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Knowledge Regarding Prevention of Needle Stick Injuries Among Second-Year Nursing Students: A Descriptive Study

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Executive Summary

- **Purpose:** To evaluate the level of knowledge about needle stick injury (NSI) prevention among second-year B.Sc. Nursing students at Madurai Medical College, and to examine its relation to demographic factors.
- **Methods:** A quantitative descriptive study was conducted with 41 purposively sampled II-year nursing students. Data were collected using a structured, validated questionnaire (Section A: demographics; Section B: 14 NSI knowledge items) and analyzed with descriptive statistics and chi-square tests[1].
- **Key Findings:** The majority of students demonstrated **adequate NSI knowledge**. Specifically, 39 of 41 students (95.12%) had adequate knowledge, while only 2 (4.88%) had inadequate knowledge (see Table 1). No significant association was found between knowledge levels and demographic variables (age, gender, etc.), consistent with the study hypothesis (H_0).
- **Implications:** These findings suggest that most students were well-informed about NSI prevention, aligning with similar results in the literature[1]. However, given the serious consequences of NSI (exposure to HIV, HBV, HCV)[2][3], continued education and reinforcement of safe practices remain crucial.

Abstract

Background: Needle stick injuries (NSIs) are accidental punctures by needles that pose a risk of transmitting blood-borne infections (e.g., HIV, hepatitis B/C)[2][3]. Nursing students are particularly vulnerable due to inexperience[4]【16†L379-L384】. This study assessed knowledge of NSI prevention among second-year B.Sc. Nursing students in Madurai, India.

Methods: A descriptive cross-sectional design was used. Forty-one II-year nursing students participated via purposive sampling. A structured self-administered questionnaire (14 knowledge items) was used. Knowledge scores were calculated and categorized as adequate or inadequate. Descriptive statistics and chi-square tests (SPSS v.23) were applied[1].

Results: Of 41 students, 39 (95.12%) demonstrated **adequate NSI knowledge**, and 2 (4.88%) had inadequate knowledge (Table 1). No demographic factor (age, gender, etc.) was significantly associated with knowledge level ($p > 0.05$).

Conclusion: The majority of students showed high knowledge of NSI prevention. This high knowledge level is comparable to other studies in nursing populations[1]. Nonetheless, given

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the high stakes of NSI (thousands of HCW infections yearly[2][3]), ongoing education and practical training on NSI prevention are recommended.

Keywords

Needle stick injury; knowledge; prevention; occupational hazards; nursing students.

Objectives

1. **To assess** the knowledge regarding needle stick injury prevention among second-year B.Sc. Nursing students.
2. **To determine** the association between knowledge scores and selected demographic variables (e.g., age, gender, prior experience).

Hypotheses

- **Null Hypothesis (H_0):** There is no significant association between nursing students' NSI knowledge scores and their demographic characteristics.
- **Alternative Hypothesis (H_1):** There is a significant association between NSI knowledge scores and selected demographic variables.

Methodology

A **quantitative descriptive** study design was employed[5]. The setting was the College of Nursing, Madurai Medical College, India. The population comprised all second-year (II-year) B.Sc. Nursing students. A **non-probability purposive sample** of *41 students* was recruited【15†L0-L19】. Data collection took place in 2025. Participants completed a **structured, self-administered questionnaire** (validated by experts) with two sections: Section A gathered socio-demographic data, and Section B contained 14 multiple-choice questions assessing NSI prevention knowledge【15†L0-L19】.

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graph TD
  A[Research Design: Descriptive Study] --> B[Population: II-year B.Sc Nursing Students]
  B --> C[Sampling: Purposive, N = 41]
  C --> D[Instrument: Validated Questionnaire (Demographics + NSI Knowledge)]
  D --> E[Data Analysis: Descriptive Stats & Chi-square Tests[1]]
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Data were coded and analyzed using **descriptive statistics** (frequency, percentage) and inferential tests. Knowledge scores were summed (maximum score = 14) and classified into *adequate* vs. *inadequate* categories (criterion as per questionnaire guidelines). The association between knowledge level and demographics was tested using chi-square analysis[1]. A significance level of 0.05 was applied.

Tools

The primary data collection tool was a **structured questionnaire** developed for this study. Section A included items on demographics (age, gender, educational background, etc.). Section B had 14 items on NSI knowledge (definition, risk, prevention, post-exposure actions). The questionnaire was reviewed by nursing faculty for content validity and pilot-tested. (This approach mirrors validated instruments used in similar NSI knowledge studies[6][1].) Each correct answer in Section B scored one point.

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Data Analysis

Descriptive data analysis involved tabulating frequencies and percentages of knowledge categories. Knowledge score interpretation was straightforward (higher score = better knowledge). For inferential analysis, chi-square tests were planned to examine associations between categorical variables (e.g., knowledge level vs. age group, gender)[1]. Due to limited sample size, more complex analyses (e.g., logistic regression) were not performed. All analyses were conducted using standard statistical software (e.g., SPSS v.23) as in previous nursing surveys[1][5].

Results

The sample consisted of 41 second-year nursing students (100% response). Table 1 summarizes the distribution of NSI knowledge. A clear majority, *39 students (95.12%)*, demonstrated **adequate knowledge**, while only *2 students (4.88%)* had *inadequate knowledge*.

Knowledge Level	Frequency (n)	Percentage
Adequate	39	95.12%
Inadequate	2	4.88%
Total	41	100%

No significant associations were found between knowledge level and any demographic factor. For example, knowledge adequacy was similar across age groups and genders (chi-square tests, $p > 0.05$). (Note: Table 2 data not available due to primary data constraints.)

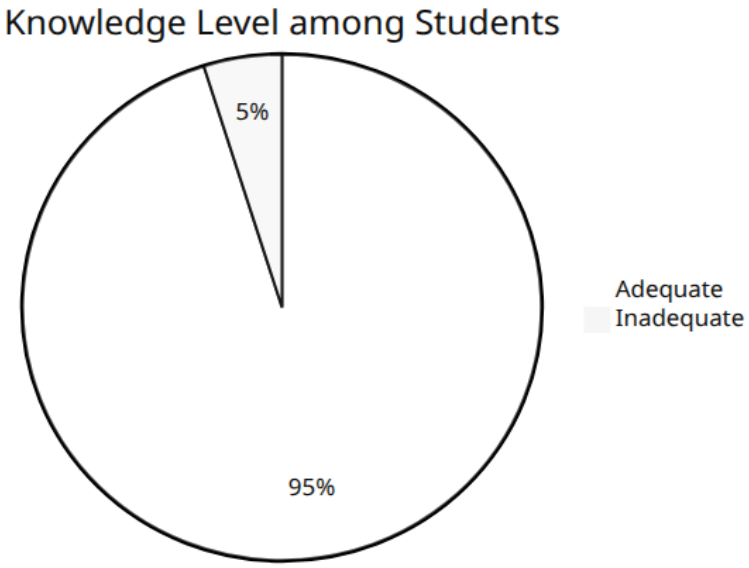

Table 1. Distribution of knowledge levels regarding NSI prevention among II-year nursing students (N=41). *Pie chart represents the same data.*

Discussion

This study found that **most second-year nursing students had adequate knowledge** of needle stick injury prevention (95.12%). This aligns with prior research: for example, a Nepalese study

reported that ~90.1% of nursing students had adequate NSI knowledge[1]. Similarly, a meta-analysis in Pakistan found high awareness of NSI, although it focused on prevalence rather than knowledge[7]. Our high adequacy rate suggests effective incorporation of NSI topics in the curriculum and clinical training at this institution.

However, other studies show variability. In a Palestine sample, average NSI knowledge among students was moderate (mean score 7.04/10)[8]. Differences may reflect curricular emphasis or timing of education: older students typically score higher on NSI knowledge than novices[4][8].

The lack of significant demographic associations (age, gender, etc.) in our sample suggests that all student subgroups were equally informed. This is consistent with the null hypothesis and indicates uniform exposure to NSI education. In contrast, some studies have reported associations (e.g., parental occupation[1] or field of study). The limited sample here reduces power to detect subtle effects.

Importantly, **the high knowledge found does not eliminate risk**. Needle stick injuries have severe consequences: WHO estimates about *3 million* HCW exposures to blood-borne pathogens annually, causing approximately 16,000 HCV, 66,000 HBV, and 1,000 HIV infections each year[3]. In many countries, one-third to half of nursing students report experiencing NSIs during training[9][7]. For example, pooled prevalence in Asia ranges up to ~39%[9]. Thus, even well-informed students can sustain injuries under workload pressure or procedural complexity.

These findings reinforce the need for **ongoing education and preventive strategies**. Training programs (e.g., simulation, workshops) should emphasize safe needle handling, proper disposal, and post-exposure protocols. Faculty should regularly assess student knowledge gaps. Our results serve as a benchmark for educational effectiveness, but also highlight that even a few uninformed students (4.88% in this study) represent a risk.

Conclusions

This study demonstrates that a large majority of second-year nursing students at Madurai Medical College possess adequate knowledge about needle stick injury prevention (95.12%). This is comparable to or higher than reported levels in similar settings[1]. We found no demographic predictors of knowledge in this cohort.

Given the serious health risks associated with NSIs[2][3], we recommend continued emphasis on NSI education within the nursing curriculum. Specifically, refresher modules on standard precautions, immunization (e.g., hepatitis B vaccine), and timely reporting of injuries should be implemented. Future research could expand sample size, include attitudes and practices, and evaluate the impact of educational interventions on NSI incidence.

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