

# Assessment of Knowledge, Attitude and Practices among Healthcare Workers in a Tertiary Care Hospital on Needle Stick Injury

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## Abstract

**Purpose:** Needle-stick injury (NSI) is one of the most potential occupational hazards for healthcare workers because of the transmission of blood-borne pathogens. As per recent data, around 30 lakh healthcare workers sustain Needle stick injuries each year. This study was conducted to assess healthcare workers' knowledge, attitude and practices regarding needle stick injury. **Materials & Methods:** A cross-sectional study was conducted in a Tertiary Care Hospital over the period of 3 months. The study population consisted of Intern Doctors, Post Graduate resident Doctors, Staff Nurses, laboratory technicians of Government Medical College and New Civil Hospital, Surat (n = 300). The data were collected using a self-administered questionnaire via the means of Google Forms. Questionnaire was made with prior review literature. The data obtained were entered and analysed in Microsoft Excel. **Results:** The prevalence of NSI in our study was 46%, with a higher prevalence among the PG residents (72%). Overall scores regarding knowledge and attitude were better in PG residents (knowledge score > 7 in 71% and Attitude Score > 7 in 68% of PG Residents). Even though the PG residents scored highest in the knowledge category, the majority of them suffered needle stick injuries as a result of poor practice scores. Among those who had NSI (n = 139/300), 70% of study participants had superficial injuries, only 9% reported the incident, 18% got medical attention within 2 hours of the incident, and 7% followed up to recheck their viral markers status. Most incidents of NSI were due to hypodermic needles while recapping needles. **Conclusion:** Exposure to needle stick injuries and their underreporting remains a common problem. It is imperative that healthcare workers receive regular training on the proper handling of sharp objects. We can also draw the conclusion that preventing NSIs requires putting knowledge into practice.

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## Keywords

Needle Stick Injury, Knowledge, Attitude, Practice, Healthcare Workers

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## 1. Introduction

Needle-stick injury (NSI) is a major occupational hazard faced by healthcare workers worldwide. It includes injury caused by sharp objects including blood collection needles, hypodermic needles, intravenous (IV) cannulas, and needles used to connect parts of IV delivery systems [1]. In November 2000, the Needle Stick Safety and Prevention Act was ratified, and it went into force in April 2001 [2]. It is a serious issue because of the risk of acquiring blood-borne diseases such as hepatitis B, C, and HIV. According to the World Health Organization's 2002 World Health Report, 2 million of the 35 million healthcare workers experience percutaneous exposure to infectious diseases each year [3]. About 37.6% of cases of hepatitis B, 39% of cases of hepatitis C, and 4.4% of cases of HIV/AIDS among healthcare professionals worldwide are due to NSIs [3]. According to estimates from the World Health Organization, at least 16 billion injections are administered globally each year. The vast majority (90%) are given for treatment purposes followed by immunization (5%). The World Health Organization reports that the average annual number of NSIs per Health Care Worker (HCW) ranged from 0.2 to 4.7 injuries globally. In India, there is neither a national network for NSI surveillance nor any nationally accepted standardized method for data collection for sharp injuries [4].

Despite their seriousness as a medical event, occupational hazards have been neglected, and most go unreported. Therefore, a low injury rate does not necessarily indicate a less significant problem [5]. In order to improve the quality and safety of the working environment for healthcare professionals, an operational and organizational step for implementing a sharp injury prevention protocol needs to be developed.

The knowledge, attitude, and practices regarding NSI differ greatly among healthcare workers (HCWs). With this background, the study was conducted among the HCWs of our institute with the following objectives:

**Primary objective:** To assess the knowledge, attitude and practices of healthcare workers regarding needle stick injury.

**Secondary objective:** To document the prevalence of needle stick injury and to assess which category of healthcare worker is associated with maximum needle stick injury.

## 2. Materials and Methods

### 2.1. Study Design

Cross sectional analytical study.

## 2.2. Study Site and Duration

The study was conducted at New Civil Hospital and Government Medical College, Surat, Gujarat. The study period was 3 months.

Ethical approval for this study was obtained from the Human Research Ethics Committee, GMCS, dated 10.11.2023. (No. GMCS/STU/ETHICS-2/Approval/29092/23).

## 2.3. Study Participants

Doctors (Intern Doctors, Post Graduate resident Doctors), Staff Nurses, laboratory technicians of Government Medical College and New Civil Hospital, Surat were included in the study.

## 2.4. Sample Size & Sampling Technique

HCWs who have given consent and responded were included in study with purposive sampling. A total of 300 HCWs have given consent and responded to questionnaire. Out of which 63 were Postgraduate resident doctors, 132 were intern doctors, 44 were lab technicians, and 61 were nursing staff.

## 2.5. Methodology

**Data Source and Management:** Data were collected by using a self-made structured questionnaire via the means of Google Forms. The questionnaire was made after reviewing the literature and was internally validated by calculating Cronbach's alpha (0.70). The questionnaire consisted of six sections. First Section included participant information and consent forms. Second section is regarding demographic details including designation and department in which they work. Third section consisted of ten questions to assess the knowledge of health care workers. Fourth section consisted of ten questions to assess the attitude of health care workers. Fifth section consisted of ten questions to assess the practices of health care workers. Sixth section consisted of questions regarding past history of needle stick injury, type of NSIs, how needle stick injury has occurred, which device was involved, etc.

Respondent knowledge, attitude and practice, these categories were assessed. A score of one was given to each correct response, and a zero was given to incorrect answers. Each category had a maximum ten marks. Zero to four meant poor performance; five, six and seven an average performance; above seven satisfactory performances.

Each respondent's KAP (knowledge, attitude, and practice) scores were determined, and those results were classified according to the professional qualification of each individual. The data were entered and analysed into MS Office Excel under various headings to uncover different aspects of NSI.

## 2.6. Bias

Selection bias, voluntary response bias, under coverage bias.

### 3. Results

Overall prevalence of NSI was 46% (N = 139/300) in the study population, with higher prevalence among the PG residents (72%) followed by interns (45%). There is a significant difference in the mean knowledge, attitude and practice scores among healthcare workers. Overall scores regarding knowledge and attitude were better in PG residents (knowledge score > 7 in 71% and Attitude Score > 7 in 68% of PG Residents) (Figure 1). Even though the knowledge was high in doctors, they were most subjected to needle stick injury. Practice scores were high among the nursing staff and laboratory technicians with scores > 7 at 74% and 73% respectively. 46% of the study participants had NSI, among them 12% had NSI multiple times (Figure 2). Most of them had a superficial type of NSI (70%) (n = 139), 7% had a severe deep NSI. Only 9% of those who had NSI have reported the incident. Only 18% had received medical attention within 2 hours of NSI (Figure 3). 7% of those who had NSI have checked their follow-up status of viral markers. The most common device involved in NSI was a hypodermic needle (32%) followed by an intravenous cannula (27%) and suture materials (21%). 47% had NSI while recapping the needle followed by in operation theatre in between steps (27%) (Figure 4).

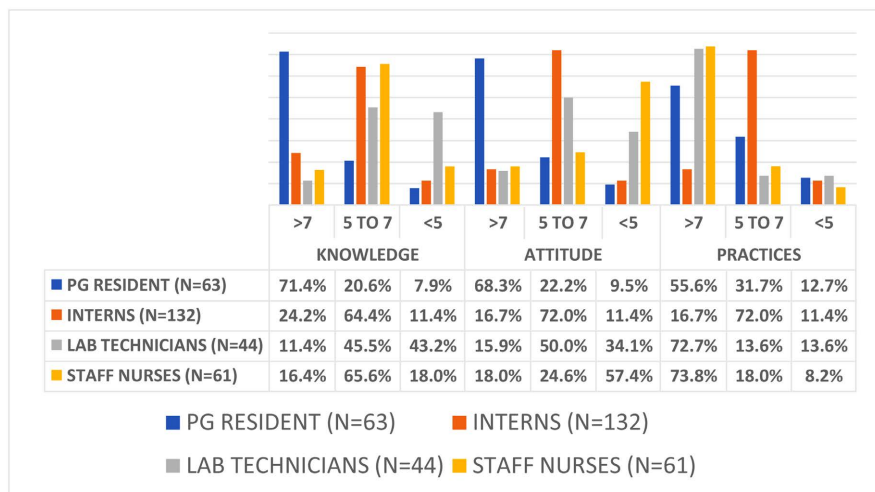


Figure 1. KAP Scores related to NSI among the study participants (n = 300).

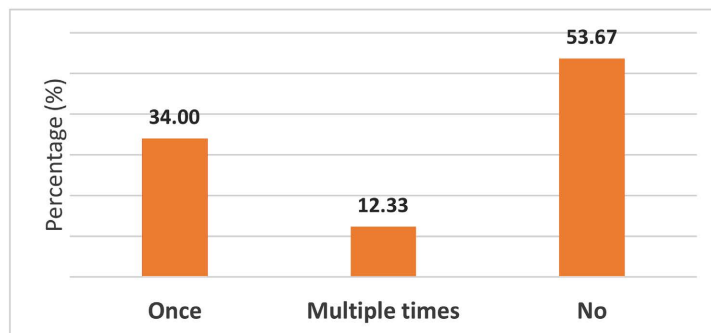
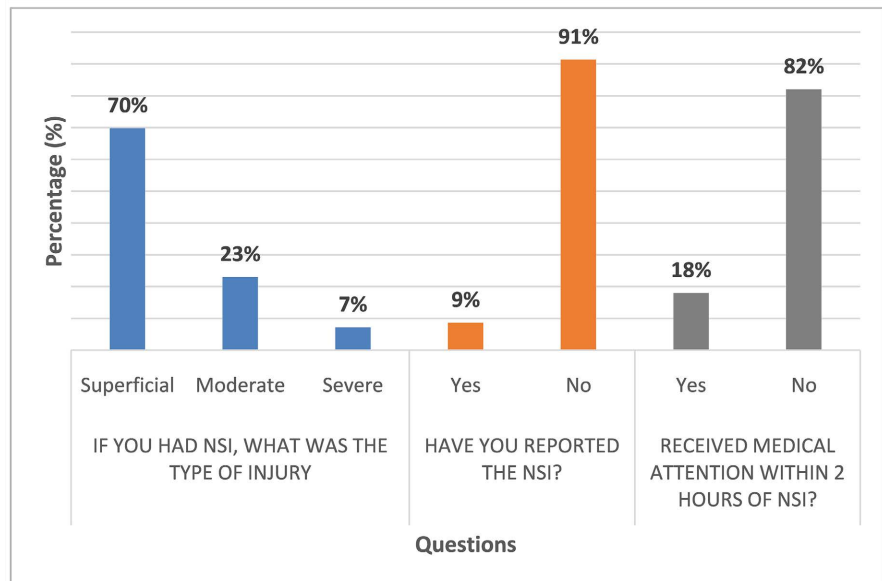
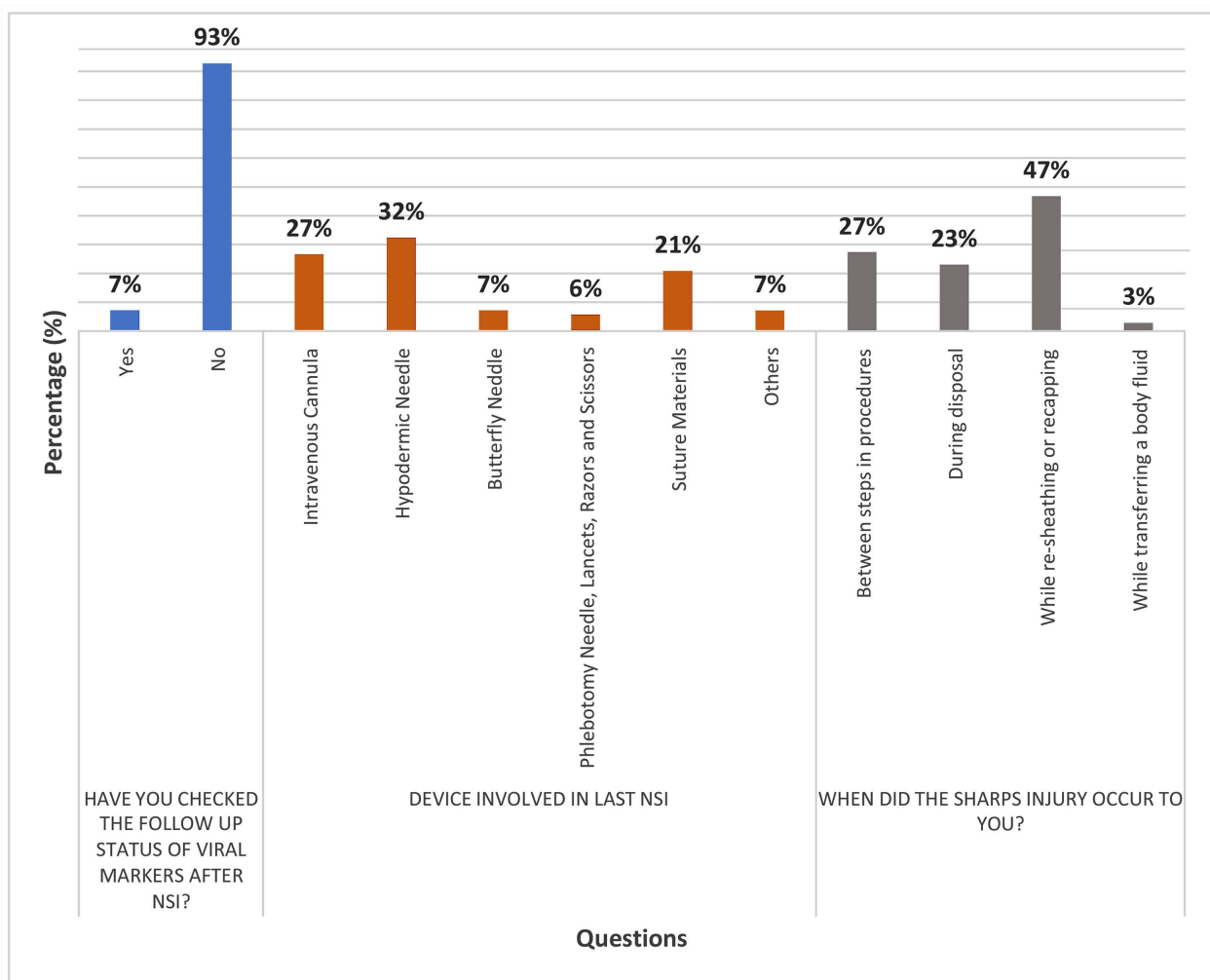


Figure 2. Needle stick injury among study participants (n = 300).



**Figure 3.** Various aspects of NSI among Health Care Workers (n = 139).



**Figure 4.** Experiences regarding NSI among the study participants (n = 139).

## 4. Discussion

Occupational hazards constitute a significant concern globally, particularly in a developing country like India. The significance of workplace health, safety, and disaster management in epidemiological research, teaching, and training has been overlooked in the medical field. The HCWs' knowledge, attitudes, and practices regarding the various NSI components were evaluated by our questionnaire.

The prevalence of NSI in our study was 46%. In the study conducted by Al-Mugheed K *et al.* total prevalence of needle stick injuries in the sample was 14.1% [6]. While in another study Prevalence of needle stick injury among the health workers was found to be 21.1% [7]. In our study prevalence amongst PG residents was high (72%) compared to other HCWs. Technicians and staff nurses reported low exposure to NSI since they are careful and use protective clothing while handling patients and infectious material. As per the study conducted by Bhargava A. *et al.* 58.3% of doctors were exposed to NSI compared to 36.4% of nurses [8].

According to our study, respondents' knowledge and attitude scores rise with their level of education. This is to be expected as education raises awareness of the dangers associated with exposure to blood and blood products as well as the importance of NSI preventive measures. PG residents scored higher overall in the knowledge and attitude categories. Nursing staff and technicians had good scores for practice, whereas PG residents and interns reported lower compliance with NSI preventive methods.

Exposure to NSI does not correlate with HCWs knowledge and attitude. Sardonically, most HCWs experiencing NSI have higher knowledge and attitude scores. Individuals who adhered to the NSI preventative strategies exhibited reduced occupational hazard exposure and higher practice scores. Thus, we can conclude that even with thorough knowledge about NSIs, NSIs cannot be prevented until routine application of this knowledge is made.

The recapping of needles is a long-standing custom that poses a serious risk to healthcare workers in underdeveloped nations [9]. The recapping of needles was the second most common cause for NSI as per the study conducted by Madhavan *et al.*, [10] this finding differed from our study in which 47% had NSI while recapping. Recapping was the most prevalent (74.1%), followed by NSI during injection (22.3%), which was the most common cause of NSI in the study conducted by Al-Mugheed K *et al.* [6]. About 52.7% of needle stick injuries occurred while using sharp devices (Alsabaani *et al.*) [11].

When the reporting status of HCWs was assessed, it was found that 91% of HCWs have not reported NSI. This statistic of under-reporting is quite high when compared to studies done by Al Jarallah AM [12] and Mehdi Jahangiri *et al* [13]. In the study conducted by Gogoi J *et al.* only 21.1% had reported their injury [7]; while in another study more than half (52.7%) of the injuries went unreported (Alsabaani A *et al.*) [11].

## 5. Limitations

Self-reported data from the study may have contributed to information bias. Since this study included only a few categories of healthcare workers with small sample size, more surveillance work in this area including other categories with large sample size will provide a more accurate image. Cross-sectional research cannot demonstrate temporal cause-and-effect correlations.

## 6. Conclusion

Overall prevalence of NSI was 46% in the study population, with higher prevalence among the PG residents (72%) followed by interns (45%). There is a significant difference in the mean knowledge, attitude and practice scores among healthcare workers. Overall scores regarding knowledge and attitude were better in PG residents. Even though the knowledge was high in doctors, they were most subjected to needle stick injury. Practices score was high among the nursing staff and laboratory technician.

## 7. Recommendations

Exposure to needle stick injuries among healthcare workers and their underreporting remains a common problem. It is recommended to put knowledge into practice to prevent NSIs. A comprehensive preventive program is the most effective way to shield healthcare staff from infectious diseases transmitted by NSI. It should include training of healthcare staff, adhering to recommended infection control practice guidelines, setting up efficient disposal systems, conducting surveillance programs, improving equipment design, utilizing safety-engineered devices, and promoting the reporting of occupational accidents. The undergraduate teaching curriculum should incorporate teaching programs for risk mitigation in order to lessen the effects and dangers of NSIs among interns. A hospital infection control committee should oversee the implementation of NSI prevention programs in all healthcare facilities. This will help to overcome the existing situation.

## Ethical approval

The study was approved by the Institutional Ethics Committee.

**No. GMCS/STU/ETHICS-2/Approval/29092/23.**

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## Appendix

Age:

Sex:

Department/Unit:

Designation - Postgraduate resident/Intern/Staff nurse/Laboratory technician

H/o Needle stick injury - Once/Multiple times/No

Type of injury - Superficial/Moderate/Severe

Have you ever reported NSI? - Yes/No

Received medical attention within 2 hours - Yes/No

Have you checked your follow up status of viral markers after NSI? - Yes/No

Device involved in the last NSI - IV cannula/Hypodermic needle/Butterfly needle/Phlebotomy needle, Lancets, Razors, Scissors/Suture needles/Others

When did the sharps injuries occur to you? - Between steps in procedures during minor or major operative procedure/During disposal of needle/While re-sheathing or recapping a needle/While transferring a body fluid between containers.

### QUESTIONS RELATED TO NSI

	KNOWLEDGE	ATTITUDE	PRACTICE
1	The decreasing order of risk of transmission following occupational exposure among HIV HBsAg HCV	Needles should be re-capped/bent after use. True/False	Do you use needle cutter/syringe destroyer? Yes/No
2	All of the following body fluids are potentially highly infectious specimen for occupational injury; except:	Post-exposure prophylaxis is really necessary? True/False	Do you use gloves for phlebotomy procedures? Yes/No
3	which of the following statement is false regarding NSI	It is vital to test the patient's blood for hepatitis B, hepatitis C, and HIV. True/False	Have you been vaccinated against HBV? Yes/No
4	what is percentage of transmission of HIV after NSI	Injuries from needle sticks must be reported. True/False	Do you recap needles after use? Yes/No
5	which of the following is true regarding PEP for HIV	Needles should be discarded immediately after use. Yes/No	Do you report needle-stick injuries? Yes/No
6	what is the protective antibody titre for Hepatitis B	Disinfectant should be used after Needle stick injury. Yes/No	Do you practice one hand method of recapping? Yes/No
7	when should you check your anti-HBS antibody titre	Do you think follow up testing of your status is necessary after needle stick injury? Yes/No	Are you following any guidelines for management of needle stick injury? Yes/No
8	what is EC3 (exposure code 3) as per NACO guidelines	PEP should be taken in full course or a single dose is enough? Full course/Single dose	Do you use disinfectant after getting needle stick injury? Yes/No
9	what is true regarding dosing schedule against Hepatitis B Vaccine	Do you think consent is necessary when you want to check status of patient after getting needle stick injury. Yes/No	Have you taken PEP after getting needle stick injury? Yes/No
10	what is SC2 (source code 2) as per NACO guidelines	Is it necessary to provide Training related to needle stick injury to all the health care workers in the institute? Yes/No	Have you attended any training regarding management of needle stick injury? Yes/No