

PROTOCOL

Name of Co-Investigator: Sukriya Bhattacharya

Designation: M.Sc Nursing Student

Place of posting: Tata Medical Center, Kolkata

Name of the Principal Investigator: Prof. Dr. Piyali Bose

Designation: Professor cum Chief Nursing Superintendent

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 including nurses, doctors, and housekeeping staffs 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. Doctors also experience substantial risk, with a pooled global prevalence of around 46%, though reported rates vary widely from 10% to 86% depending on specialty, workload, and exposure to invasive procedures such as surgery and suturing.

Housekeeping staff, although often underreported in research, are also vulnerable, with their risk primarily associated with improper biomedical waste handling, unsafe disposal of sharps, and lack of adequate training and protective measures; their prevalence is generally included within the overall healthcare worker estimates of around 43–44%. These statistics highlight that NSIs are a widespread issue affecting all categories of healthcare workers, emphasising 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
- Limited studies focusing on both knowledge and practice together

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

- Situation and associated factors of needle stick and sharps injuries among healthcare workers in a tertiary hospital: A cross-sectional survey. BMC Health Services Research, 24, 1002.

A recent cross-sectional study by X. Li et al. (2024) investigated the prevalence and associated factors of needle stick and sharps injuries among healthcare workers in a tertiary hospital setting. The study found that approximately 33% of healthcare workers experienced needle stick injuries, with higher incidence among nurses and those working in high-risk departments such as emergency and surgery. Factors significantly associated with injuries included long working hours, inadequate training, and non-compliance with safety protocols ($p < 0.05$). The study also reported that healthcare workers who had received formal training in infection control were significantly less likely to experience injuries, reinforcing the importance of continuous education and implementation of safety-engineered devices for effective prevention.

- 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.

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.

- Prevalence of needle stick injuries among health care workers of various hospitals: A cross sectional study in an urban district of North India. *International Journal of Community Medicine and Public Health*, 2021

A cross-sectional observational study conducted by Shweta Rajpal et al. (2021) assessed the prevalence of needle stick injuries among healthcare workers across government and private hospitals in an urban district of North India. The study included 384 participants comprising paramedical, technical, auxiliary, and sanitary staff, and data were collected over a one-year period using structured methods. The findings revealed that the overall prevalence of needle stick injury was 20.1%, indicating a significant occupational hazard among healthcare workers. Among different professional groups, the prevalence was higher among nurses (26.6% in public hospitals and 31.3% in private hospitals) and technicians (37.5% in public hospitals and 16.7% in private hospitals), while lower rates were observed among ward boys and sweepers. The study highlighted that inadequate adherence to standard operating protocols and lack of consistent training contributed to the occurrence of injuries. It concluded that implementation of strict institutional policies, regular training programs, early reporting systems, and availability of post-exposure prophylaxis are essential strategies for effective prevention of needle stick injuries among healthcare workers.

- Prevalence and prevention of needle stick injuries among healthcare workers in a tertiary care hospital in India. *International Journal of Community Medicine and Public Health*, 7(5), (2020).

A cross-sectional study by S. Sharma et al. (2020) assessed the prevalence and prevention practices of needle stick injuries among healthcare workers in a tertiary care hospital in India. The study included 250 participants comprising nurses, doctors, and laboratory technicians. Results showed that 38% of healthcare workers experienced at least one needle stick injury in the past year, with nurses being the most affected group (52%). Despite 72% having knowledge about standard precautions, only 54% adhered consistently to safe practices such as proper disposal of sharps and avoiding recapping needles. The study highlighted a significant gap between knowledge and practice and emphasized the need for structured training programs and strict monitoring to improve adherence to prevention protocols.

Variables

Research Variable: Knowledge and Practices regarding NSI prevention

Operational Definitions

- Knowledge: Understanding of healthcare workers regarding causes, risks, and prevention of NSI measured through a structured questionnaire.
- Practices: Actual actions performed by healthcare workers in preventing NSI are measured through a checklist.
- Healthcare Workers: Nurses, doctors, housekeeping staff 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

All healthcare workers, including Staff nurses, Fellow Doctors and Housekeeping Staffs working in a selected hospital.

Sample

Staff Nurses, Fellow Doctors and Housekeeping Staffs available during data collection period.

Sample Size

A cross-sectional study conducted among healthcare workers in North India reported that the overall prevalence of needle stick injuries was 20.1% among 384 participants, with variation across categories such as nurses (26.6%) and housekeeping staff (around 9–15%). Another hospital-based study in India reported that approximately 28.4% of healthcare workers had experienced needle stick injuries, indicating moderate prevalence in institutional settings. Based on these Indian studies showing lower prevalence (around 20–30%), a prevalence (p) of 20% can be reasonably used for calculating a smaller sample size.

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

Where:

Z = 1.96 (95% confidence interval)

p = 0.2 (20% prevalence)

q = (1-p) = (1-0.2) = 0.8

e = 0.05 (margin of error 5%)

Calculation

$$n = \frac{(1.96)^2 \times 0.2 \times 0.8}{(0.05)^2}$$

$$n = \frac{3.8416 \times 0.16}{0.0025}$$

$$n = \frac{0.6147}{0.0025}$$

$$n = 245.88 \approx 246$$

Adjusted Sample Size (10% Non-response)

$$n_{adj} = 246 / (1 - 0.1)$$

$$n_{adj} = 246 / 0.9$$

$$n_{adj} = 273.3 \approx 273$$

The sample size was calculated using Cochran's formula based on an estimated prevalence of needle stick injuries of 20% derived from previous Indian studies. At a 95% confidence interval and 5% margin of error, the calculated sample size was 246. After adjusting for a 10% non-response rate, the final sample size was 273. However, considering feasibility constraints such as limited time and resources, a sample size of 250 participants will be considered for the present study.

Sampling Technique

Simple random sampling

Inclusion Criteria

- Healthcare workers (Staff Nurses, Fellow Doctors and Housekeeping Staffs) willing to participate
- Those available during data collection

Version1 01/04/2026

- Minimum 1month of experience and have undergone an induction training program and skill development training.

Exclusion Criteria

- Interns or trainees, Senior Nursing Staffs, Consultants and other Administrative personnel
- Those on leave and 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

Data Collection Procedure

Obtain ethical clearance



Get permission from the hospital authority



Explain aims and obtain consent



Administer questionnaire



Observe practices



Collect responses



Develop a teaching module based on findings

Ethical Considerations

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

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 NSI prevention strategies

References

1. Li, X., He, Q., & Zhao, H. (2024). Situation and associated factors of needle stick and sharps injuries among healthcare workers in a tertiary hospital: A cross-sectional survey. *BMC Health Services Research*, 24, 1002.
2. Anandadurai, D., Praisie, R., Venkateshvaran, S., Nelson, S. B., & Thulasiram, M. (2024). 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.
3. Sharma, S., Verma, R., & Singh, A. (2020). Prevalence and prevention of needle stick injuries among healthcare workers in a tertiary care hospital in India. *International Journal of Community Medicine and Public Health*, 7(5), 1756–1760.
4. Singru, P. C., & Banerjee, S. (2019). Effectiveness of structured teaching program on knowledge and practices regarding needle stick injury prevention among nurses. *Journal of Clinical and Diagnostic Research*, 13(4), LC05–LC09.
5. Kermode, M., Jolley, D., Langkham, B., Thomas, M. S., Crofts, N., & Mueller, R. (2018). Compliance with universal precautions among healthcare workers in rural settings. *American Journal of Infection Control*, 33(1), 27–33.
6. Rajpal, S., Garg, S. K., Bano, T., & Singh, G. (2021). Prevalence of needle stick injuries among health care workers of various hospitals: A cross sectional study in an urban district of North India. *International Journal of Community Medicine and Public Health*, 8(4), 1976–1979.