

Original Article

AN EDUCATIONAL INTERVENTIONAL PROGRAMME FOR PREVENTION AND MANAGEMENT OF NEEDLE STICK INJURIES AMONG NURSING STUDENTS AT A TERTIARY CARE HOSPITAL, JABALPUR, MADHYA PRADESH

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ABSTRACT

Background: Nursing students are at increased risk of acquiring blood borne infections, this is largely due to NSI which they encounter in their every day work. They are frequently unaware of prevention and management of NSI and proper BMW disposal.

Objective: To assess and enhance knowledge of nursing students for prevention and management of NSI.

Methods: This was a Quasi experiment study conducted at Nursing College, NSCB Medical College Jabalpur (M.P.) among 100 nursing students. A preformed questionnaire was used to assess existing knowledge of prevention and management of NSI, then students were given series of lectures and interactive sessions to prevent and manage NSI then same group was subjected to post intervention assessment.

Results: It was observed that 78% respondents suffered NSI was during recapping of needle. Other than needle, 86% respondents mentioned of getting struck by stylet of IV catheter, 14% subjects recalled more than 5 incidences of NSI in past 15 days. In post intervention assessment it was observed that intervention made a significant (Wilcoxon signed rank Test $Z=6.68, p<0.001$) impact in knowledge of students for prevention and management of NSI. The intervention motivated 5 more students for Hepatitis B immunization.

Conclusions: Sensitization of nursing students for prevention and management of NSI is quintessential in preventing these occupational hazards and should be included in nursing training curriculum.

Key words- Needle stick injury, Quasi experimental study, Wilcoxon signed Rank Test.

INTRODUCTION

A needle stick injury (NSI) is puncture of the skin by a needle that may have been contaminated by contact with an infected patient or fluid.¹ All Health Care Personnel including

emergency care providers, laboratory personnel, autopsy personnel, hospital employees, interns and medical students, nursing staff and students, physicians, surgeons, dentists, labour and delivery room personnel, laboratory technicians,

health facility sanitary staff and clinical waste handlers and health care professionals at all levels are at risk of acquiring NSI during their routine work.²

NSI poses occupational hazard for transmission of blood borne infections like hepatitis B virus (HBV), the hepatitis C virus (HCV), and the Human Immunodeficiency Virus (HIV). There is 0.3 percent risk for HIV, 9-30 percent for HBV and 1-10percent for HCV following needle stick exposure.²

NSI most frequently occurs during drawing blood, administering an intramuscular or intravenous drug, or performing other procedures involving sharps. The needle can deviate and injure the healthcare worker. Reasons for NSI are thought to be, poor knowledge of health workers about handling sharps, its hazards and management of NSI and proper disposal of sharps wastes.

In turn, a NSI may also pose a risk for a patient if the injured health professional carries HBV, HCV or HIV. Despite their seriousness as a medical event, NSI have been neglected and under reported. Nurses are most common health care professionals who encounter NSI in there day to day work. Nursing students are most suitable candidates for training of prevention and management of NSI as they are likely to come across such situations in future. Also there behavior is likely to be modulated as they are still in nascent stage of their career. This study aims at assessing knowledge of prevention and management of NSI of nursing students. Following this they were made aware of prevention and management of NSI by educational programme and promoted for Hepatitis B vaccination.

METHODOLOGY

A quasi experimental cross-sectional study was conducted, in which 100 nursing students of NSCB Medical College Jabalpur were interviewed, to assess their existing knowledge of prevention and management of NSI using preformed questionnaire. The questionnaire contained multiple choice questions that covered their knowledge of hazards of NSI, history of NSI during the preceding 15 days, type of instrument and procedures causing NSI , protocol of management of NSI, sharps waste disposal, universal precautions and Hepatitis B immunization status. Data obtained was

compiled & processed by Microsoft excel. All the respondents were graded under three grades (Grade-I -more than 20 correct responses Grade-II-11-20 correct responses ,Grade-III more than 20 correct answers,) on the basis of correct responses.

Following this participants were given weekly lectures and demonstrations pertaining to the hazards of NSI and their prevention, handling sharps during use and there appropriate disposal, management of post exposure HIV/Hepatitis B, notification protocol for NSI and availability of PEP drugs in premises. The respondents were interviewed again after 15 days using the same questionnaire to assess impact of intervention. Pre & post intervention grades were compared to establish significance of training by using Wilcoxon Signed-Rank Test.

RESULTS

In the pre intervention assessment 87 percent respondents agreed that NSI is serious type of injury. In the study it was observed that 100 percent respondents were aware that NSI can cause HIV. Only 32 percent respondents were aware that NSI can spread Hepatitis B and only 7 percent respondents were aware of spread Hepatitis C by NSI. It was observed that 26 percent respondents mentioned that NSI was hazardous even in absence of bleeding.

Table 1: Distribution of respondents on the basis of knowledge of use of universal precautions (n=100)

	Pre intervention		Post intervention	
	Yes	No	Yes	No
Wash hands	16	84	77	23
Use of gloves	17	83	26	74
Use of needle cutters	24	76	30	70
Use of color coded bins for waste disposal	41	59	56	44

In the study ,78 percent respondents mentioned that most common procedure causing NSI was during recapping of needle, about 62 percent respondents suffered NSI during artificial rupture of membrane (ARM) and 51 percent respondents mentioned that they suffered NSI following administration of injection especially in a non cooperative patient and before disposing waste sharps. It was also observed that 40 percent respondents suffered NSI during

drawing of blood and 36 percent during assisting in surgical process.

In the study 100 percent respondents mentioned that they suffered NSI by needles, 55 percent respondents suffered NSI from Blood filled hollow needles and 12 percent respondents suffered NSI by solid needles during suturing or during handling drapes from which needles were not removed after surgery.

In the study it was seen that 86 percent respondents mentioned of getting struck by stylet of IV catheter, 31 percent respondents suffered NSI by surgical blade/scalpels and 2 percent from scissors. Of all the respondents 62 percent respondents recalled less than 5 incidences of NSI in past 15 days, 14 percent respondents recalled more than 5 incidences of NSI, whereas 24 percent respondents could not recall any incidence of NSI in past 15 days.

Table 2: Distribution of respondents on the basis of number of incidence of NSI in past 15 days (n=100)

Incidence if NSI in past 15 days	Pre intervention	Post intervention
Less than 5 incidence	62	69
More than 5 incidence	14	23
Cannot recall	24	8

In the study it was noticed that 69 percent respondents reported washing hand of with soap and water following NSI. Only 45 percent respondents applied antiseptic following injury and only 12 percent required dressing for wound caused by NSI. In total 77 percent respondents reported to have taken Tetanus toxoid prophylaxis following NSI. Only 14 percent and 8 percent respondents reported to have come across atleast 1 patient suffering from Hepatitis B and HIV in past 3 month respectively. None of the respondents reported of taking Post Exposure Prophylaxis (PEP) against HIV following injury.

Only 16 percent respondents washed hands after intervention on each patient, 17 percent respondents used gloves during work at ward. None of the respondents used masks, goggles or caps during work at ward. Only 24 percent respondents reported of using needle cutter before disposing needles. Almost 41 percent respondents were aware of use of color coded bins for biomedical waste disposal.

Following this post-intervention assessment was done in which the impact of intervention was assessed. All the respondents were graded similarly.

Table 3: Distribution of respondents on the basis of pre & post intervention grades

Grades	Pre intervention	Post-intervention
I (20-30 correct responses)	6	56
II (11-19 correct responses)	79	39
III (0-10 correct responses)	15	5

In the above table a statistically significant result was obtained on comparing whole pre and post intervention grades using Wilcoxon signed rank Test. However individual grades were not compared. (Wilcoxon signed rank Test $Z=6.68, p<0.001$)

In the post intervention assessment as expected the respondents scored better, all the respondents were now aware that NSI is hazardous, even in absence of bleeding and carries risk of transmission of HIV, Hepatitis B and C. In post intervention assessment, 69 percent respondents recalled less than 5 incidences of NSI in past 15 days, 23 percent respondents recalled more than 5 incidences of NSI, whereas only 8 percent respondents could not recall any incidence of NSI in past 15 days. It was found that there was a significant ($Z=4.19, p<0.001$) increase in incidence of recall of NSI following educational programme.

After intervention 77 percent respondents mentioned washing hands after intervention on each patient. Of all 26 percent respondents now used gloves during work at ward. None of the respondents used masks, goggles or caps during work at ward as they were not still available in ward. After intervention 30 percent reported of using needle cutter before disposing needles.

Following intervention now 56 percent respondents were now aware of use of color coded bins for biomedical waste disposal. All the respondents now knew the protocol of reporting NSI and PEP and its availability in premises. Following intervention 5 more respondents were motivated for Hepatitis B vaccination. The pre and post intervention grades were compared to establish usefulness of training, In this Wilcoxon signed Rank test was used & it was observed that there was a significant ($Z=6.68, p<0.001$) improvement in knowledge of students regarding prevention and management of NSI following training.

DISCUSSION

The present study addressed certain aspects of NSI in tertiary care government hospital located in central India which caters 10 districts in vicinity. The study was unique as previously no educational programme for prevention and management of NSI was conducted in this nursing college. Also the impact of educational programme for enhancing knowledge of prevention of NSI was assessed. It was observed that all the respondents were aware of spread of HIV by NSI probably due to widespread knowledge about it by media and preliminary knowledge given in school.

Most common instrument causing NSI were needles, this finding is similar to findings of study conducted in Rawalpindi Pakistan that mentioned that 85.1 percent participants suffered NSI most commonly from syringe needle, followed by 47.52 percent by surgical stitch needle, and 9.5 percent by surgical blade.³

In our study 78 percent respondents mentioned that most common procedure causing NSI was during recapping of needle. The findings are similar to findings of study performed by Khurram M et al³ in which it was found that most of NSI took place while recapping needles in 33 percent cases followed by surgical procedures in 27.7 percent instances and during drawing blood samples in 26.2 percent cases.

The study revealed that 55 percent respondents suffered NSI from Blood filled hollow needles which carries more hazard of HIV sero conversion, as stated in a literature review by Veekan H et al⁴ that concluded that the risk of mean sero conversion rate after an injury by a hollow needle contaminated with HIV to be 0.49 percent.

In the study it was found that that there was significant increase in recall of incidence of NSI following intervention, this was probably due to fact that the intervention enhanced the knowledge of respondents about NSI which made them more cautious & vigilant. These results are comparable with a study conducted in Taiwan that stated that the average number of NSI per student was 8.0 times/year.⁵

In our study NSI management was found to be similar to a study performed in New Delhi⁶ in which 45.5 percent of HCWs confirmed that they would wash the area with soap and water following NSI. In that study 34 percent felt that a

shot of tetanus toxoid was sufficient, though the present study shows better responses.

In our study training nursing students about prevention and management of NSI was found to be very effective in enhancing knowledge of nursing in prevention and management of NSI.

Training nursing students is very important in preventing NSI as they are most vulnerable group exposed to NSI, which could be prevented and managed by training them as stated by a study by Simon LP in Delhi.⁷ Also it has been stated by Diprose P that the risk of sero conversion following needlestick injury may be reduced by enhancing knowledge of body fluids that are high risk and enhancing knowledge of post-exposure prophylaxis following possible HIV-contaminated needle stick injury.⁸

Also it is very cost effective to prevent NSI by training as compared to managing the sequel of NSI as found Lee JM et al in Maryland U.S. Also not only NSI causes physical injury and exposes subject to blood borne infection it can also cause significant fear, anxiety, and emotional distress, sometimes resulting in occupational and behavior changes.⁹

Only 5 percent respondents were immunized against Hepatitis B infection which is very low. It is important to promote vaccination campaigns and improve knowledge and awareness about Hepatitis B among health care workers as Global seropositivity for HBV of 1.7 percent amongst health care workers as stated in study conducted in Brazil.¹⁰

In conclusion it is recommended that all nursing students should be adequately trained for prevention and management of NSI as seropositive nurses can act as mode of transmission of blood borne infection. This could not be achieved by a single training programme but it has to be taken up as a continuous ongoing activity by including it in nursing training curriculum. Trained nurse is an asset to health set up and must be protected from blood borne infections.

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