



# Prevalence and Determinants of Needle-Stick Injuries Among Nurses in Mymensingh Medical College Hospital: A Cross-Sectional Study

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## Abstract

“Prevalence and Determinants of Needle-Stick Injuries among Nurses in Mymensingh Medical College Hospital: A Cross-Sectional Study”

Needle-stick injuries (NSIs) are a major occupational hazard among healthcare workers, particularly nurses who are frequently exposed to sharp instruments during patient care. This study aimed to assess the prevalence and determinants of needle-stick injuries among nurses in Mymensingh Medical College Hospital. A descriptive cross-sectional study design was used, and data were collected from 108 nurses using a structured questionnaire.

The findings revealed that a high proportion of nurses (83.3%) experienced at least one NSI in the last 12 months. Injection administration, IV cannulation, and ampoule breaking were the most common procedures associated with NSIs. The major determinants identified were heavy workload, lack of safety devices, rushing during procedures, inadequate training on infection prevention and control, and inconsistent use of standard precautions. Although most participants (98.1%) believed NSIs are preventable, gaps between knowledge and practice were evident.

The study concludes that NSIs remain highly prevalent among nurses and are influenced by both individual and institutional factors. Strengthening training programs, ensuring adequate staffing, improving availability of safety devices, and promoting a strong reporting culture are essential to reduce NSIs.

**Keywords:** Needle-stick injury, nurses, occupational hazard, infection prevention, Bangladesh.

## I. Introduction

### “Prevalence and determinants of Needle-Stick Injuries among Nurses in Hospital Settings”

**Background:** Needle-stick injury (NSI) remains one of the most common and serious occupational hazards among nurses, who constitute the largest

group of frontline healthcare workers and routinely handle needles, syringes, and other sharps during patient care.

Needle-stick injury (NSI) means an accidental penetration of the skin by a needle or sharp instrument used in patient care within the last 12 months, as reported by the nurse.

Needle stick injuries (NSIs) are sharps percutaneous injuries, and sharps exposures. NSIs are injuries caused by needles such as hypodermic needles, intravenous (IV) stylets, blood collection needles, and needles used to connect parts of IV administration systems, according to the US National Institute of Occupational Safety and Health. NSIs are widespread and expected among healthcare workers (HCWs) while performing their responsibilities. A needle poke or sharps contaminated with blood or body fluids produce a break in the skin, resulting in percutaneous exposure. When blood or body fluids come into touch with open wounds, non-intact skin (as in eczema), or mucous membranes (such as the mouth and eyes), mucocutaneous exposure occurs.

A study have been about this problem among nurses in private hospital at Dhaka city, there was describe that 35 million health care worker worldwide, 3 million experience needle stick and sharps injuries every year. Needle stick injuries (NSIs) pose a considerable risk for the transmission of more than 20 kinds of blood borne pathogens, such a hepatitis B virus, C Virus and HIV. Even though up to 90% of the injuries occurrence developing nations, the number of studies reporting the serious issues is less compared to developed nation. In less developed countries, the risk of occupational transmission due to excessive handling of contaminated needles that result from some common unsafe practices. These include administration of unnecessary injections on demand, reuse of nonsterile needles when supplies are low and inappropriate disposal of hazardous waste. A safer work environment and practice could have prevented the Needle stick injuries (NSIs).

According to Bangladesh Nursing and Midwifery Council, all nurses are not vaccinated against infectious disease. So, the nurses are riskiest



to Needle stick injuries (NSIs). Only few studies conducted on prevalence of Needle stick injuries (NSIs) but not on responses among nurses in Bangladesh. Bangladesh's healthcare system faces numerous challenges that increase the risk of needle stick injuries. Limited resources, overcrowded facilities, and a lack of comprehensive training on occupational hazards contribute to the prevalence of these injuries. 7 Moreover, inadequate access to safety-engineered devices, weak enforcement of infection control policies, and poor awareness regarding post-exposure prophylaxis (PEP) further exacerbate the issue. 8 Compounding this, the lack of robust reporting mechanisms and improper sharps waste disposal practices expose healthcare workers to additional risks. 9 Addressing these systemic shortcomings is critical to ensuring the safety of healthcare workers and improving patient care outcomes. (Nisu JF, Chaklader M.A. & Yasmin R et al)

NSI is a prevalent hazard in HCWs of HD units. The high rate of NSI and unreported cases, besides the lack of adequate information, indicates the necessity of implementing protocols and strategies for improving the safety of this personnel. It is difficult to compare the result of this study with those performed among HCWs in other settings; hence, further studies are needed to determine whether HCWs of these units are more exposed to NSIs (Jamshid Roozbeh1, Leila Malekmakan1 & Mina Mashayekh1 et al).

According to the World Health Organization (WHO), sharps injuries contribute to 40% of Hepatitis C Virus (HCV) and Hepatitis B Virus (HBV) infections and 2-3% of Human Immunodeficiency Virus (HIV) infections among healthcare workers. The National Institute for Occupational Safety and Health (NIOSH), USA, defines needle stick injuries as those caused by devices such as blood collection needles, hypodermic needles, needles used in intravenous (IV) systems, and IV stylets.

#### Justification:

The best way to reduce NSI is to impart knowledge and awareness about it. Reporting of sharp injuries, preventive measures and post exposure prophylaxis and follow up should be the core issues to Infection prevention and control. Knowledge Regarding Needle Stick Injury & use of Personal Protective Equipment among Nurses at Dhaka Medical College Hospital, Dhaka.

Since most of us in our profession are involved in working with needle stick injury and are at risk being aware and acquiring knowledge about needle stick injury is very important for our

profession. But needle stick injury is the most common among health worker service due to lack of enough knowledge and practice about safe handling of needle stick. Also we have studied many articles/thesis about needle stick injury and also got so many possible information. By doing the thesis study on needle stick injury, I found that there are more information and variables gaps about needle stick injury. If we do a little more research on them, maybe I can try to solve the problems or set suggestions and think that if I, fill the gaps, the quality of our nursing service will improve and will benefit health workers a lot. This is why I originally selected this needle stick injury problem and are eager to work on it.

#### General Objective:

To assess the prevalence and determinants of Needle-Stick Injuries among Nurses in Mymensingh Medical College Hospital, Mymensingh.

#### Specific Objectives:

1. To identify the **demographic and occupational characteristics** of nurses in hospital setting
2. To determine the **prevalence** of needle-stick injuries among nurses in hospital setting
3. To assess the **knowledge** of nurses regarding needle-stick injury prevention.
4. To determine the **factors associated** with the occurrence of needle-stick injuries.

#### Research Question:

What is the prevalence and determinants of needle-stick injuries among nurses in the Mymensingh Medical College Hospital?

#### Variables:

##### Dependent Variables

- Prevalence of needle-stick injuries (NSI)
- Determinants of needle-stick injuries (based on demographic and work-related factors)
- Types of needle-stick injuries
- Reporting practices after NSI

##### Independent Variables

###### Demographic variables

- Age
- Sex
- Educational level
- Years of nursing experience
- Working shift



### Work related (Associate) Variable

- Hospital department (General Medical, Surgical Wards and Emergency.)
- Work shift
- Workload (patients per nurse)
- Number of procedures performed per shift
- Training on infection prevention and NSI
- Needle disposal practices

### Operational definition

#### 1) Needle stick Injury(NSI):

An accidental penetration of the skin by a needle or sharp instrument used in patient care within the last **12 months**, as reported by the nurse.

#### 2) Prevalence of NSI:

The **percentage of nurses** who experienced at least one needle-stick injury within the last **12 months**, measured by self-reported responses on the questionnaire.

#### 3) Nurse:

A registered or Govt. appointed nurse who provides direct patient care in the hospital and has worked for **at least 6 months** in the selected setting.

#### 4) Hospital Setting:

Any clinical area where nursing care is provided, including, general medical and surgical wards, and emergency also.

#### 5) Work Shift:

The time period in which a nurse works (Morning or Evening or Night shift), recorded as reported by the participant.

#### 6) Risk procedures:

Any nursing procedure involving needles or sharps, such as:

- IV cannulation
- Blood sample collection
- Injection administration
- Suturing assistance
- Breaking ampule
- Measured by frequency reported by nurses.

The study is expected to be completed within **20-24 weeks**, including data collection, analysis, and report writing.

### Study Areas

The study will be carried out in selected department of the hospital, including:

- General Medical and Surgical wards
- Emergency department

### Study Population

All registered nurses who are Govt. appointed and providing direct patient care in the selected areas of hospital during the data collection period.

### Inclusion Criteria

- Nurses with **at least 6 months** of clinical experience.
- Nurses directly involved with patient care and procedures using needles/sharps.
- Nurses who are willing to participate.
- Nurse who are well/healthy.

### Exclusion Criteria

- Nurses on leave during data collection.
- Administrative or managerial nurses not performing.
- Nurse who are disagree to participate.
- Nurse who are sick/unhealthy.

### Sampling Technique

**Non probable, conveniencesampling** technique will be used depending on the number of department.

**Sample Size [Used Yamane formula because, when the total population is known. This formula is widely applied in social science, health, and nursing research due to its clarity, ease of use, and ability to produce an adequate sample size with a predetermined margin of error (commonly 5%).]**

$$n = \frac{N}{1 + N(e^2)}$$

Here, N=148 [There are total number of population 148, evidenced by Nursing superintendent in MMCH November 2025]

Marginal error .05 standard

**So, sample size 108.**

### Data collection Instrument

A **structured, administered questionnaire** will be used consisting of:

1. **Socio-demographic information** – age, sex, qualification and years of experience
2. **Occupational and behavioral factors** – department, shift, workload, PPE use.
3. **NSI occurrence** – history of NSIs in the past 12 months, frequency, reporting behavior

## II. Literature Review

### Methods and Materials

#### Study Design

A **descriptive cross-sectional study** will be conducted to assess the prevalence and determinants of needle-stick injuries (NSIs) among nurses in the hospital setting.

#### Study Duration



4. **Knowledge and associate**– knowledge of NSI prevention, safe needle handling, post-exposure procedures

The questionnaire will include, **yes/no**, and **multiple-choice** items.

**Data collection procedure**

- Permission will be taken from hospital authorities.
- Participants will be briefed about study purposes.
- Consent will be obtained.
- Questionnaires will be distributed and collected on the same day or within a set time of period.
- Privacy and anonymity will be maintained.

**Data Analysis**

Data will be coded and analyzed using SPSS version 23

Analysis will include:

- **Descriptive statistics:** frequency, percentage, mean, standard deviation
- Results will be presented in **tables, charts, and graphs.**

**Ethical Consideration**

- Permitted from the chief of study areas.
- Written informed consent will be taken from all participants.
- Confidentiality and anonymity will be strictly ensured.
- Participation will be voluntary with the right to withdraw anytime.

**Pre-test Instrument:**

After permission of hospital authority, the questionnaire should be tested by the 5-6 participants and if any query, that must be modify then apply finally to the study sample.

**Analysis and Interpretation**

A descriptive cross-sectional study has conducted to assess the prevalence and determinants

of needle-stick injuries (NSIs) among nurses in the Mymensingh Medical College Hospital. The study is expected to be completed within 24 weeks, including data collection, analysis, and report writing. The study had carried out in selected department of the Mymensingh Medical College Hospital, in General Medical and Surgical departments (Male and Female wards) and Emergency department. All registered nurses who were Govt. appointed and providing direct patient care in the selected areas of hospital during the data collection period. The sample size was 108.

**Statistics**

**Table 1:** Age of participant

N	Valid	108
	Missing	0
Mean		35.2870
Median		33.5000
Mode		30.00
Std. Deviation		6.33349
Minimum		25.00
Maximum		55.00

Table 1 presents the descriptive statistics of the study variables among 108 participants. The mean age of participants was **35.29 ± 6.33 years**, with a range of 25 to 55 years, indicating that most nurses were in their early to mid-adult age group. The mean nursing experience was **11.71 ± 4.84 years**, suggesting that the participants were generally experienced professionals.

Overall, the data suggest that the study population consists of moderately experienced nurses with diverse educational backgrounds and working conditions, which may influence their exposure to occupational risks such as needle-stick injuries.

**Table: 2** Sex of participant

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Female	85	78.7	78.7	78.7
Male	23	21.3	21.3	100.0
Total	108	100.0	100.0	

Table 2 shows the distribution of participants according to sex. The majority of respondents were **female** (78.7%, n = 85), while **male** participants accounted for 21.3% (n = 23) of the total sample.



**Table 3 Qualification of participant**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma in Nursing	43	39.8	39.8	39.8
	B.Sc. in Nursing	52	48.1	48.1	88.0
	MSN	3	2.8	2.8	90.7
	MPH	10	9.3	9.3	100.0
	Total	108	100.0	100.0	

Table 3 presents the educational qualifications of the participants. The highest proportion of respondents held a **B.Sc. in Nursing** (48.1%, n = 52), followed by those with a **Diploma in Nursing** (39.8%, n = 43). A smaller proportion had **MPH degrees** (9.3%, n = 10), while only a few participants had an **MSN degree** (2.8%, n = 3). This indicates that most of the participants had undergraduate-level nursing education, with a smaller proportion having postgraduate qualifications. The variation in educational background may influence knowledge, practice, and awareness related to infection prevention and occupational safety, including needle-stick injury prevention.

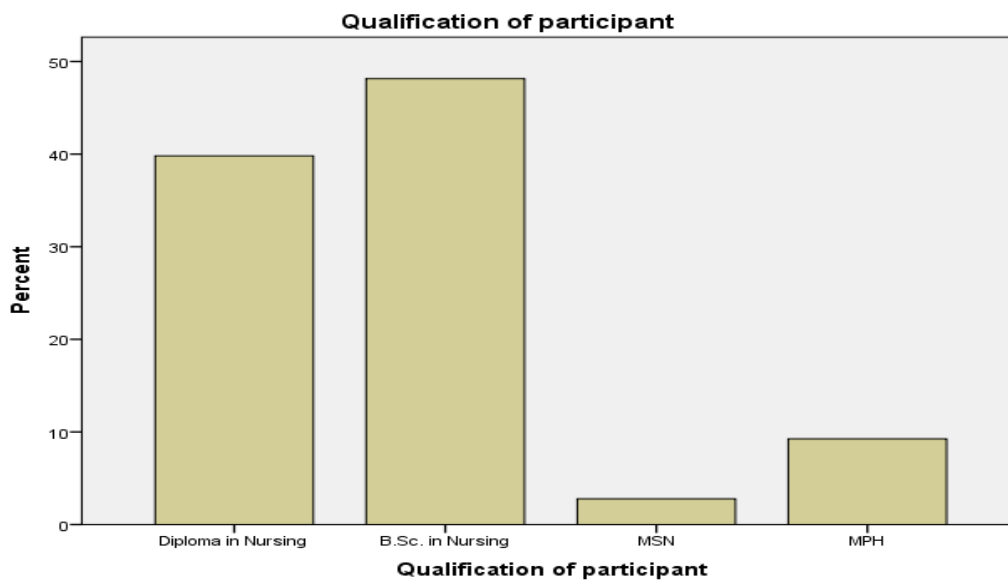


Figure no 1 showed that qualification of participant were B.Sc. in nursing 48.1% (52), Diploma in nursing 39.8% (43), MPH 9.3% (10) and MSN 2.8% (3).

**Table: 4 Current Working department**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Emergency	13	12.0	12.0	12.0
	Surgery	51	47.2	47.2	59.3
	Medicine	44	40.7	40.7	100.0
	Total	108	100.0	100.0	



Table 4 shows the distribution of participants according to their current working department. The highest proportion of nurses were working in the **Surgery department** (47.2%, n = 51), followed by the **Medicine department** (40.7%, n = 44). A smaller proportion of participants were from the **Emergency department** (12.0%, n = 13).

This indicates that most respondents were working in high patient-load clinical areas such as Surgery and Medicine, where frequent invasive procedures are performed. Such working environments may increase occupational exposure and the risk of needle-stick injuries among nurses.

**Table 5 Working Shift of participant**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Morning	58	53.7	53.7	53.7
Evening	32	29.6	29.6	83.3
Night	18	16.7	16.7	100.0
Total	108	100.0	100.0	

according to their working shift. More than half of the nurses were working in the **morning shift** (53.7%, n = 58), followed by the **evening shift** (29.6%, n = 32). A smaller proportion of participants were assigned to the **night shift** (16.7%, n = 18).

This indicates that the majority of nurses were engaged in daytime duties, where patient flow and clinical procedures are generally higher. Variations in shift duty may influence workload, fatigue, and exposure to occupational hazards, including needle-stick injuries

**Table 6 Do you receive training on infection prevention and control (IPC)?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	53	49.1	49.1	49.1
No	55	50.9	50.9	100.0
Total	108	100.0	100.0	

Table 6 shows the participants' responses regarding training on infection prevention and control (IPC). Slightly less than half of the respondents (49.1%, n = 53) reported that they had received IPC training, while a slightly higher proportion (50.9%, n = 55) reported that they had not received such training. This finding indicates that a considerable number of nurses are not adequately trained in infection

prevention and control. The lack of IPC training may contribute to unsafe clinical practices and increase the risk of occupational hazards, including needle-stick injuries. Therefore, regular and comprehensive IPC training programs are essential to improve safety practices among nurses.

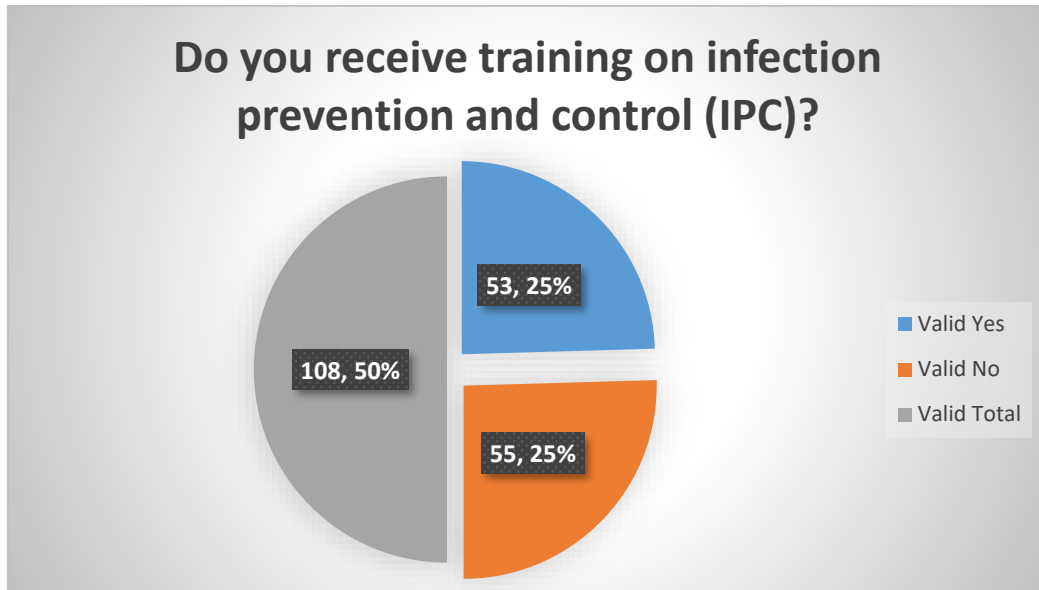


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Table 7 Do you use Gloves during procedures?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Always	10	9.3	9.3	9.3
Sometime	96	88.9	88.9	98.1
Never	2	1.9	1.9	100.0
Total	108	100.0	100.0	

Table 7 shows the practice of glove use during clinical procedures among participants. The majority of respondents (88.9%, n = 96) reported that they sometimes use gloves, while only 9.3% (n = 10) stated that they always use gloves. A small proportion (1.9%, n = 2) reported that they never use gloves during procedures.

This indicates that consistent use of gloves among nurses is relatively low, with most participants using them irregularly. This inconsistent practice may increase the risk of occupational exposure, including needle-stick injuries, highlighting the need for strict adherence to standard precautions and reinforcement of infection prevention protocols.



Figure 3 shows the practice of glove use during clinical procedures among participants. The majority of respondents (88.9%, n = 96) reported that they sometimes use gloves, while only 9.3% (n = 10) stated that they always use gloves. A small proportion (1.9%, n = 2) reported that they never use gloves during procedures.

**Table 8 How many patients do you handle per shift on average?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-10 pts	2	1.9	1.9	1.9
	10-20 pts	4	3.7	3.7	5.6
	20-30 pts	14	13.0	13.0	18.5
	Above 30 pts	88	81.5	81.5	100.0
	Total	108	100.0	100.0	

Table 8 shows the average number of patients handled by nurses per shift. The majority of participants (81.5%, n = 88) reported handling more than 30 patients per shift. A smaller proportion handled 20–30 patients (13.0%, n = 14), while only 3.7% (n = 4) and 1.9% (n = 2) handled 10–20 patients and 1–10 patients respectively.

This indicates that most nurses are working under a very high patient load per shift. Such an excessive workload may increase stress, reduce concentration, and contribute to a higher risk of occupational hazards, including needle-stick injuries.

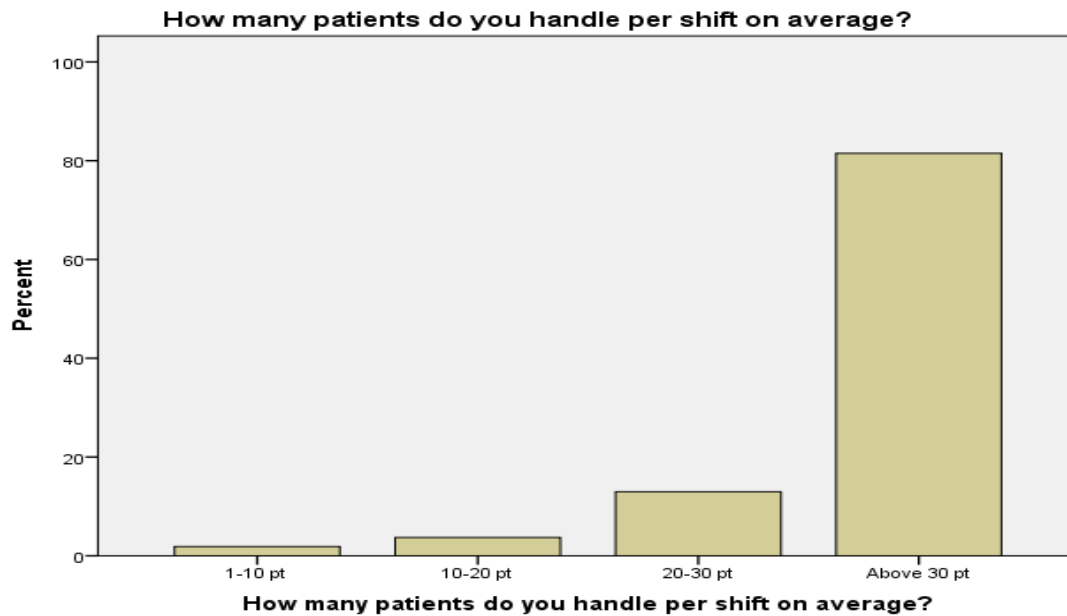


Figure no 4 shows the average number of patients handled by nurses per shift. The majority of participants (81.5%, n = 88) reported handling more than 30 patients per shift. A smaller proportion handled 20–30 patients (13.0%, n = 14), while only 3.7% (n = 4) and 1.9% (n = 2) handled 10–20 patients and 1–10 patients respectively.

**Table 9 How often do you perform needle-related procedures?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Frequently	57	52.8	52.8	52.8
Occasionally	6	5.6	5.6	58.3
Sometime	45	41.7	41.7	100.0
Total	108	100.0	100.0	

Table 9 shows the frequency of performing needle-related procedures among participants. The majority of nurses reported that they perform needle-related procedures **frequently** (52.8%, n = 57), followed by those who perform them **sometimes** (41.7%, n = 45). A small proportion of participants reported performing such procedures **occasionally** (5.6%, n = 6).

This indicates that most nurses are regularly engaged in needle-related clinical activities, which increases their occupational exposure. Frequent performance of such procedures may elevate the risk of needle-stick injuries, emphasizing the importance of strict adherence to standard precautions and safe injection practices.

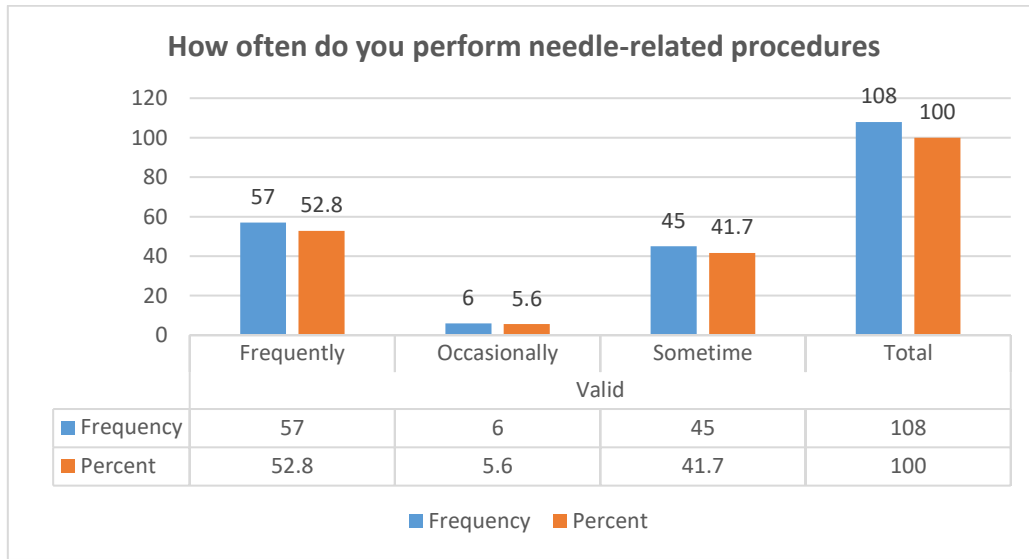


Figure no 5 showed that the participant was performed needle related procedures “frequently 52.8% (57), sometime 41.7% (45) and occasionally 5.6% (6).

**Table 10 Have you ever experienced a needle-stick injury in the last 12 months?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	83.3	83.3	83.3
	No	18	16.7	16.7	100.0
	Total	108	100.0	100.0	

Table 10 shows the occurrence of needle-stick injuries (NSIs) among participants in the last 12 months. The majority of nurses (83.3%, n = 90) reported that they had experienced at least one NSI, while only 16.7% (n = 18) reported no such incidents.

This indicates a high prevalence of needle-stick injuries among nurses in the study setting. The findings suggest that occupational exposure to NSIs is a significant problem, highlighting the urgent need for effective preventive measures, strict adherence to safety protocols, and regular training on infection prevention and control.



Figure no 6 showed that the participant was replayed above question **Yes** 83.3% (90) and **No** 16.7% (18).



**Table 11 If yes, how many NSIs have you experienced?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 time	42	38.9	42.4	42.4
	2 time	29	26.9	29.3	71.7
	3 time	27	25.0	27.3	99.0
	11.00	1	.9	1.0	100.0
	Total	99	91.7	100.0	
Missing	System	9	8.3		
Total		108	100.0		

Table 11 presents the frequency of needle-stick injuries (NSIs) experienced by participants. Among those who reported NSIs (n = 99), the highest proportion experienced NSI **once** (42.4%, n = 42), followed by those who experienced it **twice** (29.3%, n = 29) and **three times** (27.3%, n = 27). A very small proportion (1.0%, n = 1) reported an unclear or outlier response.

This indicates that repeated exposure to needle-stick injuries is common among nurses in the study setting. The findings suggest that many nurses are not only exposed to NSIs once but may experience them multiple times, highlighting persistent gaps in adherence to safe injection practices and the need for stronger preventive strategies, continuous training, and improved workplace safety measures.

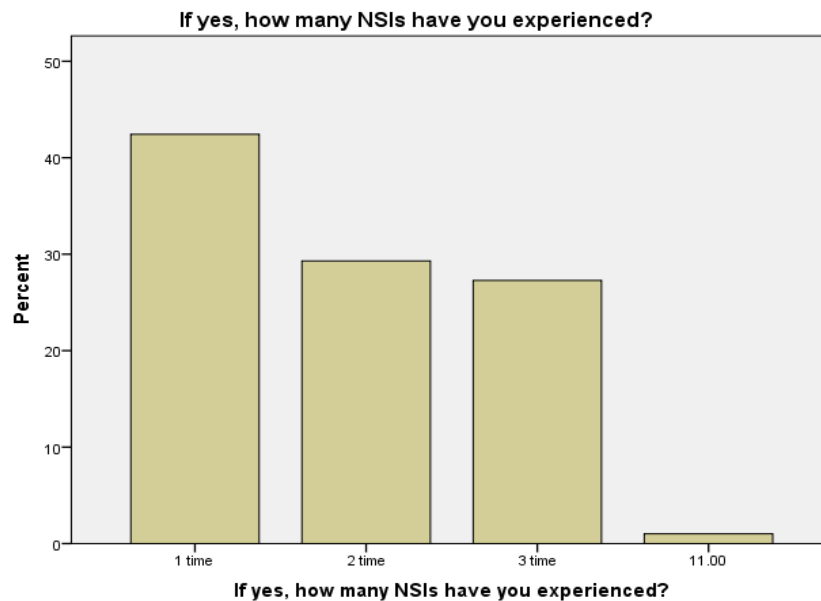


Figure no 7 explore that the participant was experienced about NSIs 1 time 38.9% (42), 2 time 26.9% (29) and 3 time 25% (27) and absent to response 8.3% (9).

**Table 12 During which procedure did the NSI occur?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Iv Cannulation	29	26.9	27.6	27.6
	Injection Administration	44	40.7	41.9	69.5
	Blood sample collection	4	3.7	3.8	73.3
	Suturing assistance	4	3.7	3.8	77.1



Breaking ample	24	22.2	22.9	100.0
Total	105	97.2	100.0	
Missing System	3	2.8		
Total	108	100.0		

Table 12 shows that the highest proportion of participants sustained needle-stick injuries during **injection administration** (40.7%, n = 44), followed by **IV cannulation** (26.9%, n = 29) and **breaking ampoules** (22.2%, n = 24). A smaller proportion of injuries occurred during **blood sample collection**

(3.7%, n = 4) and **suturing assistance** (3.7%, n = 4).

This indicates that needle-stick injuries are more common during routine and frequently performed procedures, suggesting the need for stricter adherence to safety precautions and improved training during these high-risk activities.

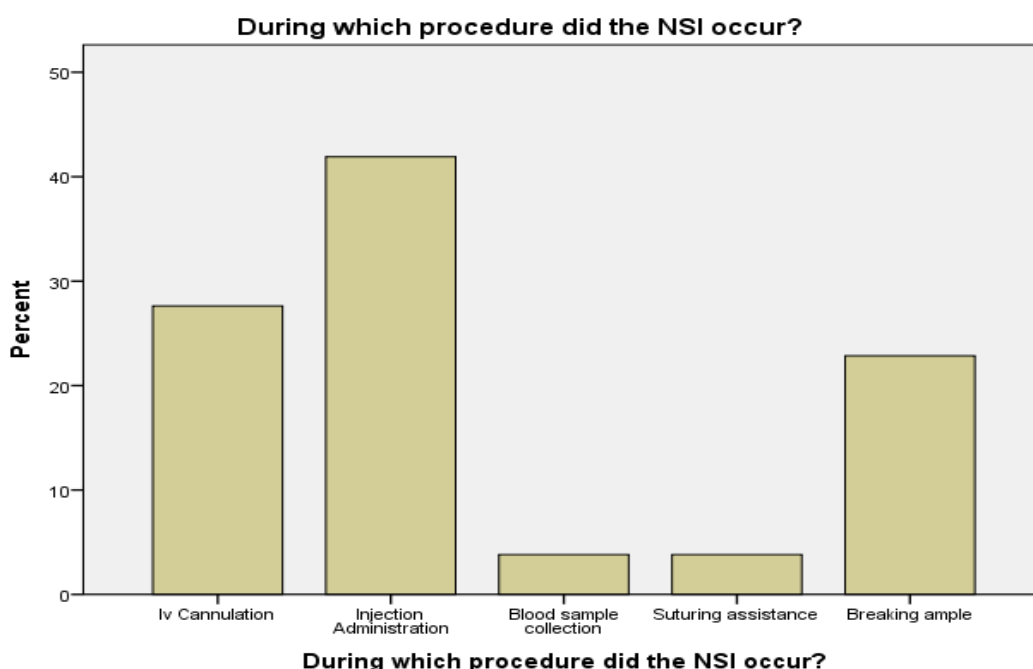


Figure no 8 explored that the participants were injured injection administration procedure 40.7% (44), Iv cannulation 26.9% (29), breaking ample 22.2% (24), blood sample collection 3.7% (4) and suturing assistance 3.75 (4).

**Table 13** What do you think contributed to the NSI?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Over workload	76	70.4	70.4	70.4
Fatigue	3	2.8	2.8	73.1
Inadequate lighting	4	3.7	3.7	76.9
Lack of safety devices	13	12.0	12.0	88.9
Rushing during procedure	12	11.1	11.1	100.0
Total	108	100.0	100.0	

Table 13 shows that the majority of participants experienced needle-stick injuries due to **overwork load** (70.4%, n = 76). Other contributing factors included **lack of safety devices** (12.0%, n = 13), **rushing during procedures** (11.1%, n = 12), **inadequate lighting** (3.7%, n = 4), and **fatigue** (2.8%, n = 3).

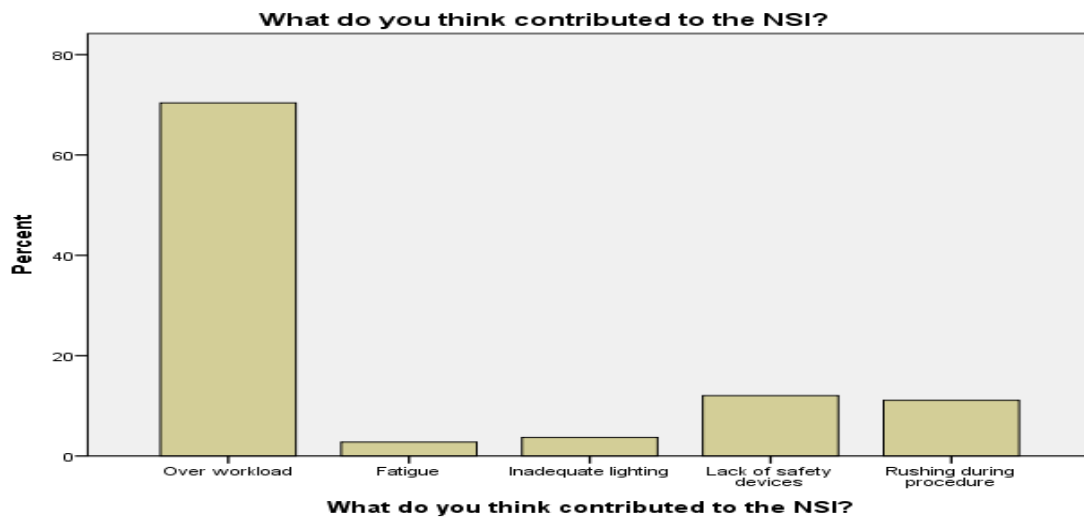


Figure no 9 showed that NSI injured the participants because over workload 70.4% (76), lack of safety devices 12.0% (13), rushing during procedure 11.1% (12), inadequate lighting 3.7% (4) and fatigue 2.8% (3).

**Table 14 Did you report the NSI incident?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	57	52.8	52.8	52.8
	No	51	47.2	47.2	100.0
	Total	108	100.0	100.0	

Table 14 shows the reporting status of needle-stick injury (NSI) incidents among participants. Slightly more than half of the respondents (52.8%, n = 57) reported that they had reported the NSI incidents, while 47.2% (n = 51) stated that they did not report such incidents.

This indicates that nearly half of the nurses did not report NSI occurrences, suggesting a considerable

level of underreporting. This may be due to lack of awareness, perceived low importance of reporting, or fear of consequences. The finding highlights the need to strengthen reporting systems, ensure staff education, and promote a supportive, non-punitive reporting culture in the workplace.

**Table 15 if no, why did you not report it?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fear of blame	7	6.5	6.5	6.5
	Not aware of reporting system	42	38.9	38.9	45.4
	Thought it was not serious	28	25.9	25.9	71.3
	No benefit	31	28.7	28.7	100.0
	Total	108	100.0	100.0	

Table 15 shows the reasons for not reporting needle-stick injury (NSI) incidents among participants. The most common reason was **lack of awareness of the reporting system** (38.9%, n = 42), followed by **perceived no benefit in reporting** (28.7%, n = 31). Other reasons included **belief that the injury was**

**not serious** (25.9%, n = 28) and **fear of blame** (6.5%, n = 7).

This indicates that underreporting of NSIs is mainly associated with knowledge gaps and misconceptions regarding the importance of reporting, along with some organizational and psychological barriers. The



finding highlights the need for improved awareness, education on reporting procedures, and the

development of a supportive, non-punitive reporting environment.

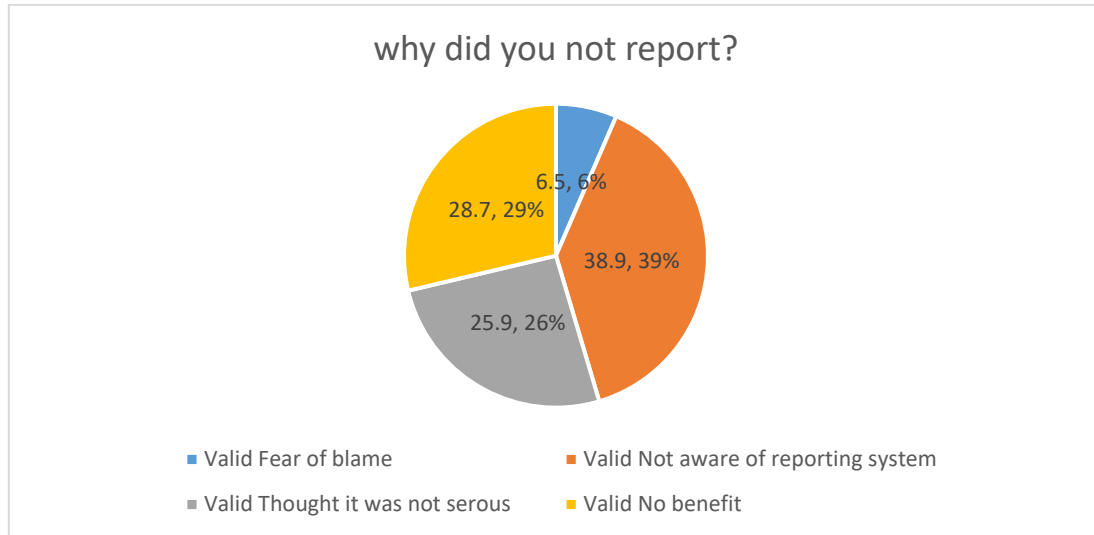


Figure no 10 shows that participants did not report needle-stick injury (NSI) incidents mainly due to lack of awareness of the reporting system (38.9%, n = 42). Other reasons included perceived no benefit in reporting (28.7%, n = 31), belief that the injury was not serious (25.9%, n = 28), and fear of blame (6.5%, n = 7).

**Table 16 Do you know proper reporting protocol for NSI?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	51	47.2	47.2	47.2
No	55	50.9	50.9	98.1
11.00	2	1.9	1.9	100.0
Total	108	100.0	100.0	

Table 16 shows the participants' knowledge regarding the proper reporting protocol for needle-stick injuries (NSIs). Nearly half of the respondents (47.2%, n = 51) reported that they were aware of the proper reporting protocol, while a slightly higher proportion (50.9%, n = 55) reported that they were not aware of it. A small number of participants (1.9%, n = 2) gave an unclear or invalid response.

**Table 17 Did you follow standard precautions?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Always	25	23.1	23.1	23.1
Sometime	82	75.9	75.9	99.1
Never	1	.9	.9	100.0
Total	108	100.0	100.0	

Table 17 shows the practice of standard precautions among participants. The majority of nurses (75.9%, n = 82) reported that they **sometimes** follow standard precautions, while only 23.1% (n = 25) stated that they **always** follow them. A very small

proportion (0.9%, n = 1) reported that they **never** follow standard precautions.

This indicates that consistent adherence to standard precautions among nurses is low, with most participants following them irregularly. Such



inconsistent practice may increase the risk of occupational exposure, including needle-stick injuries. The finding emphasizes the need for

continuous training, supervision, and reinforcement of infection prevention guidelines to ensure full compliance with standard precautions.

table 18 Does your hospital provide enough safety engineered devices?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	37	34.3	34.3	34.3
No	71	65.7	65.7	100.0
Total	108	100.0	100.0	

Table 18 shows the participants' responses regarding the availability of safety-engineered devices in the hospital. The majority of nurses (65.7%, n = 71) reported that the hospital does not provide enough safety-engineered devices, while 34.3% (n = 37) stated that such devices are adequately available.

This indicates a significant shortage of safety-engineered devices in the study setting. The lack of adequate protective equipment may increase the risk of occupational exposure, including needle-stick injuries among nurses. The finding highlights the need for improved supply of safety devices and stronger institutional commitment to occupational safety.

Table 19 Do you believe NSI are preventable?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	106	98.1	98.1	98.1
No	2	1.9	1.9	100.0
Total	108	100.0	100.0	

Table 19 shows the participants' perception regarding the preventability of needle-stick injuries (NSIs). The vast majority of nurses (98.1%, n = 106) believed that NSIs are preventable, while only a very small proportion (1.9%, n = 2) considered them not preventable.

This indicates a strong positive perception among nurses regarding the preventability of NSIs. It suggests good awareness about occupational safety principles; however, despite this awareness, the occurrence of NSIs may still be influenced by gaps in practice, workload, and inadequate safety measures. The finding emphasizes the need to translate knowledge into consistent safe practices through training and system-level improvements.

## V. RESULTS

### 5.1 Socio-Demographic Characteristics of Participants

A total of 108 nurses participated in the study. The mean age of participants was 35.29 ± 6.33 years, ranging from 25 to 55 years. The mean nursing experience was 11.71 ± 4.84 years. The majority of participants were female (78.7%), while 21.3% were male. Regarding educational qualification, 48.1% had B.Sc. in Nursing, 39.8% had Diploma in

Nursing, 9.3% had MPH, and 2.8% had MSN degrees.

### 5.2 Working Characteristics of Participants

Most participants were working in the Surgery department (47.2%), followed by Medicine (40.7%) and Emergency (12.0%). More than half were working morning shifts (53.7%), followed by evening (29.6%) and night shifts (16.7%).

The majority of nurses reported handling more than 30 patients per shift (81.5%), indicating a high workload environment.

### 5.3 Needle-Related Practice Characteristics

More than half of the participants (52.8%) frequently performed needle-related procedures, while 41.7% performed them sometimes. Only 5.6% performed such procedures occasionally.

Regarding glove use, 88.9% reported sometimes using gloves, 9.3% always used gloves, and 1.9% never used gloves.

### 5.4 Infection Prevention and Control Training

About 49.1% of nurses had received training on infection prevention and control (IPC), while 50.9% had not received any such training.



### 5.5 Prevalence of Needle-Stick Injury

A high proportion of participants (83.3%) reported experiencing at least one needle-stick injury in the last 12 months, while 16.7% reported no such injury.

Among those affected, 42.4% experienced NSI once, 29.3% twice, and 27.3% three times or more.

### 5.6 Circumstances of NSI

NSIs most commonly occurred during injection administration (41.9%), followed by IV cannulation (27.6%), and ampoule breaking (22.9%). Smaller proportions occurred during blood sample collection (3.8%) and suturing assistance (3.8%).

### 5.7 Determinants of NSI

The main reported causes of NSIs were workload (70.4%), lack of safety devices (12.0%), rushing during procedures (11.1%), inadequate lighting (3.7%), and fatigue (2.8%).

### 5.8 Reporting Practice

Only 52.8% of nurses reported NSI incidents, while 47.2% did not report them.

Reasons for not reporting included lack of awareness of reporting systems (38.9%), no perceived benefit (28.7%), belief that injuries were not serious (25.9%), and fear of blame (6.5%).

### 5.9 Knowledge and Safety Practices

Only 23.1% always followed standard precautions, while 75.9% followed them sometimes, and 0.9% never followed them. A majority (65.7%) reported insufficient availability of safety-engineered devices in the hospital. Despite this, 98.1% of participants believed that NSIs are preventable.

### Conclusion:

This study assessed the prevalence and determinants of needle-stick injuries (NSIs) among nurses in Mymensingh Medical College Hospital. The findings indicate that NSIs are a significant occupational hazard among nurses. Several factors, such as workload, inadequate use of protective measures, lack of training, and unsafe handling practices, were identified as key determinants. The results reflect the real clinical environment and highlight the need for improved safety protocols, regular training, and strict adherence to standard precautions to reduce the incidence of NSIs and ensure the safety of nursing professionals.

### Recommendations:

- 1) Adequate staffing should be ensured to reduce workload and patient-to-nurse ratio.
- 2) Concerned organizations should take appropriate actions based on the findings of this study.

- 3) Regular training programs on infection prevention and control (IPC) should be conducted to improve safe clinical practices.
- 4) Safety-engineered devices should be made readily available in all clinical areas to reduce the risk of needle-stick injuries.
- 5) Awareness programs should be implemented to improve understanding of the importance of reporting NSIs and associated risks.
- 6) Professional organizations should provide funding and support for further research on this topic.
- 7) Future research should be conducted on a larger scale with a bigger sample size to improve generalizability.

### Study Limitation:

1. The study was conducted with limited manpower, as it relied primarily on self-directed efforts.
2. Budget constraints were a significant limitation affecting the scope of the study.
3. Data collection was confined to participants from three departments of a medical college hospital, limiting broader representation.
4. The study was carried out under regular guidance and follow-up by the advisor/supervisor.
5. Time constraints were present, as all activities were completed on a part-time basis.

## VI. Discussion

A descriptive cross-sectional study has been conducted to assess the prevalence and determinants of needle-stick injuries (NSIs) among nurses in the Mymensingh Medical College Hospital. The findings reveal that NSIs are highly prevalent among nurses, with the majority of participants reporting at least one NSI in the past 12 months. This high rate of exposure is inconsistent with the nature of nursing practice, where frequent handling of needles and sharp instruments is routine, particularly in high-workload clinical areas such as surgery and medicine departments.

The study identified injection administration, IV cannulation, and ampoule breaking as the most common procedures associated with NSIs. These findings are similar to previous studies that have reported these procedures as high-risk due to their repetitive nature and frequent urgency in clinical settings. In addition, most injuries were associated with heavy workload and rushing during procedures, indicating that work pressure plays a significant role in increasing occupational risk.



The study further found that a large proportion of nurses handle more than 30 patients per shift, which reflects a high workload environment. Such workload can lead to fatigue, reduced concentration, and compromised adherence to standard precautions, thereby increasing the likelihood of NSIs. Inconsistent use of gloves and irregular compliance with standard precautions observed in this study further support this explanation.

Although nearly all participants believed that NSIs are preventable, actual practices did not fully reflect this awareness. Only a small proportion of nurses consistently followed standard precautions, and nearly half did not report NSI incidents. The main reasons for underreporting included lack of awareness of reporting systems, perceived no benefit, and belief that injuries were not serious. These findings suggest a gap between knowledge and practice, as well as weaknesses in institutional reporting culture.

Another important finding is the insufficient availability of safety-engineered devices in the hospital, as reported by most participants. This structural limitation may contribute significantly to the occurrence of NSIs, despite nurses' awareness of preventive measures. Furthermore, only about half of the participants reported receiving training on infection prevention and control, indicating inadequate institutional support for occupational safety.

Overall, the study highlights that NSIs among nurses are influenced by multiple factors, including high workload, unsafe practices, inadequate training, poor reporting systems, and limited availability of safety equipment. Therefore, a comprehensive approach involving adequate staffing, regular training, improved safety infrastructure, and a non-punitive reporting system is essential to reduce the incidence of NSIs in healthcare settings.

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