

PROTOCOL

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Introduction

Needle Stick Injury (NSI) is a significant occupational hazard among healthcare workers (HCWs), exposing them to blood-borne infections such as HIV, Hepatitis B, and Hepatitis C. Despite advances in infection control, NSIs continue to occur due to inadequate knowledge, improper practices, and non-adherence to standard precautions.

Healthcare workers are at high risk due to frequent exposure to needles and sharp instruments. Prevention through education and adherence to safe practices is essential. Hence, assessing the knowledge and practices and developing a structured teaching module is crucial.

Background of the Study

Globally, needle stick injuries (NSIs) remain a significant occupational hazard among healthcare workers, with more than 2 million cases occurring annually and an overall prevalence of approximately 44–45% among healthcare workers. Among different categories, nurses represent the highest risk group, with a global prevalence ranging from 40% to 49%, particularly higher in developing regions due to frequent exposure to injections, intravenous procedures, and direct patient care. These statistics highlight that NSIs are a widespread issue affecting all categories of healthcare workers, emphasizing the need for targeted education and preventive strategies. Educational interventions have proven effective in improving compliance with safety guidelines. Therefore, this study aims to assess existing knowledge and practices and develop a teaching module to enhance prevention strategies.

Need for the Study

- High prevalence of NSI among healthcare workers
- Risk of life-threatening infections
- Lack of proper training and awareness
- Need to improve safe handling practices

Problem Statement

Assessment of Knowledge and Practices regarding Needle Stick Injury Prevention among Healthcare Workers and Development of a Teaching Module based on findings in a Selected Hospital, Kolkata.

Objectives

1. To assess the knowledge regarding needle stick injury prevention among healthcare workers.
2. To assess the practices regarding needle stick injury prevention among healthcare workers.
3. To find the association between knowledge and selected socio-demographic variables.
4. To find the association between practices and selected socio-demographic variables.
5. To develop a teaching module on needle stick injury prevention.

Review of Literature

- Kanani, K., Rajdev, S., & Mullan, S. (2024). Assessment of knowledge, attitude and practices among healthcare workers in a tertiary care hospital on needle stick injury. *Advances in Infectious Diseases*, 14, 487–495.

Total 300 healthcare workers are considered as study population. The prevalence of NSIs was 40.5% (92 out of 227 participants; 95% CI: 34.1%-47.2%). Good knowledge was observed in 203 (89.4%) for NSI, 159 (70%) for HIV, and 211 (93%) participants for Hepatitis B. However, 68 participants (30%) had only average or poor knowledge of HIV. No significant association was found between NSI occurrence and age, gender, experience, or marital status. Similarly, knowledge levels for NSI, HIV, and Hepatitis B were not significantly influenced by demographic factors. Attitudes were largely positive: 203 participants (92.6%) perceived the NSI risk as serious, and 214 (97.7%) believed NSIs are preventable. Most supported immediate reporting and PEP for HIV (204; 94.4%) and Hep B (201; 93%). Despite this, only 27 of 87 (31%) received PEP after injury. NSIs frequently involved hypodermic needles or lancets and occurred during disposal or recapping. However, unsafe practices persisted, with 53 of 219 (24%) of nurses recapping needles, a behavior significantly associated with NSI incidence ($p = 0.045$). The most cited barriers to NSI reporting were time constraints (166; 78.3%) and lack of awareness about reporting procedures (98; 46%).

- Awareness, perception, and practice regarding needle-stick injury and its prevention among healthcare workers in a tertiary care hospital in Southern India. *Cureus*, 16(3), e55820.

A cross-sectional study by D. Anandadurai et al. (2024) assessed awareness, perception, and practices regarding needle stick injury prevention among healthcare workers in a tertiary care hospital in South India. The study included doctors, nurses, and paramedical staff, and findings revealed that although 85% of participants had adequate awareness of needle stick injury risks, only 62% consistently followed standard precautions, and nearly 30% reported experiencing at

least one needle stick injury during their career. Additionally, improper disposal of sharps and recapping practices were still observed among a significant proportion of participants. The study emphasized that despite good knowledge levels, gaps in safe practices persist, highlighting the need for regular training, strict institutional protocols, and monitoring systems to improve compliance with prevention strategies.

- Alsabaani, A., Alqahtani, N. S., Alsubaie, S. S., Alqahtani, A. S., & Alqahtani, M. A. (2022). Incidence, knowledge, attitude, and practice toward needle stick injury among healthcare workers in Saudi Arabia. *Journal of Family Medicine and Primary Care*, 11(2), 528–534.

Alsabaani et al. (2022) conducted a cross-sectional study among 786 healthcare workers to evaluate knowledge and practices regarding NSI in Saudi Arabia. The study found that the annual incidence of NSI was 11.57%, demonstrating a considerable occupational hazard. Among those affected, 52.7% of injuries were not reported, indicating significant underreporting. The study further revealed that 52.7% of injuries occurred during sharp device usage, and 42.9% occurred in patient rooms. Statistical analysis showed significant associations between NSI occurrence and workplace factors such as department level ($p = 0.003$) and surgical practice ($p < 0.001$). Although participants had moderate knowledge levels, poor adherence to safety protocols and reporting systems contributed to the persistence of NSI, highlighting the need for improved compliance and preventive training.

- Mohammed, M. U., V, K. R. K. (2020). Knowledge and practices of needle stick injury prevention among nursing personnel in a tertiary care teaching hospital in South India. *IP International Journal of Medical Microbiology and Tropical Diseases*, 6(4), 246–248.

A cross-sectional study was conducted by using a structured questionnaire. Informed verbal consent was taken prior to distribution of the self-reporting Questionnaire and 100 nursing staffs were included. Response rate was 80%, Incidence of NSI was 45%, Only 24% of the nurses were aware of the definition of NSI, about 90% of them were aware of the infections transmitted, 85% of them are unaware of 'no-recapping' technique of disposal, 90% of them were aware of standard precautions, Overall knowledge is adequate among 65% nurses. Only 35% nurses reported their NSI after incident, 24% knew post exposure prophylaxis, 98% of the reported NSI incidents NSI were due to recapping of needles.

- Madhavan, Anitha1,; Asokan, Anjana1; Vasudevan, Anu2; Maniyappan, Janeesh1; Veena, K1. Comparison of knowledge, attitude, and practices regarding needle-stick injury among health care providers. *Journal of Family Medicine and Primary Care* 8(3):p 840-845, March 2019. | DOI: 10.4103/jfmpc.jfmpc-103-19

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. 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.

- Alwabr GM. Knowledge and practice of needlestick injury preventive measures among nurses of Sana'a city hospitals in Yemen. *Indian J Health Sci Biomed Res* . 2018;11(1):70-6.

A cross-sectional study among a random sample of nurses (n= 259) were conducted. A pretested structured self-administered questionnaire was used for data collection. One hundred and fourteen (44%) respondents had poor knowledge of needlestick injury preventive measures, 75 (29%) had a fair knowledge, and 70 (27%) had good knowledge. The knowledge was significantly associated with hospital's name ($P < 0.017$). One hundred and ninety-eight (76.5%) respondents had a poor practice of needlestick injury preventive measures, (8.9%) had fair practice, and (14.7%) good practice. There was a statistically significant association ($P < 0.001$) between the knowledge and practice. Among all the respondents, 48.6% were vaccinated against hepatitis B.

Variables

Research Variable: Knowledge and Practices regarding NSI prevention

Operational Definitions

- Knowledge: Understanding of healthcare workers regarding causes, risks, and prevention of NSI are measured through a structured questionnaire.
- Practices: Actual actions performed by healthcare workers in preventing NSI are measured through a checklist.
- Healthcare Workers: Staff Nurse working in a selected hospital.
- Teaching Module: Structured educational material prepared based on study findings.

Research Approach

Quantitative research approach

Research Design

Descriptive design

Setting of the Study

Selected hospital (e.g. tertiary care hospital in Kolkata)

Population

Healthcare workers including Staff nurses working in a selected hospital.

Version1 14/04/2026

Sample

Staff Nurses available during data collection period.

Sample Size

A study by Kanani, Rajdev, and Mullan (2024) assessed knowledge, attitude, and practices regarding needle stick injury among healthcare workers in a tertiary care hospital. The study reported that approximately 46% of healthcare workers had adequate knowledge regarding needle stick injury prevention.

$$\text{Formula: } n = \frac{Z^2 \times p \times (1-p)}{e^2}$$

Where:

Z = 1.96 (95% confidence interval)

p = 0.46 (46% prevalence)

q = (1-p) = (1-0.46) = 0.54

e = 0.07 (margin of error 7%)

Calculation

$$n = \frac{(1.96)^2 \times 0.46 \times 0.54}{(0.07)^2}$$

$$n = \frac{3.8416 \times 0.2484}{0.0049}$$

$$n = \frac{0.95425344}{0.0049} = 194.7456 \approx 195$$

The sample size was calculated using Cochran's formula based on an estimated prevalence of knowledge regarding needle stick injuries of 46% derived from previous Indian studies. At a 95% confidence interval and 7% margin of error, the calculated sample size was 195. However, considering feasibility constraints such as limited time and resources, a sample size of 200 participants will be considered for the present study.

Sampling Technique

Stratified random sampling

Inclusion Criteria

- Healthcare workers (Staff Nurses) willing to participate
- Minimum 1month of experience and have undergone an induction training program and skill development training.

Exclusion Criteria

- Interns or trainees, Senior Nursing Staff, and other administrative personnel
- Those are unwilling to participate

Tool and Technique

Tool:

Section A: Demographic data

Section B: Structured knowledge questionnaire

Section C: Practice checklist

Technique:

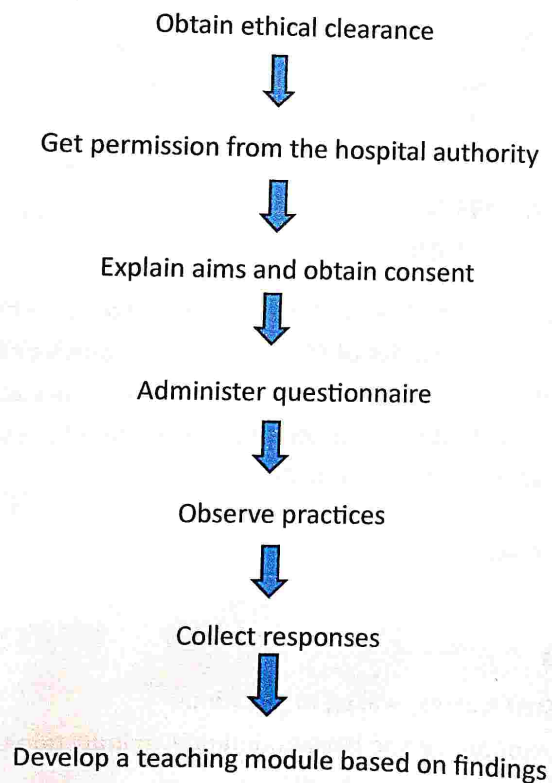
Self-administered questionnaire

Observation

Ethical Considerations

- Approval from the Institutional Ethics Committee
- Informed consent from participants
- Confidentiality maintained
- Right to withdraw ensured

Data Collection Procedure



Plan for Data Analysis

Descriptive statistics: Mean, percentage, frequency

Inferential statistics: Chi-square test (association)

Expected Outcome

- Identification of unsafe practices
- Development of an effective teaching module
- Improvement in Needle Stick Injury prevention strategies

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