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**“A STUDY TO DETERMINE THE OCCURRENCE AND KNOWLEDGE REGARDING  
NEEDLE STICK INJURIES AMONG STUDENT NURSES IN SELECTED NURSING  
INSTITUTIONS OF PUNJAB.**

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**INTRODUCTION**

*“Knowledge enables us to do the Right thing at the right moment”*

- *T.M.A. Pai*

**Background of the study**

Needle stick injuries (NSIs) are a frequent occurrence among healthcare workers (HCWs).<sup>1</sup> Accidental NSIs are common among nurses who are exposed to blood and body fluids.<sup>2</sup> These preventable injuries expose workers to over 20 different blood-borne pathogens and result in an estimated 1000 infections per year, the most common being Hepatitis B, Hepatitis C and HIV.<sup>3</sup> NSI means a physical wound caused by needles, scalpel, scissors, when skin is accidentally punctured. These injuries can occur at any time, when people use, disassemble or dispose of needles.<sup>4</sup> The risk of accidental NSIs is great during invasive procedures such as collection of blood and giving injections.<sup>5</sup>

According to the Centers for Disease Control and Prevention, approximately 3,84,000 percutaneous injuries occur annually in US hospitals, with about 2,36,000 of these resulting from needlesticks involving hollow-bore needles. EPI-net (Exposure Prevention Information Network) data for 2003 reports a rate of approximately 27 NSIs per 100 beds in teaching hospitals. There are few reports on NSIs from India, and with limited data, it is not possible to estimate an annual incidence.<sup>2</sup>

The World Health Report 2002 estimates that 2.5% of HIV, 40% of HBV and HCV cases among HCWs worldwide are the result of occupational exposures.<sup>6</sup> The absence of appropriate post exposure prophylaxis (PEP) in such exposures is associated with enhanced risk of infection with these pathogens. The emotional impact of a needle stick injury can result in considerable psychological trauma for the HCW. Data from developing countries show that adherence to



'universal precautions' and documentation of exposures are suboptimal and also that awareness about PEP among HCWs is poor.<sup>7</sup>

According to Canadian Needle Stick surveillance data (2001), 43% of injuries occur during the use of the device, 33% after its use, and 12% are related to disposal whereas another 12% have an unknown etiology. Besides blood-borne viruses (BBV) other infections that can be transmitted are MRSA, tuberculosis, blast mycosis, brucellosis, Cryptococcus, diphtheria, malaria, syphilis and toxoplasmosis. An estimated 6,00,000 to 800,000 needle stick and other percutaneous injuries are reported annually among U.S. health care workers. These injuries can result in substantial health consequences and psychological stress for providers and their loved ones. All health care providers who perform invasive procedures with sharp instruments are at risk for injury; however, the operating-room setting presents the greatest risk. The hazard of injury is further compounded by the high prevalence of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) among hospitalized patients.<sup>8</sup>

HIV/AIDS is making new demands on the health services and the competence of health workers. The nursing staff plays a major role in looking after the diagnostic needs, therapeutic help and psychological support of the patients. The nursing students share this responsibility especially in the overcrowded Government hospitals. They are mainly responsible for collection of blood, administration of oral and injectable drugs, preparing bed, sending laundry, collection and sending laboratory specimens etc.<sup>5</sup>

The risk of accidental Needle sticks injuries is great during invasive procedures such as collection of blood and giving injections. There is confusion regarding correct responses to such accidents both at the administrative levels where policy decisions for institutions are to be made as well as amongst the nursing staff and students themselves who are not aware about the preventive aspects and of the immediate prophylactic steps to be taken in case of such accidents. There is an urgent need to develop a coordinated approach for the provision of information support and referral for health care workers who sustain occupational related needle stick injuries.<sup>5</sup>

### **Need for the study**

The greatest occupational risk for transmitting a BBV is through parental exposure, by subcutaneous, intramuscular or intravenous route. As compared to mucocutaneous exposures,



percutaneous exposures carry a higher risk of possible infection. BBVs have not been shown to be transmitted by blood contamination of intact skin, by inhalation or by faeco-oral route.<sup>6</sup>

According to WHO Bulletin 2003, 30% to 50% of all needle injuries occur during clinical procedures.<sup>9</sup> The Centers for Disease Control (CDC), 2007 estimates that about 6, 00,000 to one million needle stick injuries occur each year. Unfortunately, about half of these needle stick injuries go unreported.<sup>10</sup> The American Nurses Association (ANA), 2007 estimates that of the numerous needle stick injuries only about 1,000 healthcare workers actually contract an infection. Besides exposure to blood borne pathogens, the nurse is also at risk for about 20 other infections apart from blood borne pathogens, which can be transmitted through a needle stick, including tuberculosis, syphilis and malaria. When a nurse is exposed to a needle stick, the risk of transmitting various types of blood borne pathogens (HIV, Hepatitis B or Hepatitis C) from an infected patient to a health care worker is greatly increased.<sup>1</sup> The Indian Journal of Medical ethics reported that total number of NSIs that an average nurse in India experience is likely to be higher and the absence of training and protective devices increases the total exposure and possibly infected blood or body fluids.<sup>4</sup>

The threat of NSI is serious all over the world. In US, 600,000 to 1,000,000 receive NSI from conventional needles every year while in UK, it is 100,000 every year. In India, however, authentic data on NSI is scarce. It is known that around 3-6 billion injections are given per year of which two-thirds are unsafe. According to the health ministry, three out of every five injections in India are unsafe. According to WHO, 63% of injections in India are unsafe, of this, nearly one-third carries a risk of transmitting blood-borne viruses. According to WHO, as many as 40% of all injections in the developing world are administered with reused, unsterile medical devices.<sup>11</sup>

NSI - an occupational hazard mainly affecting doctors and nurses that could pass on life threatening blood- borne diseases like Hepatitis B, C and HIV - have been found to be very high in some hospitals in Delhi.<sup>11</sup> A study carried out at Vardhaman Medical College and Safdarjung Hospital has thrown up some worrying statistics - of the 428 healthcare workers studied, almost 80% (343) gave a history of NSI in the preceding one year. Even worse, as many as 60% of them received NSI after use but before disposal of the needles. All nurses surveyed 100% reported NSIs, making them the worst affected followed by 87% of junior residents, 85% of nursing students, 84% of lab technicians, 82% interns, 80% of senior residents and 53% of undergraduate students. Seventy four per cent of HCWs were wearing gloves at the time of NSI. The commonest clinical



activity to cause NSI was blood withdrawal (55%), followed by suturing (20.3%) and vaccination (11.7%). About 13% of NSIs were received due to patient aggressiveness while recapping needles caused NSI in almost 40% of cases. After a NSI, majority of HCWs took action instantly (60%), while 14% took action later on the same day and 26 per cent did not take any action.<sup>12</sup>

Another study was carried out at a tertiary care hospital in Mumbai, India to estimate the incidence of exposure to blood and body fluids in a teaching hospital. Among 342 injuries, 254 were from known sources and 88 from unknown sources. From known sources, 37 were seropositive; 13 for HIV, 15 for HCV, nine for HBV. Sixty six sharp injuries were sustained through garbage bags, 43 during IV line administration, 41 during injection administration, 35 during needle recapping, 32 during blood collection, 27 during blood glucose monitoring, 24 from OT instruments, 17 during needle disposal, 16 while using surgical blade, seven during suturing and 34 from miscellaneous sources. The study reported, "Few institutions in India maintain records and registers of incidence of NSI and have protocols for management and follow-up of NSI cases. This is a dire necessity in all large healthcare facilities. Preventive strategies have to be devised and reporting of NSI has to be made mandatory."<sup>8</sup>

There is an urgent need to develop a coordinated approach for the provision of information, support and referral for health care workers who sustain occupationally related needle stick injuries. Assessment of exposures and initial management of occupational exposures varies between institutions and often reflects the level of staff education and previous experience in areas of infection control and transmission of blood borne diseases.<sup>5</sup>

There are very few studies in India documenting the frequency, PEP protocols followed and consequences of needle stick injuries. Studies show that many of the occupational exposures that occur in hospital go unreported, and thus the number of infected individuals may be much higher than the figures actually reported.<sup>8</sup>

Researcher identified that there are many needle stick injuries among student nurses. In which some of them are not reported. This is because of inadequate knowledge on practice regarding handling and disposal of needles. Despite the growing body of knowledge concerning needle stick injury, there has been little research focusing on needle stick injury in the student population. So the researcher felt the need of conducting research on knowledge regarding needle stick injuries among student nurses with a view to prepare an information booklet on prevention of needle stick injuries.



The study examined the following hypotheses which were tested at 0.05 level of significance.

H<sub>1</sub>: There will be a significant difference between 2<sup>nd</sup> and 3<sup>rd</sup> year nursing students in level of knowledge on needle stick injuries among.

H<sub>2</sub>: There will be a significant association between knowledge on NSI with selected demographic variables.

As the present study is aimed to determine proportion of occurrence of NSI and knowledge of student nurses on NSI, the conceptual model of this study was based on Rosenstock's Health belief model.

Non-experimental design with descriptive survey approach was adopted in order to achieve the objectives of the study. The study was conducted in three different Nursing colleges in Mangalore. The sample for the present study consisted of 164 student nurses. Proportionate stratified random sampling technique was used for the sample selection. The researcher used a structured knowledge questionnaire to assess the knowledge on NSI and proportion of occurrence of NSI among student nurses. The development of the tool involved steps of test construction that is preparing the blue print, item writing, content validity, pre-testing and establishing reliability.

The content validity of the developed tool was established by experts' agreement in the field of nursing and medicine. Reliability of the prepared structured knowledge questionnaire was determined and it was found to be reliable.

Pilot study was conducted on ten student nurses in APS College of Nursing, Malsian, Jalandhar who fulfilled the sampling criteria. The main study was conducted at four different colleges of Mangalore by administering the validated tool among student nurses. The analysis was done by applying descriptive and inferential statistics.

**The findings of the study can be summarized as follows:**

Sample distribution according to demographic factors shows that highest percentage from 2<sup>nd</sup> year (91.95%) and 3<sup>rd</sup> year (55.84%) belonged to the age group of 18-20 years and majority (87.36%) of 2<sup>nd</sup> year and 77.92% of 3<sup>rd</sup> year students were female. Most of the students from 2<sup>nd</sup>



year (77%) and 3<sup>rd</sup> year (93.51%) students were immunized against Hep. B. The findings show that 80.46% of 2<sup>nd</sup> year (70/87) and 90.91% of 3<sup>rd</sup> year (70/77) did not attend any workshop on sharp handling.

In the present study 37.93% (33/87) of 2<sup>nd</sup> year and 64.94% (50/77) of 3<sup>rd</sup> year students had occurrence of NSI. Majority of 2<sup>nd</sup> year (30/33) and 3<sup>rd</sup> year (41/50) student's NSIs are self induced and 42.43% of 2<sup>nd</sup> year and 30% of 3<sup>rd</sup> year got only once. Majority of (69.7%) of the 2<sup>nd</sup> year and 58% NSIs of 3<sup>rd</sup> year students did not report. Among 2<sup>nd</sup> year 60% (6/10) and 47.62% (10/21) from 3<sup>rd</sup> year reported to nurse. The highest percentage (43.48%) of 2<sup>nd</sup> year and 27.59% of 3<sup>rd</sup> year students mentioned the cause of not reporting the NSI was they were scared about the result. Majority of 2<sup>nd</sup> year (57.58%) and 60% of 3<sup>rd</sup> year students were known about the infectious status of the patient before NSI. The highest percentage of 2<sup>nd</sup> year (66.67%) and 76% of 3<sup>rd</sup> year got NSI while working in general ward. Majority of 2<sup>nd</sup> year (81.82%) and 88% of 3<sup>rd</sup> year got NSI from hollow bore needle. Majority of students (38/83) got NSI while recapping the needle. Among the 2<sup>nd</sup> year 100% and 98% of 3<sup>rd</sup> year students were not tested for HIV, Hep.B and HCV. The highest percentage of 2<sup>nd</sup> year (87.88%) and 3<sup>rd</sup> year (92%) students did not take any PEP after injury.

Assessment of knowledge of student nurses regarding NSI reveal that highest percentage of 2<sup>nd</sup> year (47.13%) and 3<sup>rd</sup> year (58.45%) students had good knowledge on NSI. 17.24%, 27.59% and 4.04% of 2<sup>nd</sup> year and 25.97%, 15.58%, 0% of 3<sup>rd</sup> year students had excellent, average and poor knowledge respectively.

Analysis shows that students had the highest mean percentage (70.14%) of knowledge score in the area of measures to prevent NSI which had a mean and SD of  $4.91 \pm 1.4$ ; in the area of concept of NSI was 68.75% which had a mean and SD of  $2.75 \pm 0.95$ . the least mean percentage (66.5%) was found in the area of post exposure prophylaxis of NSI which had a mean and SD of  $3.99 \pm 1.21$ .

Unpaired 't' test was used to calculate the significance of difference between the knowledge of 2<sup>nd</sup> year and 3<sup>rd</sup> year student nurses. The result revealed that the calculated 't' value is greater than the table value 3.41 at 0.05 level of significance for knowledge scores of 2<sup>nd</sup> year and 3<sup>rd</sup> year student nurses. Hence it was concluded that there is a significant difference in knowledge level of 2<sup>nd</sup> year and 3<sup>rd</sup> year nursing students.



Chi-square ( $\chi^2$ ) test was used to find the association between knowledge on NSI and selected demographic factors. Result indicated that there is a significant association between knowledge on NSI and attendance in workshop on sharp handling. However no significant association was found between age of the student and year of study.

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