Comparison of knowledge, attitude, and practices regarding needle-stick injury among health care providers

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ABSTRACT

Introduction: Needle-stick injury (NSI) is one of the most potential hazards for health care workers. They pose a significant risk of occupational transmission of blood-borne pathogens. The present study was done to determine the incidence of NSI among interns and nurses; their knowledge, attitude, and preventive strategies undertaken by the respondents after NSI. Materials and Methods: The cross-sectional study was done among interns and nurses in various departments of a tertiary care center in Kerala, India using a self-administered questionnaire. Results: The incidences of NSI among interns and nurses were 75.6% and 24.4%, respectively. The most common clinical activity leading to NSI among interns was blood withdrawal (42%) followed by recapping (29%). It was found that nurses had enough knowledge and followed better NSI practices and attitude than the interns. Conclusion: All the parameters analyzed were inadequate among the interns, indicating the need for continual awareness programs particularly during the preclinical years.

Keywords: Health care workers, interns, needle-stick injury, nurses

Introduction

Needle-stick injury (NSI) is a major occupational health and safety issue faced by health-care professionals globally. They include wounds caused by sharps such as hypodermic needles, blood collection needles, intravenous (IV) cannulas, or needles used to connect part of IV delivery systems (Muralidhar et al., 2010). The Needle stick Safety and Prevention Act was signed into law in November 2000 and became effective in April 2001. (Kotwal, 2010; Foley et al., 2003). It is of grave concern because of the risk of acquiring blood-borne diseases such as hepatitis B, C, and HIV. World Health Organization in its World Health Report 2002 reports that out of 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. Approximately 37.6% of hepatitis B, 39% of hepatitis C, and 4.4% of HIV/acquired immunodeficiency syndrome in healthcare workers around the world are due to NSIs. Despite their seriousness as a medical event, NSIs have been neglected, most go unreported, and ICD-10 coding is not available. Hence, a low-injury rate should not be interpreted as a less serious issue (Camilla Rodrigues, 2010).

The knowledge, attitude, and practices regarding NSI vary widely among health care workers (HCWs). With this background, the present study was conducted among the HCWs of our institute with the following objectives:

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1. To assess and compare the level of awareness, attitude, and practices regarding NSIs, standard precautions, and safe injection practices among doctors and nurses in a tertiary care hospital.

2. To study the incidence and factors resulting in NSI among the two groups.

3. To assess hepatitis B immunization status in the study group.

Materials and Methods

The data collection for the cross-sectional study was done using a self-structured questionnaire consisting of 27 multiple choice questions, which was used to assess the KAP of HCWs regarding NSI. The HCWs included 100 house surgeons and 100 staff nurses. The purpose of study was explained to each participant, and informed written consent was obtained from them before getting enrolled. Ethical clearance was obtained from the institutional ethics committee. An assurance was given that all information would be confidential and would not be used for any purpose other than research.

The initial part of the questionnaire comprised of demographic information of the participant such as occupation, age, sex, work experience, and marital status. Another section collected data about their vaccination status, incidence of NSI, reasons for not reporting NSI, knowledge and practice of universal precautions, and post-exposure prophylaxis (PEP).

The data were entered into MS-office Excel and analyzed using the statistical package, SPSS version 20. Comparison of variables between the different professions was made using Pearson’s Chi-square test, and the statistical significance was set at \( P < 0.05 \) for this study.

Results

The respondents included 100 interns and 100 nurses. Among interns, 42 (95.5%) were males and 58 (37.2%) were females. The majority of the nurses were females 98 (62.8%). The mean age of interns and nurses were 24.38 ± 1.21 and 33.77 ± 7.16, respectively. There is statistically significant difference in the age between the two groups (\( P \text{ value} < 0.001 \)).

It was observed that interns had more knowledge regarding the correct definition of NSI (61%) and standard precautions (57.1%) when compared to nurses [Table 1]. This was found to be statistically significant.

When 58.4% of nurses were aware that not to recap was the most important measure to prevent NSI, only 41.6% of doctors agreed to the same (\( P \text{ value} < 0.002 \)). Only 38% of interns were aware of the fact that NSI was a reportable event, and 42.7% of them followed the correct method of needle disposal (\( P \text{ value} < 0.001 \)).

The practice of using PPE especially gloves by interns was comparatively lower than in nurses [Table 2]. Approximately, 73.8% interns followed the practice of recap (\( P \text{ value} < 0.001 \)). In our study, 75.6% of interns experienced NSI during their 12 month internship period. Of them, 53.9% got NSI more than once when compared to nurses (\( P \text{ value} < 0.001 \)).

The PEP practices followed by the study group were also analyzed and tabulated [Table 3]. Hepatitis B vaccination status of the respondents showed that only 71 (53.8%) interns, and 61 (46.4%) nurses were completely immunized. Among them, only 40.4% interns and 59.6% nurses have checked their anti hepatitis B surface antigen titre.

The data regarding attitude to NSI events among the study group show that the nurses have better attitude scores [Table 4].

When 69% of doctors agreed that NSI is under reported [Table 3], the reasons for non-reporting were analyzed [Table 5]. Busy schedule of the interns gave them inadequate time to
report (34%). The most common cause of non-reporting among the nurses was the thought that it was a minor injury (43.6%).

The reporting status in our study group [Figure 1] shows that 68% of interns and 49% of nurses failed to report the incident.

Among the various practices analyzed causing NSI, venipuncture (42%) and giving injections (26%) were found to be the most common procedure resulting in NSI among interns and nurses, respectively [Figure 2].

Overwork appeared to be the most common cause for NSI among interns (33%) and nurses (36.1%) [Figure 3].

The various sources of information regarding the prevention of NSI [Figure 4] when assessed show that 49% of nurses followed the infection control guidelines, whereas 36% interns relied on their senior colleagues.

Discussion

The results of the present study highlight the KAPs following NSI in a tertiary care teaching hospital in South Kerala, India.

The study focused on two groups of HCWs who formed the major working group in the hospital. The incidence of NSI in interns was 75.6%. This data correspond with several reports from India.\textsuperscript{[5-7]} This is probably owing to their lack of experience and busy schedules. Moreover, the interns are expected to do routine blood investigations, IV insertion, and suturing procedures in a teaching hospital as ours. This along with the high patient load and long working hours may be the other contributing factors.\textsuperscript{[8,9]} In our study, the incidence of NSI in nurses was found to be 24.4%. Studies from India and other countries also reported low frequency of NSI (17.1% to 26.2%) among nurses than doctors.\textsuperscript{[10-11]}

We observed that 53.9% of interns and 46.1% of nurses experienced NSI more than once (P value < 0.001). This is quite high when compared to the study conducted by Angadi et al. (42%)\textsuperscript{[12]} and Fullerton et al. (21.9%).\textsuperscript{[13]}

We also found that knowledge about universal precautions [Table 1] was higher (57.1%) among interns. This result differed from K. Vaz, D. McGrowder et al. in which 90% of nurses were more knowledgeable than other HCWs.\textsuperscript{[14]} The knowledge of proper disposal of needles was also significantly low among interns. This may be owing to lack of training on proper biomedical waste management during the orientation or pre-internship classes. Very few interns (38%) knew the correct authority to whom they should report following NSI. These rates are far less (48% doctors and 95.5% nurses) when compared to the study done by Aradhana Bhargava et al.\textsuperscript{[15]}

| Table 3: Post-exposure prophylaxis (PEP) practices |
|---------------------------------|-----|-----|-----|
| **PEP**                        | **Response** | **Intern** | **Nurses** | **P value** |
| ---                            | ------ | ----- | ------- | ---------- |
| Rinse with soap and water after NSI | Yes   | 60 (44.4%) | 75 (55.6%) | 0.017     |
| Hepatitis B vaccination taken | Yes   | 71 (53.8%) | 61 (57.4%) | NS        |
| Checked Anti-HBs titer taken | No    | 29 (42.6%) | 39 (46.2%) | NS        |
| Screened for viral markers of source and self | Yes   | 39 (44.3%) | 49 (55.7%) | <0.001    |

\textsuperscript{NS}=not significant

| Table 4: Attitude related to NSI practices |
|---------------------------------|-----|-----|-----|-----|-----|-----|-----|
| **Attitude parameters**         | **Always** | **Never** | **Seldom** | **Very often** |
| ---                            | I   | N   | I   | N   | I   | N   | I   | N   |
| Worried about NSI              | 45  | 49  | 8   | 21  | 28  | 19  | 19  | 11  |
| More concerned on patient care | 12  | 30  | 64  | 34  | 21  | 21  | 3   | 15  |
| NSI is preventable             | 50  | 73  | 6   | 1   | 16  | 10  | 28  | 16  |
| Report NSI immediately          | 77  | 80  | 5   | 2   | 10  | 3   | 8   | 15  |
| NSI is most common event        | 50  | 54  | 5   | 14  | 15  | 31  | 26  |     |
| NSI is neglected                | 24  | 23  | 14  | 20  | 17  | 26  | 45  | 31  |

\textsuperscript*I=Interns, N=Nurses

![Figure 1: Reporting status of needle-stick injury among HCWs](image-url)
The recapping of needles is an age long tradition that has contributed to be a significant hazard to HCWs in developing countries. The most important measure to prevent NSI is never to recap, and our interns were less aware regarding this. It also was observed that a significant proportion of interns (73.8%) still practice recapping. A study conducted in St. Johns Bengaluru shows that 87.3% of interns wear gloves during phlebotomy.

The recapping of needles comes only as the second most common cause for NSI among the study group. Studies conducted in Delhi and Bengaluru report recapping as the most frequent cause of NSI.

The immediate correct PEP practice of washing the wound with soap and water was followed by 44.4% of interns and 53.8% nurses only. These rates are comparatively low when compared to other studies. Although a significant proportion of study group had knowledge of the infections transmitted through NSI, it was found that serological status for three major viral markers (HIV, HBV, and HCV) of source and self was not checked in 54.5% and 45.5% of interns and nurses, respectively.

When the reporting status of HCWs was assessed, it was found that almost 49% of nurses did not report NSI with at least 13.5% totally ignoring the incident. This statistics of under-reporting is quite high when compared to studies done by Al Jarallah AM and Mehdi Jahangiri et al. Approximately, 68% interns did not report NSI and take adequate PEP. This is comparatively higher when compared to that reported by B Gurung and Prakash KP. This shows poor awareness on post-exposure prophylaxis practices among our study group. In a questionnaire-based study done in Egypt, it was seen that 74.7% HCWs did not report the injury to employee health services, and physicians were less likely to report an NSI as compared to other health-care professionals.

The results obtained after assessing the attitude parameters indicated that most of the HCWs were casual and non-serious about the consequences of NSI. When 48.1% interns agreed that NSI is the most common event, and 51.1% totally neglected the incident.

Our being a tertiary referral teaching hospital, the interns do phlebotomy procedures. Their lack of experience and patient overload makes venipuncture (42%) the most common procedure resulting in NSI among them. Procedures such as giving injection (intramuscular, intravenous and subcutaneous) which is the duty of nursing staff makes them more prone to NSI (26%).

In this study, overwork was significantly associated with occurrence of NSI, which is consistent with other studies.
This finding confirms the need for keeping adequate working hours to reduce the risk of these injuries and infection with blood-borne pathogens. Other important reasons included inattention and lack of PPE.

Infection control guidelines were cited as the most common source of information regarding prevention of NSI among nurses (49%). Information from senior colleagues (36%) and continuing medical education (CME) was the common source of information among interns [Figure 4]. Our study also shows that lack of awareness of infection control (IC) guidelines among interns may be owing to their lack of importance in the teaching curriculum.

When reasons for non-reporting of NSI was analyzed [Table 5], it was found that 34% of interns were too busy to report the incident and 43.6% of nurses thought that it was only a minor injury. Only a minor proportion of respondents reported fear of stigma and discrimination as a cause of non-reporting (11%), whereas this formed the main cause of non-reporting in other studies. The KAP regarding NSI and PEP among HCWs is also relevant among the primary care physicians as they provide the bulk of medical services to a good majority of patients. Their job responsibilities include phlebotomy, block anesthesia, IV cannulation, laceration repair, etc., which makes them at risk for NSI. Therefore, this occupational risk is equally applicable to all doctors and nurses who form the most vulnerable group in medical profession.

**Conclusion**

NSIs remain a major health hazard even in most of the Indian hospitals especially the ones that deal with high-patient load. To reduce the risks and effects of NSIs among interns, teaching programs for risk reduction should be included in the undergraduate teaching curriculum during the preclinical years that should be reinforced during each clinical posting. Authorities should direct the efforts toward training of HCWs, use of safety engineered devices, and decreasing patient load per HCW as these steps are most likely to benefit the existing situation.

**Limitations**

The study was according to the self-reported data that can lead to information bias and social bias. By its nature cross-sectional study cannot establish temporal cause and effect relationships.

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**Conflicts of interest**

There are no conflicts of interest.

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