledge on needle stick injury with selected demographic variables. Likewise, Gambhir (2020) reported that the level of knowledge on needle stick injury among first year nursing students (107) in selected colleges of Pondicherry. Their findings showed that 88 (82.2%) of the student had poor knowledge and 18 (16.82%) student had average level of knowledge and 1 (0.3%) student had good knowledge on needle stick injuries. There was a significant association found between level of knowledge with income of father at *P* < 0.05 level.

CONCLUSION

In the current study, the frequency and percentage distribution of effectiveness of IEC on needle stick injury among B.Sc nursing students were 4 (8%) belongs to inadequate knowledge, 4 (8%) belongs to moderately

adequate knowledge, 42 (84%) belongs to adequate knowledge. Studies and interventions indicate that targeted IEC programs significantly improve students' understanding. The findings of the present study have important implications in the field of nursing practice, nursing education, nursing research and nursing administration.

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