

# An Evaluation of the Impact of a Nurse-Led Program on Knowledge and Practices Related to Needle Stick Injury Prevention Among 2nd Year B.Sc. Nursing Students at the College of Nursing, PT. B.D. Sharma PGIMS, Rohtak

Adarsh<sup>1\*</sup>, Rajpati<sup>2</sup>, Kavita Choudhary<sup>3</sup>

## Abstract

Healthcare workers and nursing students frequently face accidental occupational exposures while caring for patients, with needle stick injuries being the most common form of exposure in healthcare settings. These injuries pose a significant risk of infections. This study aimed to evaluate the awareness and practices related to the prevention of needle stick injuries among second-year B.Sc. Nursing students, assess the effectiveness of a nurse-led intervention in enhancing their knowledge and practices, and explore the relationship between pre-test knowledge and practice scores and certain demographic factors. A quantitative, pre-experimental design using a one-group pre-test and post-test approach was implemented, involving 150 second-year B.Sc. Nursing students selected through purposive sampling. Data were gathered using a self-designed questionnaire and a practice checklist. The findings revealed that, in the pre-test, 17% of students had insufficient knowledge, 81% had moderate knowledge, and only 2% demonstrated adequate knowledge. Following the intervention, 90% of students achieved adequate knowledge, and only 10% had moderate knowledge. In terms of practice, 32% of students had unsatisfactory practices in the pre-test, which improved significantly after the intervention, with 14% demonstrating satisfactory practices. The knowledge score increased from a pre-test mean of 14.04 ( $\pm 3.35$ ) to a post-test mean of 24.08 ( $\pm 2.33$ ), and the practice score rose from 7.29 ( $\pm 1.56$ ) to 8.93 ( $\pm 1.37$ ), both showing significant improvements ( $t$ -values of 39.407 and 17.313, respectively). Additionally, a significant association was found between pre-test knowledge scores and vaccination status ( $\chi^2=7.187$ ,  $df=2$ ). However, no demographic variable was significantly associated with pre-test practice scores. The findings indicate that the nurse-led program was highly effective in enhancing both the knowledge and practices of nursing students regarding needle stick injury prevention and post-exposure prophylaxis. This highlights the significance of such programs in enhancing workplace safety practices.

### \*Author for Correspondence

Adarsh  
E-mail: [adarshsunil25@gmail.com](mailto:adarshsunil25@gmail.com)

<sup>1</sup>Student, Department of Nursing, College of Nursing, Pandit Bhagwat Dayal Sharma University of Health Sciences, Rohtak, Haryana, India

<sup>2</sup>Senior Lecturer, Department of Nursing, College of Nursing, Pandit Bhagwat Dayal Sharma University of Health Sciences, Rohtak, Haryana, India

<sup>3</sup>Junior Lecturer, Department of Nursing, College of Nursing, Pandit Bhagwat Dayal Sharma University of Health Sciences, Rohtak, Haryana, India

Received Date: December 19, 2024

Accepted Date: January 30, 2025

Published Date: February 15, 2025

**Citation:** Adarsh, Rajpati, Kavita Choudhary. An Evaluation of the Impact of a Nurse-Led Program on Knowledge and Practices Related to Needle Stick Injury Prevention Among 2nd Year B.Sc. Nursing Students at the College of Nursing, PT. B.D. Sharma PGIMS, Rohtak. International Journal of Evidence Based Nursing and Practices. 2025; 3(1): 28–66p.

**Keywords:** Needle stick injury, nurse led programme, Post exposure prophylaxis, knowledge and practice

## INTRODUCTION

“A safe injection is one that ensures the recipient's safety, minimizes unnecessary risks to the healthcare worker, and prevents the generation of hazardous waste that could harm the community. A needle stick injury happens when a needle unintentionally penetrates the skin. Studies show that 30 to 50% of needle stick injuries happen

during clinical procedures. Factors contributing to needle stick injuries include overuse of injections, lack of appropriate supplies such as disposable syringes and safer needle devices, inadequate or unavailable sharp containers for disposal, insufficient staffing, recapping needles after use, absence of safety mechanisms like safer needle devices, passing instruments by hand in operating rooms, and lack of awareness or proper training regarding these hazards [1].

Needle stick and other percutaneous injuries pose a significant risk for the occupational transmission of severe blood-borne infections, including hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency virus (HIV), to both healthcare workers (HCWs) and patients. According to the World Health Organization (WHO), healthcare workers worldwide face approximately 16,000 cases of HCV, 66,000 cases of HBV, and 1,000 cases of HIV annually as a result of needle stick injuries. Second-year B.Sc. Nursing students, during patient care, are also vulnerable to exposure to blood-borne pathogens, which can result in infections such as HIV, Hepatitis B, and Hepatitis C. In addition to these viruses, more than 20 other infections, such as syphilis, malaria, diphtheria, tuberculosis, and toxoplasmosis, can also be transmitted through needle stick injuries. Needle stick and sharp injuries remain a significant and widespread issue in healthcare environments worldwide, defined as injuries caused by needles or sharp instruments that accidentally penetrate the skin during routine duties [2, 3].

Every day, thousands of healthcare workers worldwide are exposed to blood-borne pathogens through accidental occupational injuries, resulting in infections like HIV and Hepatitis B and C. Needle stick and sharp injuries present various risks, including bleeding, surface scratches, and minor skin injuries, though the primary concern is the transmission of viral infections. Scalpel injuries are of particular concern compared to needle sticks. According to the World Health Organization (WHO), healthcare workers experience an estimated 35 million needle stick and sharp injuries annually, with 2 million of these resulting in percutaneous exposure to infectious diseases. Globally, needle stick injuries (NSIs) are responsible for approximately 37.6% of hepatitis B, 39% of hepatitis C, and 4.4% of HIV/AIDS cases in healthcare workers. However, the actual incidence is probably much higher, as many cases go unreported, with reporting rates often falling below 50%. Research indicates that between 11 and 50% of nursing students have experienced exposure to infections caused by sharp injuries during their undergraduate training. Studies have identified several causes for these injuries, including recapping needles (18%), sharps exchange (16%), and injury while transferring body fluids (15%), as well as passing instruments between hands, lack of hazard awareness, and inadequate training. Nursing education combines classroom learning and clinical practice, and nursing students, particularly those in internships, are at an increased risk of these injuries as they interact with patients for the first time under stressful conditions. This heightened exposure to sharp injuries occurs while performing procedures that involve needles and other sharp instruments. Addressing these risks requires the implementation of safety protocols, educational programs, and training on the use of safer technologies, which have been shown to significantly reduce such incidents. To effectively prevent needle stick injuries, an exposure control program should be established with a designated leader and a committee comprising frontline patient care providers. This team should be responsible for evaluating potential hazards, reviewing injury data, and making recommendations for injury prevention. The committee must also ensure proper follow-up care and post-exposure prophylaxis based on the nature of the injury and the source patient. The most effective way to prevent the transmission of blood-borne pathogens is by reducing exposure to needle stick injuries. Primary prevention involves eliminating unnecessary injections and needles. The introduction of educational programs, universal precautions, safety devices, and practices such as avoiding needle recapping and using designated sharp containers has led to an 80% reduction in needle stick injuries [4–7].

A comprehensive approach to preventing needle stick injuries includes staff training, controlled work practices, engineering controls, surveillance systems, and effective disposal methods. Since nurses and nursing students are at high risk for needle stick injuries, it is crucial that they have thorough knowledge of the associated hazards, the prevalence of injuries, and the measures available to control and prevent them [8].

## **NEED FOR THE STUDY**

### **Occupational Hazard**

Needle stick injuries (NSIs) pose a major occupational risk for healthcare workers, particularly nurses. These injuries can lead to the transmission of blood-borne pathogens such as HIV, Hepatitis B, and Hepatitis C. Therefore, it is essential to adopt effective strategies to prevent such incidents in healthcare environments.

### **Preventable Nature**

Many needle stick injuries are preventable through proper knowledge and adherence to safety protocols. Educating nursing students about preventive measures can significantly reduce the incidence of NSIs in their future careers.

### **Legal and Ethical Responsibility**

Healthcare organizations have a legal and moral responsibility to protect the health and safety of their employees. Providing education and training programs to prevent NSIs among nursing students aligns with this responsibility.

### **Cost and Productivity Implications**

Needle stick injuries not only pose health risks to healthcare workers but also have cost and productivity implications for healthcare institutions. Treating needle stick injuries, managing potential infections, and absenteeism due to injuries can incur significant costs and affect productivity.

### **Educational Enhancement**

Evaluating the impact of nurse-led programs on nursing students' knowledge and practices related to NSI prevention can provide valuable insights for shaping curriculum and educational approaches. It ensures that nursing students receive comprehensive training on occupational safety, enhancing their preparedness for real-world healthcare settings [9, 10].

Despite the recognition of NSIs as a significant occupational hazard, limited research has been conducted on the effectiveness of educational interventions, specifically nurse-led programmes, in preventing such injuries among nursing students. Therefore, there is a pressing need to evaluate the impact of these programmes on both knowledge acquisition and the implementation of safe practices among nursing students. By systematically assessing the effectiveness of a nurse-led programme at the College of Nursing Pt. B. D. Sharma PGIMS, Rohtak, this study aims to fill this gap in the existing literature and provide evidence-based insights into effective strategies for NSI prevention in educational settings [11].

In conclusion, this study addresses a critical need within the healthcare sector by evaluating the effectiveness of a nurse-led programme in preventing NSIs among B.Sc. Nursing 2nd year students. This study contributes to the creation of evidence-based strategies for improving occupational safety among nursing students by providing empirical data on the effects of educational interventions for NSI prevention. The findings can ultimately help shape policies and practices in nursing education, fostering a safer and healthier environment for both healthcare workers and the wider community [12].

## **OBJECTIVES**

1. To evaluate the knowledge and practices of second-year B.Sc. Nursing students regarding the prevention of needle stick injuries.
2. To assess the impact of a nurse-led program on needle stick injury prevention, focusing on changes in knowledge and practices among second-year B.Sc. Nursing students.
3. To explore the relationship between pre-test knowledge and practice scores and selected demographic factors in the prevention of needle stick injuries.

---

## OPERATIONAL DEFINITIONS

1. *Needle Stick Injury*: A needle stick injury refers to a wound caused when a needle unintentionally punctures the skin.
2. *Assess*: To assess means to examine and evaluate the knowledge and practices of second-year B.Sc. Nursing students.
3. *Effectiveness*: Effectiveness refers to the improvement in knowledge and practices regarding needle stick injuries among second-year B.Sc. Nursing students, as indicated by a significant difference between pre-test and post-test scores.
4. *Nurse-Led Program*: A nurse-led program involves organized and structured teaching, both verbal and written, aimed at providing second-year B.Sc. Nursing students with information about needle stick injuries.
5. *Knowledge*: In this study, knowledge refers to the awareness of second-year B.Sc. Nursing students regarding needle stick injuries, measured by the scores they achieve on a structured knowledge questionnaire.
6. *Practice*: Practice refers to the actions and measures adopted by second-year B.Sc. Nursing students to prevent and manage needle stick injuries.
7. *Second-Year B.Sc. Nursing Student*: In this study, a second-year B.Sc. Nursing student is defined as an individual currently enrolled in the Nursing program at PGIMS, Rohtak.

## Assumptions

1. It is assumed that second-year B.Sc. Nursing students may already possess some knowledge and practices related to needle stick injuries.
2. The study assumes that a nurse-led program is an effective approach for enhancing the knowledge and practical skills of second-year B.Sc. Nursing students regarding needle stick injuries.

## HYPOTHESES

All hypotheses will be tested at a significance level of 0.05 (p-value).

- *H01*: There will be no significant difference between the mean pre-test and post-test knowledge and practices of second-year B.Sc. Nursing students regarding needle stick injuries and their prevention.
- *H1*: There will be a significant difference between the mean pre-test and post-test knowledge and practices of second-year B.Sc. Nursing students regarding needle stick injuries and their prevention.
- *H02*: There will be no significant relationship between the pre-test knowledge and practice scores on needle stick injury prevention and the selected demographic variables.
- *H2*: There will be a significant relationship between the pre-test knowledge and practice scores on needle stick injury prevention and the selected demographic variables.

## Inclusion Criteria

- Second-year B.Sc. Nursing students who were present and willing to participate during data collection.
- Second-year B.Sc. Nursing students enrolled at the College of Nursing, PGIMS, Rohtak.

## Exclusion Criteria

- Second-year B.Sc. Nursing students who were either unwilling to participate or absent during data collection.

## Delimitation

- The study was confined to second-year B.Sc. Nursing students enrolled at the College of Nursing, PGIMS, Rohtak.

## **CONCEPTUAL FRAMEWORK**

The conceptual framework is a collection of concepts and a set of propositions that describe the relationships between them. It plays a crucial role in advancing scientific knowledge by making findings meaningful and applicable across different contexts. A conceptual framework helps in facilitating communication and offers a structured approach to nursing research, education, administration, and practice. For this study, the framework is based on Ludwig Von Bertalanffy's General System Theory (1968) (Figure 1). According to Bertalanffy, General System Theory is a science of "wholeness" that aims to unify scientific thought across disciplines. It provides a framework for analysing entire systems rather than isolated components. He defines a system as a "complex interaction", consisting of interconnected elements that form an organized whole, where the parts interact with one another rather than operating independently. In all systems, activity is broken down into feedback loops, such as input, process, and output. The system functions as a whole, and dysfunction in one part leads to disruption in the system. Feedback loops are crucial in maintaining the integrity of the system [13, 14].

### **Input**

Input refers to the process by which the system receives energy and information from its environment. In this study, the input includes the second-year B.Sc. Nursing students at the College of Nursing, PGIMS, Rohtak. Influential demographic factors include age, gender, marital status, religion, residential area, prior knowledge of needle stick injuries, sources of information, and vaccination status against Hepatitis B.

### **Throughput/Process**

Throughput refers to the actions or processes required to achieve the desired outcome, energy and information exchange that maintain the system's equilibrium. Through dynamic interactions with the environment, the system transforms information in various forms, including verbal and behavioural communication. In this study, the process involves assessing the knowledge and practices of B.Sc. Nursing students regarding the prevention and post-exposure management of needle stick injuries. This will be measured using a self-structured knowledge questionnaire and observational checklist. A nurse-led program, focused on prevention and post-exposure prophylaxis for needle stick injuries, will be developed and implemented. After the intervention, the students' knowledge and practices will be reassessed using the same tools to determine whether there was a gain in knowledge and practice.

### **Output**

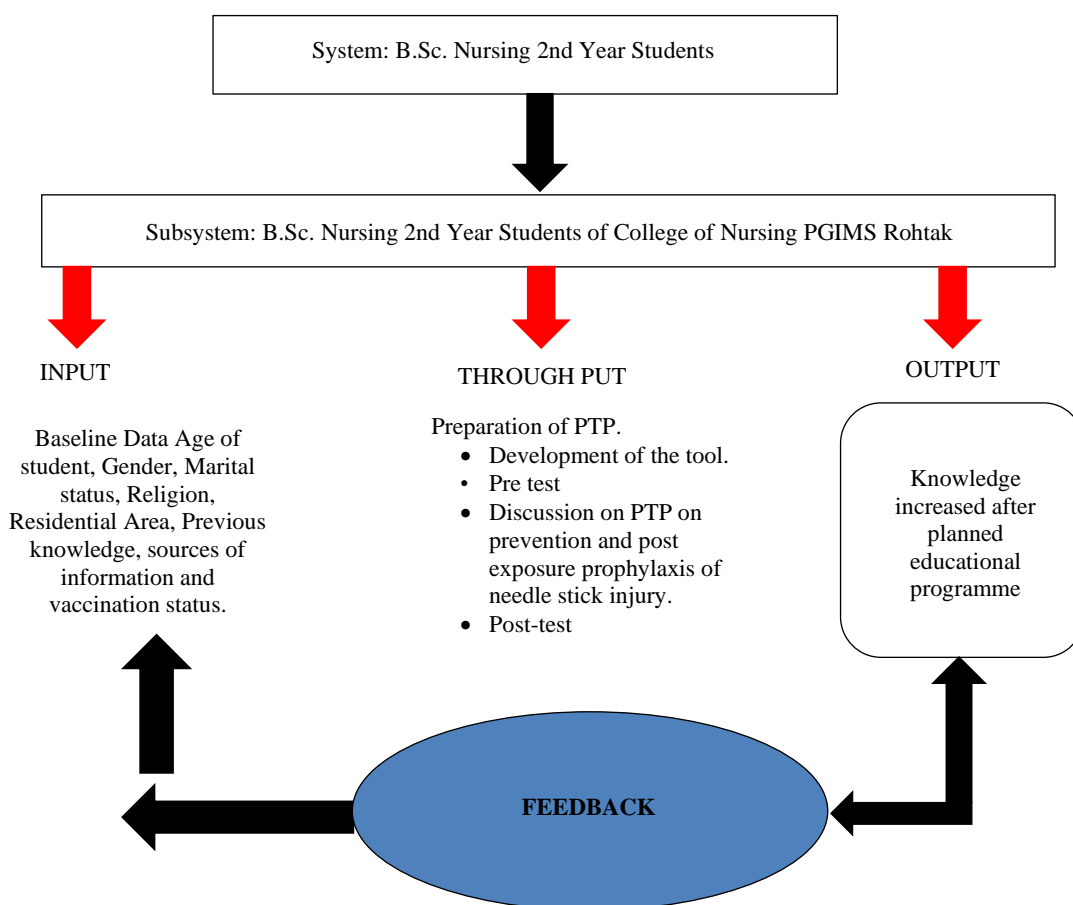
Output refers to the results or products of the system after processing the input. Once the input has been processed, the system releases energy and information back into the environment as output. In this study, output refers to the evaluation of the effectiveness of the nurse-led teaching program concerning the prevention and post-exposure management of needle stick injuries.

### **Feedback**

Feedback is the process by which information is gathered at each stage of the system and used to guide future evaluations or actions. It provides insights into the output's effectiveness. In this study, feedback will be based on the comparison of the knowledge and practice scores before and after the program. Higher scores on the post-test indicate that the intervention was successful in increasing the students' knowledge and practices regarding needle stick injury prevention and post-exposure prophylaxis. Lower scores suggest that the program was not effective in improving the students' knowledge and practices.

## **REVIEW OF LITERATURE**

This study presents a review of the literature to gain a deeper understanding of various aspects of the research topic, including the study design, methods, instruments, and data collection techniques that may be valuable for the proposed study.



**Figure 1.** Conceptual framework based on general system theory by Ludwig von Bertalanffy 1986.

The literature review serves as a foundation for future research, supports the need for further studies, highlights potential challenges in data collection, and helps to compare and relate findings across different studies. Additionally, it contributes to building a solid body of scientific knowledge in the field, which can inform the development of valid and relevant theories. This cross-sectional study aimed to assess needle stick and sharp injuries among nurses in three Turkish hospitals. A total of 201 nurses participated, selected through convenience sampling. Self-structured questionnaires were used for data collection and analysed using SPSS version 10. Results showed that 44.3% of nurses experienced sharp or needle stick injuries during their professional career, with injection needles being the most common source (35.8%). The majority of nurses (74.6%) reported using gloves and protective glasses. The study by Akyol and Kargin underscores the importance of implementing strategies such as emphasizing work practices, improving disposal systems, education initiatives, and infection control precautions to reduce needle stick injuries and associated factors [15].

This study by Nawafleh *et al.* aimed to assess the incidence, perspectives, perceptions, and knowledge of needle stick injuries (NSIs) among nursing students at Al-Hussein Bin Talal University. The sample included undergraduate nursing students from the second to fourth academic levels. Data collection involved a self-structured questionnaire covering socio-demographic details, NSI occurrences, knowledge, perceptions, and precautions. Results indicated positive perceptions of NSIs among students, with two-thirds experiencing such injuries, primarily among second-year students due to lack of knowledge on universal precautions and acupuncture safety devices. The study emphasizes the need for increased awareness and education on NSI prevention among nursing students [16].

A study by Patel *et al.* on needle stick injury (NSI) knowledge, attitude, and practice among undergraduate medical students involved 450 participants from a medical college and tertiary hospital

in a metropolitan city. Self-structured questionnaires were utilized and analysed using SPSS version 20. The average age of participants was 21.9 years. Findings revealed that 406 students were aware of diseases transmitted by NSI, with 189 identifying a Medicine Physician as the first person to contact in case of NSI occurrence. However, 208 students were unaware of post-exposure prophylaxis (PEP), and only 138 recognized PEP guidelines proposed by NACO or 101 by WHO. Most students (261) believed the emergency ward presented the highest risk of NSI, and 363 emphasized the importance of NSI training before clinical exposure. Additionally, 345 students highlighted the need for healthcare worker insurance against diseases transmitted by NSI. The study underscores the vulnerability of medical students to NSI and highlights the imperative for comprehensive preventive measures and regular training on NSI and PEP for all healthcare workers [17].

This study aimed to assess the awareness of healthcare workers (HCWs) about the health risks associated with needle stick injuries (NSIs), as well as their knowledge of post-exposure prophylaxis (PEP) and hepatitis B vaccination. A cross-sectional study was conducted in a tertiary care government hospital, involving a sample of 100 healthcare workers (HCWs), including 20 residents, 20 interns, 20 lab assistants, 20 nurses, and 20 Class IV workers. Data were collected using a structured questionnaire, and the responses were analysed with the chi-square test. Among the 100 HCWs, 45% reported experiencing at least one needle stick injury (NSI) during their careers, with the highest occurrence found among Class IV workers (70%). Only 21% of HCWs were aware of the diseases that can be transmitted through NSIs, and just 30% of Class IV workers were familiar with the hepatitis B vaccine, although none had been vaccinated. While many HCWs knew the initial steps to take after an NSI, their knowledge of post-exposure prophylaxis (PEP) was inadequate. Although awareness of health risks related to NSIs was generally low across most HCW categories, Class IV workers had the least knowledge, most HCWs were aware of the hepatitis B vaccination. The study underscores the need for improved education for HCWs regarding PEP following NSIs.

In a separate cross-sectional study at Narayana Medical College and Hospital in Nellore, Andhra Pradesh, India, 1,525 healthcare providers were surveyed to assess their awareness of needle stick injuries [18].

Findings indicate that 10.81% experienced NSIs, predominantly caused by syringe needles (75%). Most incidents (75%) occurred in various department wards, with the morning shift (70%) being the most common time. Only 65% were wearing gloves during injury, yet the majority (82%) sought immediate treatment. The study underscores the importance of NSI prevention programs to reduce occurrences and facilitate prompt treatment [19].

A cross-sectional study at a tertiary care center in Kerala, India, surveyed 200 healthcare providers (100 interns and 100 staff nurses) using self-structured questionnaires. The incidence of needle-stick injuries (NSIs) was significantly higher among interns (73.6%) compared to nurses (24.4%). Among interns, the most common activities leading to NSIs were blood withdrawal (42%) and recapping (29%). Nurses demonstrated better knowledge, practices, and attitudes towards NSI prevention compared to interns. Data analysis was conducted using SPSS version 20 [20].

The World Health Report 2002 by WHO highlights the significant risk of needle stick injuries among healthcare workers, leading to infections such as Hepatitis B, Hepatitis C, and HIV/AIDS. Factors contributing to these injuries include overuse of injections, lack of disposable syringes, and insufficient training. Needle stick injuries not only endanger health workers but also cause emotional distress. Introducing health teaching programs is crucial to improving nurses' knowledge of safety procedures. A study involving 30 student nurses using a quasi-experimental design revealed that none had adequate knowledge of needle stick injuries, with 80% possessing moderate knowledge and 20% having inadequate knowledge [21].

---

This systematic review and meta-analysis sought to evaluate the global prevalence and causes of needle-stick injuries (NSIs) among healthcare workers (HCWs). A total of 87 studies, involving 50,916 HCWs from 31 countries, were included in the analysis. The global pooled prevalence of NSIs over 1 year was found to be 44.5%, with the highest rate observed in the South East Asia region (58.2%). Dentists experienced the highest prevalence at 59.1%. The most common cause of NSIs was hypodermic needles, responsible for 55.1% of the cases. These results highlight the critical need for improved occupational health services and enhanced needle-stick injury prevention and education programs worldwide [22].

In a separate study, the focus was on evaluating nursing students' awareness of needle-stick injuries and determining the effectiveness of a structured teaching program on the subject. Conducted at Lingaya's Institute of Health Sciences in Faridabad, Haryana, the study involved 60 nursing students who were selected using non-probability convenience sampling. Data were gathered through self-administered questionnaires. The pre-test mean score was 5.41 (SD=3.29), which significantly increased to 14.10 (SD=3.71) in the post-test, showing a mean improvement of 8.69. The calculated 't' value of 35.58, which was statistically significant at  $p < 0.05$ , indicated that the structured teaching program effectively enhanced the students' knowledge regarding needle-stick injuries.

Similarly, a study aimed to assess the impact of a training module on the competence of internship nursing students regarding needle-stick and sharp injury safety. Conducted at the Faculty of Nursing, Tanta University, and Tanta Main University Hospital, the study included a random sample of 75 internship nursing students [23].

Utilizing a quasi-experimental research design, data were collected using three tools: a structured questionnaire on safety measures, an observation checklist for students' practice, and a survey on challenges affecting safety measure follow-up. Results indicated significant improvements in both knowledge and practice among nursing students regarding safety measures post-implementation of the training module ( $p < 0.05$ ). Challenges affecting follow-up safety measures included night shifts and insufficient training. The study concluded that the training module successfully enhanced nursing students' understanding and implementation of safety measures concerning needle stick and sharp injuries. Continuous reinforcement of student instructions and effective clinical supervision were recommended to ensure compliance with safety protocols across all clinical experiences involving needle stick injuries [24].

A cross-sectional study assessed nursing students' knowledge, practices, and attitudes towards safe injection practices and needle stick injuries. The rate of needle stick injuries among nursing students across three academic levels was reported to be 52.1%. The majority demonstrated insufficient knowledge and improper practices regarding safe injections and needle stick injuries. It is recommended to implement continuous health education programs and training courses on safe injection practices before students begin clinical practice [25].

A non-experimental study was conducted on 40 first-year BSc nursing students in Kashmir to assess their knowledge of needle stick injuries. A structured teaching program (STP) was implemented, followed by post-test assessments. Results showed that before the program, 67.50% had inadequate knowledge, while after, none had inadequate knowledge, with 57.5% having adequate knowledge. The structured teaching program (STP) was found to be effective, suitable, and feasible in enhancing awareness about preventing needle stick injuries [26].

This article examines the literature on infection control knowledge and attitudes among healthcare workers (HCWs) and highlights the factors contributing to effective infection control. It emphasizes the risks posed by infections, especially HBV, HCV, and HIV, to HCWs. A total of 28 articles published between 2000 and 2018 were reviewed from databases such as PubMed, Medline, and UpToDate. The

findings indicate that HCWs generally possess high levels of knowledge regarding preventive measures and needle safety compliance, alongside positive attitudes. A weak positive correlation was found between staff attitudes and the implementation of precautionary measures, while a moderate positive correlation exists between precautionary measures and adherence to needle safety protocols. The study concluded that stronger precautionary measures significantly enhance compliance with needle safety practices. Nursing students are particularly susceptible to needle stick injuries (NSIs) compared to other healthcare workers, primarily due to their lack of work experience and limited awareness of occupational safety measures. The findings revealed that 67% of the students had experienced at least one NSI during their internship. The most frequent causes of these injuries included the injection process, venous catheter management, and improper disposal of needle waste. Risk factors for NSIs included intentionally breaking needles after use, recapping needles, and manually separating needles from syringes [27, 28].

A similar study was carried out at Saveetha Medical College and Hospital in Chennai, India, to evaluate the knowledge, attitude, and practices regarding needle stick injuries among students and staff. Data was collected using a standardized questionnaire. The study found that 62.1% of participants were familiar with the most recent universal precaution guidelines for managing NSIs, and 83.3% were fully vaccinated against Hepatitis B. Moreover, 70.9% always used gloves when handling needles. However, 14.3% of participants reported experiencing a needle stick injury. Despite this, 40.9% strongly believed that these injuries are preventable. The study concluded that the institution's awareness efforts contributed to higher levels of knowledge, attitudes, and practices among participants compared to similar studies [29].

In Oman, a cross-sectional survey of 167 students from a government university aimed to assess their knowledge of needle stick injury prevention guidelines and the prevalence of such injuries. The online survey revealed a mean knowledge score of 6.6 out of 10, with 18.2% of students reporting needle stick injuries, mostly occurring during medication preparation and administration. Recapping needles was identified as the primary cause of these injuries. The study emphasized the importance of improving infection control practices among nursing students and recommended greater collaboration between academic institutions and clinical settings to address this issue [30].

Additionally, a systematic review was conducted to examine the epidemiology and risk factors contributing to needle stick injuries (NSIs) among healthcare workers in Iran. 43 articles were analysed. Results showed that females (OR=1.30, 95% CI 1.06–1.58, P value=0.009), younger age (OR=2.75, 95% CI 2.27–3.33, P value < 0.001), rotated shift workers (OR=2.16, 95% CI 1.47–3.15, P value<0.001), not attending training courses (OR=1.30, 95% CI 1.07–1.56, P value=0.006), working in the surgery ward (OR=1.83, 95% CI 1.33–2.50, P value<0.001), less work experience (OR=1.43, 95% CI 1.04–1.95, P value =0.025) apposed a greater risk factors for NSI among healthcare workers. Implementation of education programs is crucial in mitigating the burden of NSIs among healthcare personnel in Iran [31].

A study among healthcare students in Sangli, Maharashtra, revealed a 25.2% prevalence of needle stick and sharps injuries, with nursing students being most affected. While students showed adequate awareness of blood-borne virus transmission and prevention, knowledge gaps were evident in post-exposure prophylaxis. Moreover, there was a disparity between knowledge and practical implementation, especially in injury prevention and management. Addressing these issues requires curricular reforms, regular educational initiatives, and strict adherence to guidelines. Establishing reporting centres and standardized procedures for needle stick incidents are crucial steps forward [32].

A systematic review was conducted to assess the prevalence, epidemiological profile, and risk factors for needle stick injuries (NSIs) among dental students globally. 25 studies from 15 countries were included. The pooled prevalence of NSIs among dental students was estimated at 44%, with local

---

anaesthesia, tooth cleaning or scaling, and waste disposal being associated with the highest risk. Under-reporting of NSIs was common, and dental students exhibited inadequate knowledge regarding post-exposure management.

Overall, dental students had a high prevalence and low reporting rate of NSIs, potentially exacerbated by insufficient knowledge [33].

The study aimed to evaluate nursing students' knowledge of needle stick injuries, assess the effectiveness of an educational program, and examine safety practices. 60 students from Shri Ram Murti Smarak College of Nursing, Bareilly, were surveyed using purposive sampling. Data was analysed using SPSS version 27. Most participants were females (53.3%) and unmarried (80%). Results showed a significant increase in post-test knowledge scores (mean =16.37±3.37) compared to pre-test scores (mean =10.87±3.61), with a mean difference of 5.5 [34].

Needle stick injuries pose significant risks to healthcare workers, particularly nurses, increasing the burden of blood-borne infections. Comprehensive training in prevention and management is crucial. A cross-sectional study conducted among 360 female registered nurses at Nishtar Teaching Hospital, Multan, aimed to evaluate their knowledge of safety measures against needle stick injuries. Results showed that 48.9% had adequate knowledge, while 46.8% followed current practices. Most nurses recognized needle stick accidents as percutaneous injuries (76.6%), but only 57.8% understood the risk of blood-borne diseases transmission. Nurses with 6–10 years of experience demonstrated better knowledge and practice. Educating healthcare workers on proper handling techniques and promoting the use of personal protective equipment can reduce the frequency of needle stick injuries [35].

This cross-sectional study at Dhaka Medical College Hospital aimed to assess nurses' knowledge of needle stick injuries (NSI) and personal protective equipment (PPE) usage. Out of 200 respondents, 65% demonstrated good knowledge of NSI, while 56% had good knowledge of PPE. The findings emphasize the importance of education and awareness in reducing NSIs, including reporting, preventive measures, and post-exposure prophylaxis.

Implementing infection prevention and control measures is crucial in addressing these occupational hazards among healthcare workers [36].

A descriptive cross-sectional study was conducted at a private nursing institute in Karachi to assess student nurses' knowledge of needle stick injuries (NSI). 67 participants were recruited through purposive sampling. Results showed 53.7% of participants experienced NSI during clinical rotations, with 59.7% having low knowledge levels regarding NSI. Notably, only 62.7% had received the Hepatitis B vaccine. The study suggests implementing educational programs and immunization drives to enhance knowledge and protect students from NSI and Hepatitis B [37].

This study aimed to assess the prevalence of needlestick injuries (NSIs) and examine nursing students' knowledge, attitudes, and practices regarding NSIs. Out of 300 participants, 281 were included, yielding an 82% response rate. Results indicated satisfactory knowledge (Mean =6.4, SD=1.4) and positive attitudes (Mean =27.1, SD=4.12) towards NSIs, but low adherence to safe practices (Mean =14.1, SD=2.0). The overall NSI prevalence was 14.1%, with most incidents occurring during recapping (74.1%) or injections (22.3%). Non-reporting was common (77.4%), mainly due to fear (91.2%). Female and senior students exhibited higher scores across NSI domains compared to male and junior counterparts. Those experiencing NSIs frequently reported lower scores. Despite adequate knowledge and positive attitudes, promoting awareness, continuing education, and incident reporting training are recommended to improve NSI prevention among nursing students [38].

Needle-stick injuries (NSIs) represent a significant risk for healthcare workers, particularly nurses, in Malaysia. With the right level of knowledge, attitudes, and practices (KAP), the frequency of these

injuries can be significantly reduced. This research aimed to evaluate the KAP of nurses in public hospitals in Malaysia concerning NSIs. A cross-sectional survey was conducted, involving 208 nurses who completed self-reported questionnaires assessing their knowledge, attitudes, and practices related to NSIs. The findings revealed that the majority of nurses demonstrated a strong understanding of NSI risks and exhibited positive attitudes and practices. The study recommends enhancing NSI-related education, including training on hand hygiene, post-exposure prophylaxis, and safe working protocols, to further improve KAP and decrease NSI rates among nurses in Malaysian public hospitals [39].

This cross-sectional study in a tertiary care hospital in Peshawar involved 147 student nurses to assess the prevalence of needle stick injuries (NSIs) and their knowledge of NSI prevention and control. Results indicated a 37% incidence of NSIs in the last 6 months, with 70% vaccinated and 75% screened for blood-borne diseases. The study highlights the need for training, workshops, and supervision to prevent NSIs and improve safe practices. It also underscores the importance of free vaccination and government support to address NSI rates. Lack of supervision and patient labelling contribute to NSIs, leading to psychological consequences like fear and anxiety among student nurses. Education and awareness campaigns can help mitigate NSI risks, especially among student nurses lacking advanced knowledge and experience. Staff shortages in hospitals also contribute to NSIs, with two-handed recapping identified as a significant cause [40].

This cross-sectional study conducted at Fauji Foundation Hospital in Rawalpindi, Pakistan, aimed to assess the frequency of needle stick and sharp injuries (NSSIs), associated risk factors, and safety measures among healthcare workers (HCWs). Out of 250 participants, 76.8% reported experiencing NSSIs at least once during their employment. The highest incidence was among HCWs aged 26–30 years (31.6%) and those with 2–7 years of experience (50.4%). Common risk factors included heavy workload (40%) and needle recapping (22%). Only 38% reported incidents, and 44% received hepatitis B vaccination post-exposure. Additionally, 58% used personal protective equipment, and 73.6% utilized safety boxes for sharp waste disposal. The study highlights the importance of enhanced training and strict compliance with universal safety protocols to minimize the occurrence of needle-stick and sharps injuries (NSSIs) among healthcare workers (HCWs) [41].

This study investigates needle stick injury prevalence and its association with knowledge and attitude among clinical medical students. Conducted at the University of Cyberjaya, it utilized convenience sampling for a descriptive cross-sectional online survey. Among respondents (70.9% females, 51.7% year-4 students), only 8.6% reported needle stick injuries, primarily during tasks like needle disposal and recapping. Lack of experience was perceived as the main cause (4.6%). Although the majority of students displayed adequate knowledge (84.1%) and a positive attitude (84.8%), nearly half exhibited average or poor practices (42.4%). However, no significant correlations were observed between knowledge and attitude, or between knowledge and practice. The study emphasizes the need for targeted interventions to improve needle-stick injury precautions among clinical medical students [42].

A cross-sectional study in South India involving 400 healthcare workers from a tertiary care hospital revealed mixed awareness, perceptions, and practices regarding needle stick injuries (NSIs) and their prevention. While 89% were aware of proper disposal practices, 44% mistakenly believed recapping needles prevented NSIs, with 30.5% practicing it, mainly among doctors. Although 79.8% recognized HIV, Hepatitis B & C as common blood-borne pathogens, only 49% knew Hepatitis B posed the highest transmission risk. Most were aware of Hepatitis B vaccination doses (75%) and post-NSI procedures (89.5%), with 96% willing to report NSIs promptly. Awareness of Hepatitis C prevention was lower, with 47% knowing no vaccination exists and 46% unaware of post-exposure prophylaxis. While 61% were concerned about NSIs, 56.5% prioritized patient care over personal safety. Most used designated disposal containers (88%) but fewer used needle cutters/shredders (53%). 85% attended training on safe device usage, and 72.8% were vaccinated against Hepatitis B. Although perceptions were positive, practices like recapping need improvement, suggesting tailored training is essential [43].

This systematic review aimed to assess the prevalence, predictors, and knowledge, attitudes, and practices regarding percutaneous exposure incidents (PEIs) among healthcare workers and students. 56 studies involving 16,607 respondents were analysed. Annual PEI prevalence in Africa ranged from 18.7 to 83.3%, while lifetime prevalence varied from 15.6 to 90.3%. Overall, annual and lifetime prevalences were 48.0 and 44.6%, respectively. Predictors included needle recapping, female gender, increased workload, and lack of infection prevention training. Despite high PEI rates, respondents generally exhibited good knowledge, positive attitudes, and good practices. While encouraging, further research is needed for comprehensive evidence in this area [44].

## **METHODOLOGY**

This study deals with research design, research approach, research setting, population and sample. Sampling technique, development and description of tools, pilot study, data collection and plan for data analysis (Figure 2).

### **Research Approach**

Quantitative Research approach.

### **Research Design**

Pre-experimental one group pre-test and post-test research design is used for the study.

### **Variables Under Study**

- Independent variable: Nurse-led program.
- Dependent variable: Knowledge and practices of nursing students related to the prevention and post-exposure prophylaxis of needle-stick injuries.
- Demographic variables: Age, gender, marital status, religion, place of residence, prior knowledge of needle-stick injuries, sources of information, and Hepatitis B vaccination status.

### **Setting of the Study**

The study was conducted among B.Sc. nursing students in college of nursing at PGIMS Rohtak.

### **Population**

B.Sc. nursing students of college of nursing.

### **Target Population**

Accessible B.Sc. Nursing 2nd Year students of college of nursing at the time of data collection.

*Sample Size:* 150

### **Sampling Criteria**

#### ***Inclusive Criteria***

- B.Sc. nursing 2nd year students who were willing and present at the time of data collection.
- B.Sc. nursing 2nd year students studying in college of nursing at PGIMS, Rohtak.

#### ***Exclusive Criteria***

- B.Sc. Nursing 1st year, 3rd year and 4th year students who were not included in the study.

### **Sampling Technique**

Purposive sampling technique was used to select 150 samples who met the inclusive criteria.

### **Development of Tool**

The researcher developed a structured self-administered questionnaire on knowledge and practice of nursing students regarding prevention and post exposure prophylaxis of needle stick injury.

The following steps were carried out for preparing the tool:

- Review of literature;
- Experts' opinion; and
- Researchers' personal experience.

### **Data Collection Tool and Technique**

The tool for data collection was self-structured knowledge questionnaire and practice checklist. The technique for data collection was questionnaires and structured observational checklist method to assess the practice of nursing students.

### **Description of Tool**

Self-structured knowledge questionnaire comprised of three sections:

#### ***Section A: Socio Demographic data***

This section includes 8 items that outline the socio-demographic characteristics of second-year B.Sc. nursing students, covering factors such as age, gender, marital status, religion, residential area, prior knowledge of needle-stick injuries, sources of information, and Hepatitis B vaccination status.

#### ***Section B: Knowledge Questionnaire***

This section contains 30 multiple-choice questions designed to assess nursing students' knowledge on the prevention and post-exposure prophylaxis of needle-stick injuries. Each question has one correct answer and three incorrect options. A score of 1 is awarded for each correct response, while incorrect answers receive a score of 0. The total possible score is 30, corresponding to 30 correct answers.

*The Level of Knowledge was Classified as:*

- Inadequate knowledge: Score 0–10.
- Moderately adequate knowledge: Score 11–20.
- Adequate knowledge: Score 20 to above.

#### ***Section C: Practice Checklist***

This section includes a 14-item checklist designed to evaluate the practice level of nursing students concerning the prevention and post-exposure prophylaxis of needle-stick injuries. Each correct response is awarded 1 point, with a total maximum score of 14. The researcher uses an interview method to assess the students' practices.

*The Level of Practice was Classified as:*

- Unsatisfactory practice: Score 0–6.
- Moderately satisfactory practice: Score 7–10.
- Satisfactory practice: Score more than 11.

### **Validation of the Tool**

The developed tool, along with the objectives, hypotheses, operational definitions, blueprints, scoring key, and criteria checklist for validation, was submitted to a panel of seven experts. This group included five experts from the Medical-Surgical Department of the College of Nursing, one expert from the ENT department at the hospital, and one expert from the Orthopaedic Department in the clinical setting. The tool was revised according to the feedback provided by these experts.

### **Reliability of the Tool**

Reliability refers to the consistency and accuracy with which an instrument measures the intended attributes. In this study, reliability was assessed using the test-retest method ( $r=0.83$ ) during the pilot phase. Following the pilot study, the tool was determined to be feasible, practical, and acceptable, and therefore no modifications were deemed necessary for the main study.

---

### **Pilot Study**

- Data collection was done from 5th January to 12th January 2024.
- Permission for conducting pilot study was taken from authority of respective college.
- Pilot study was done at BDM College of Nursing, Chhuchhakwas Jhajjar.
- Purpose of the study was to assess the knowledge and practice regarding needle stick injury among students of B.Sc. Nursing 2nd Year in selected BDM College of Nursing, Chhuchhakwas Jhajjar.
- The data for the pilot study was collected from the 15 nursing students .
- Verbal consent was taken from the subjects after explaining the purpose of the study.
- Data was collected by using questionnaire method.
- Data collected using paper-pencil technique.
- It took 30–35 min for data collection to complete the questionnaire.
- At the end of the questionnaire the researcher administered nurse led programme.
- After 7 days, post-test of the same subjects was taken to assess the effectiveness of nurse led programme.

### **Findings of the Pilot Study**

The findings of the pilot study show that the mean of the pre-test knowledge is 12.73 and the mean value of post-test knowledge is 23.73. The obtained “t” value for knowledge was 9.025 which is greater than the table value at 0.05 level of significance.

The mean of the pre-test practice is 7.8 and the mean value of the post-test practice is 10. The obtained “t” value for practice was 9.054 which is greater than the table value at 0.05 level of significance.

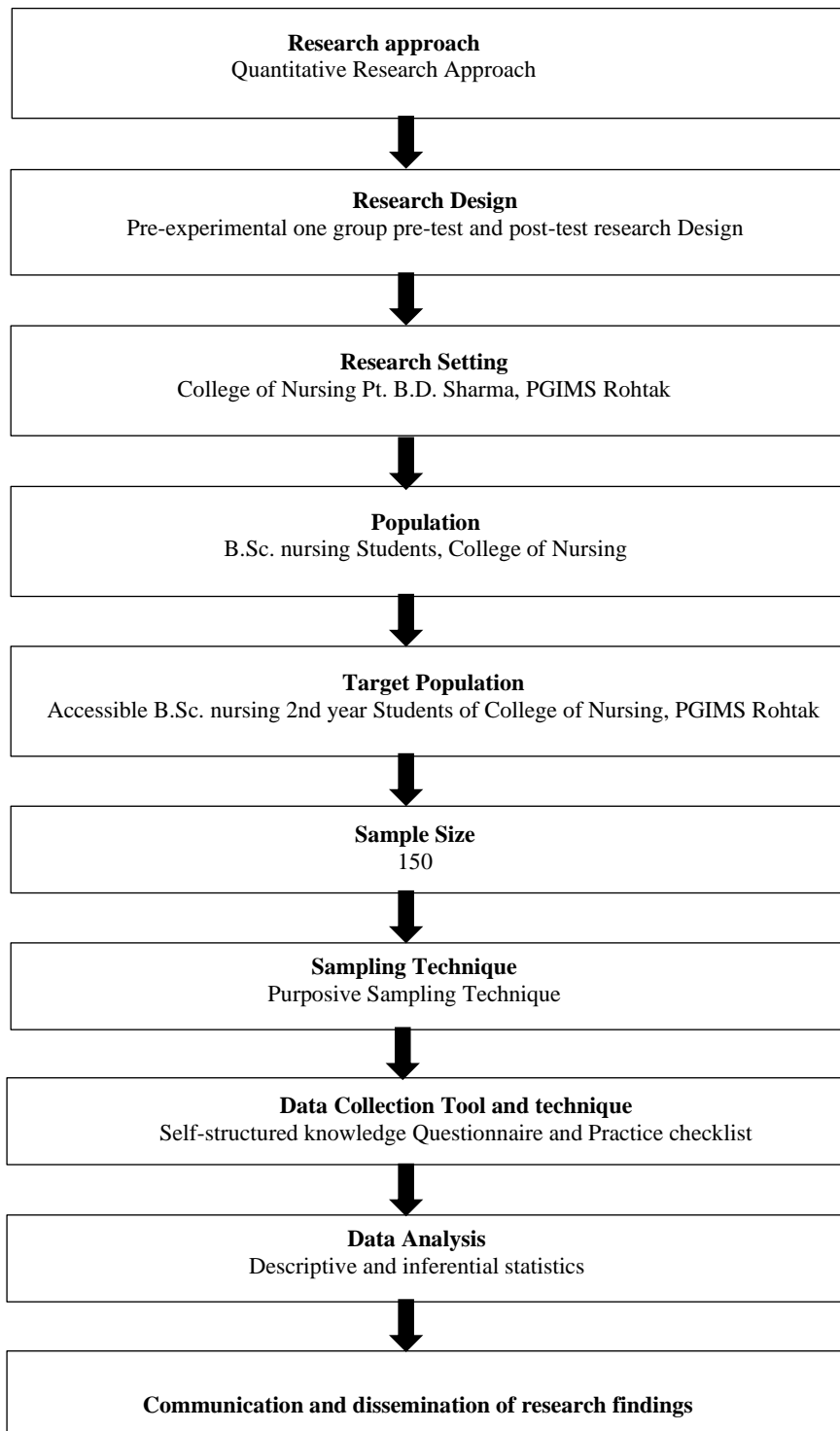
### **Plan for Data Collection Procedure**

- Legal administrative permission was obtained from Principal, college of nursing Pt. B.D. Sharma PGIMS Rohtak.
- The data was collected from 24-01-2024 to 23-02-2024.
- Samples were collected according to the selection criteria.
- Informed verbal consent was taken from the participants.
- Pre-test was taken by administering self-structured questionnaire for the assessment of knowledge and checklist for the assessment of the practice of nursing students regarding prevention of needle stick injury.
- Nurse led programme regarding prevention and post exposure prophylaxis of needle stick injury was administered to the nursing students on day 1st.
- Post-test was taken after 7 days by using same self-structured questionnaire and checklist.

### **Plan for Data Analysis**

The data analysis was planned on the basis of objectives of the study. The data obtained was analysed by using descriptive and inferential statistics. The plan of data analysis is as follows:

- *Section A:* Socio demographic data was analysed by using frequency and percentage.
- *Section B:* The assessment of the knowledge and practice of nursing students were analysed in terms of frequency, percentage, mean and standard deviation.
- *Section C:* Paired “t” test was used to analyse the effectiveness of nurse led programme in terms of knowledge and practice.
- *Section D:* Chi square test used to analyse the association between pre-test knowledge and practice of students regarding needle stick injury and its prevention with selected demographic variables.



**Figure 2.** Schematic representation of research methodology.

### **Analysis and Interpretation**

This study deals with analysis and interpretation of data collection from 150 nursing students studying in PGIMS Rohtak. In order to assess the level of knowledge and practice regarding prevention and post exposure prophylaxis of needle stick injury, the self-administered questionnaire and practice checklist was used for data collection. The data were analysed from the nursing students with the help of structured questionnaire and practice checklist. Score was organized, analysed and interpreted by using descriptive and inferential statistics.

---

## ORGANISATION OF FINDINGS

The data is organized, analysed and presented in the following sections:

### Section-A

- Frequency and percentage distribution of socio-demographic variables of students.

### Section-B

- Assessment of knowledge of students regarding needle stick injury and its prevention.
- Assessment of practice of students regarding needle stick injury and its prevention.

### Section-C

- Effectiveness of nurse led programme in terms of knowledge of students.
- Effectiveness of nurse led programme in terms of practice of students.

### Section-D

- Association between pre-test knowledge of students regarding needle stick injury and its prevention with selected demographic variables.
- Association between pre-test practice of students regarding needle stick injury and its prevention with selected demographic variables.

### Section-A: Description of the Sample Characteristics

This part deals with the analysis of the students' socio-demographic characteristics. These socio-demographic variables are as follows:

- Age,
- Gender,
- Marital Status,
- Religion,
- Residential Area,
- Previous knowledge about needle stick injury,
- If yes, sources of information?
- Are you vaccinated against Hepatitis B vaccine?

Tabulation is done for the socio-demographic data and frequency and percentage method is used for the description of the sample characteristics.

#### *Demographic Characteristics of the Study Samples*

Table 1 presents the frequency and percentage distribution of the demographic characteristics of the sample. It provides a comprehensive overview of the key demographic factors, helping to contextualize the sample population for the study. The data presented in Table 1 highlights the diversity and composition of the sample in terms of various demographic variables.

Table 2 and Figure 3 depict that among the nursing students, 49% belonged to age group above 21 years, 49% of subjects were in the age group 19–20 years, and 3% of subjects were in the age group 17–18 years.

Table 3 displays the distribution of subjects according to gender. It provides a detailed breakdown of the male and female participants in the study, offering insights into the gender composition of the sample. This distribution is essential for understanding gender-related trends within the study's findings (Figure 4).

Table 4 and Figure 5 depict that all the subjects (100%) were unmarried.

**Table 1.** Frequency and percentage distribution of demographic characteristics of the samples (N=150).

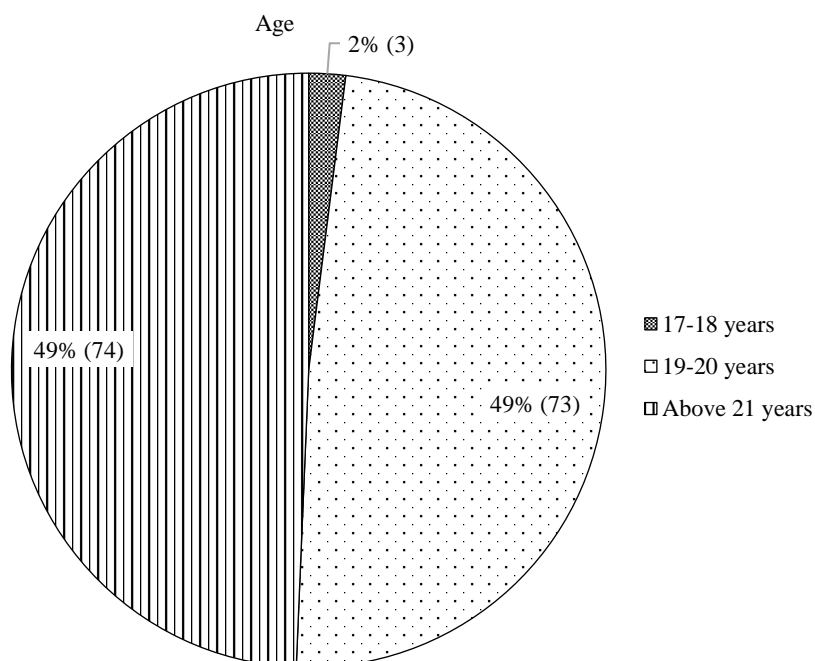
S.N.	Sample Characteristics	Frequency	Percentage
1.	<i>Age</i>		
	17–18 years	3	2%
	19–20 years	73	49%
	Above 21 years	74	49%
2.	<i>Gender</i>		
	Male	0	0%
	Female	150	100%
	Transgender	0	0%
3.	<i>Marital Status</i>		
	Married	0	0%
	Unmarried	150	100%
4.	<i>Religion</i>		
	Hindu	150	100%
	Christian	0	0%
	Muslims	0	0%
	Others	0	0%
5.	<i>Residential Area</i>		
	Urban	70	47%
	Rural	80	53%
6.	<i>Previous Knowledge About Needle Sticks Injury?</i>		
	Yes	150	100%
	No	0	0%
7.	<i>If Yes, Sources of Information</i>		
	Media (TV, Newspaper, computer, phone)	20	13%
	Health professionals	129	86%
	Family members and relatives	0	0%
	Friends and neighbours	1	1%
8.	<i>Are you Vaccinated Against Hepatitis B?</i>		
	Yes	139	93%
	No	11	7%

**Table 2.** Distribution of subjects according to age.

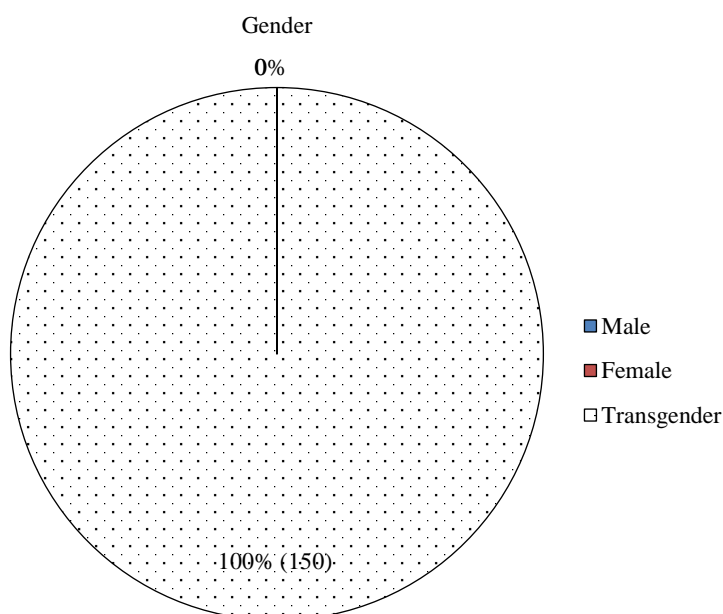
Sample Characteristics	Frequency	Percentage
<i>Age</i>		
17–18 years	3	2%
19–20 years	73	49%
Above 21 years	74	49%

**Table 3.** Distribution of subjects according to gender.

Sample Characteristics	Frequency	Percentage
<i>Gender</i>		
Male	0	0%
Female	150	100%
Transgender	0	0%



**Figure 3.** Frequency and percentage distribution of subjects according to age.



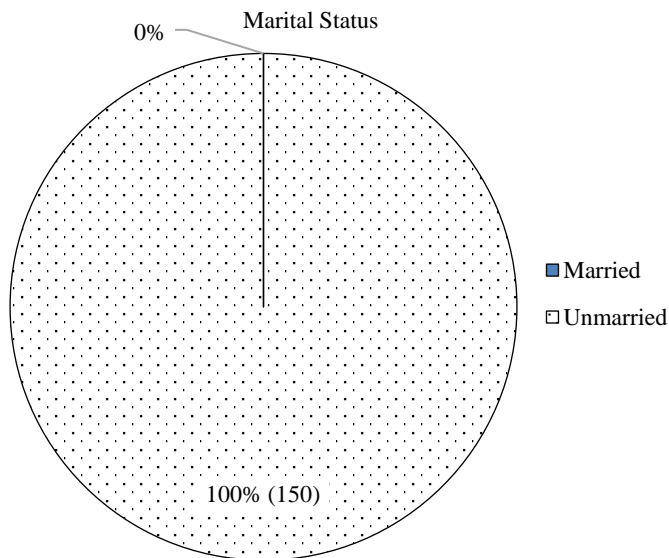
**Figure 4.** Frequency and percentage distribution of subjects according to gender.

**Table 4.** Distribution of subjects according to marital status.

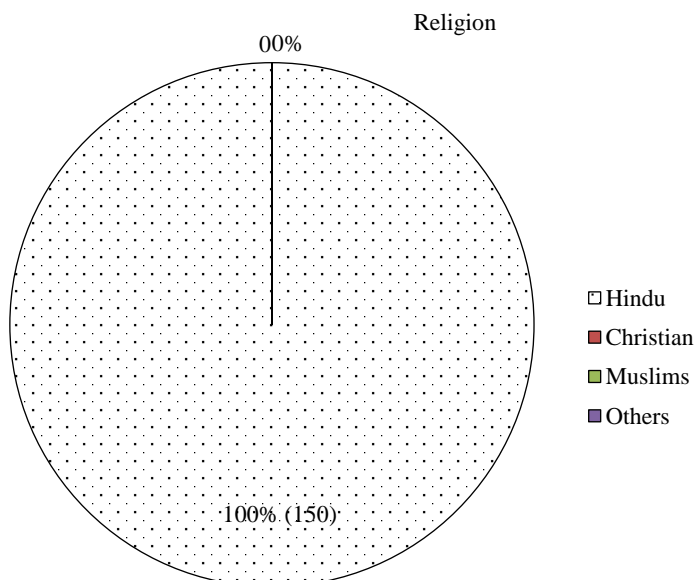
Sample Characteristics	Frequency	Percentage
<i>Marital Status</i>		
Married	0	0%
Unmarried	150	100%

Table 5 and Figure 6 depict that all the subjects (100%) were Hindus.

Table 6 and Figure 7 depict that majority of the subjects (53%) belonged to rural area and 47% belonged to urban area.



**Figure 5.** Frequency and percentage distribution of subjects according to marital status.



**Figure 6.** Frequency and percentage distribution of subjects according to religion.

**Table 5.** Distribution of subjects according to religion.

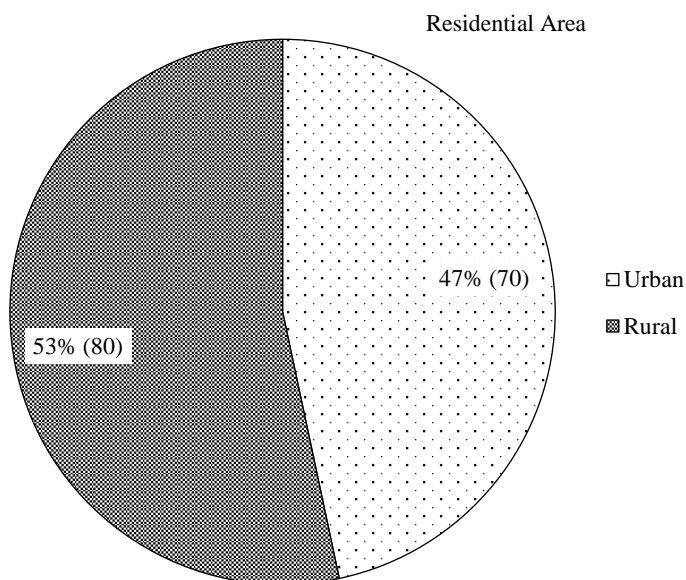
Sample Characteristics	Frequency	Percentage
<i>Religion</i>		
Hindu	150	100%
Christian	0	0%
Muslims	0	0%
Others	0	0%

**Table 6.** Distribution of subjects according to residential area.

Sample Characteristics	Frequency	Percentage
<i>Residential Area</i>		
Urban	70	47%
Rural	80	53%

Table 7 and Figure 8 depict that all the subjects (100%) had previous knowledge about needle sticks injury.

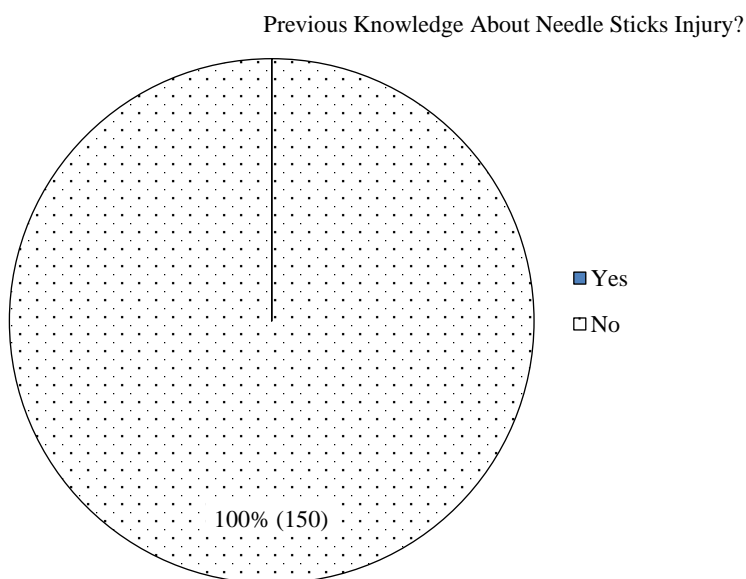
Table 8 and Figure 9 depict that sources of information of majority of subjects (86%) had information from health professionals, sources of information of 13% subjects were media (TV, New paper, computer, phone) and sources of information of 1% subjects were friends and neighbours.



**Figure 7.** Frequency and percentage distribution of subjects according to residential area.

**Table 7.** Distribution of subjects according to previous knowledge about needle sticks injury.

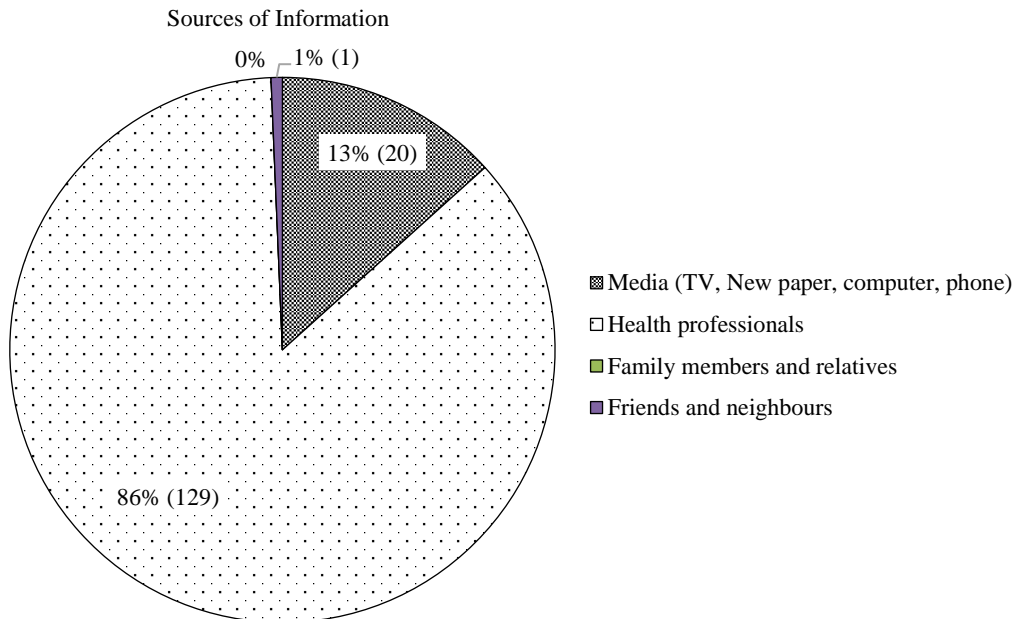
Sample Characteristics	Frequency	Percentage
<i>Previous Knowledge About Needle Sticks Injury?</i>		
Yes	150	100%
No	0	0%



**Figure 8.** Frequency and percentage distribution of subjects according to previous knowledge about needle sticks injury.

**Table 8.** Distribution of subjects according to sources of information.

Sample Characteristics	Frequency	Percentage
<i>If yes, sources of Information</i>		
Media (TV, New paper, computer, phone)	20	13%
Health professionals	129	86%
Family members and relatives	0	0%
Friends and neighbours	1	1%



**Figure 9.** Frequency and percentage distribution of subjects according to sources of information.

**Table 9.** Distribution of subjects according to vaccination status.

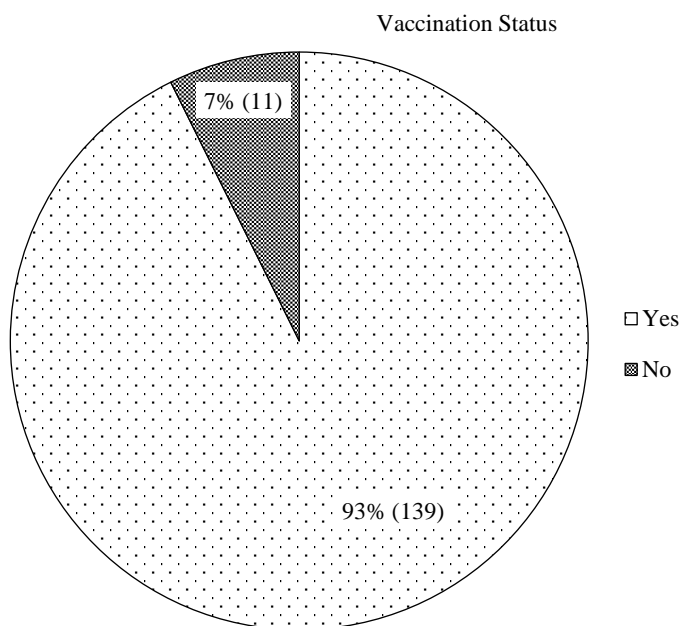
Sample Characteristics	Frequency	Percentage
<i>Are You Vaccinated Against Hepatitis B?</i>		
Yes	139	93%
No	11	7%

Table 9 and Figure 10 depict that majority of the subjects (93%) were vaccinated against hepatitis B and 7% not vaccinated against hepatitis B.

### Section-B: Description of Knowledge and Practice Regarding Prevention of Needle Stick Injury and Its Post Exposure Prophylaxis Treatment

#### *Assessment of Knowledge of Students Regarding Prevention of Needle Stick Injury and Its Post Exposure Prophylaxis Treatment*

This part deals with the description of knowledge of students regarding prevention of needle stick injury and its post exposure prophylaxis treatment. Self-structured knowledge questionnaire was developed to assess the knowledge of students. It consists of 30 multiple choice questions to access the level of knowledge of nursing students regarding prevention and post exposure prophylaxis of needle stick injury. Each item has 1 correct response and 3 wrong responses. Each correct answer rewarded with score 1 and incorrect response with zero score. The total possible correct responses were 30 giving rises to a maximum score of 30. The obtained scores were analysed in terms of mean, median and standard deviation. Also, details regarding the content of knowledge assessment are presented in the description of score (Table 10). According to the total score obtained by each subject, knowledge was classified in to three sections.



**Figure 10.** Frequency and percentage distribution of subjects according to vaccination status.

**Table 10.** Classification of level of knowledge according to knowledge score.

Level of Knowledge	Knowledge Scores
Inadequate	0–10
Moderately Adequate	11–20
Adequate	21–30

**Table 11.** Frequency and percentage distribution of level of knowledge of the subjects in pre-test N=150.

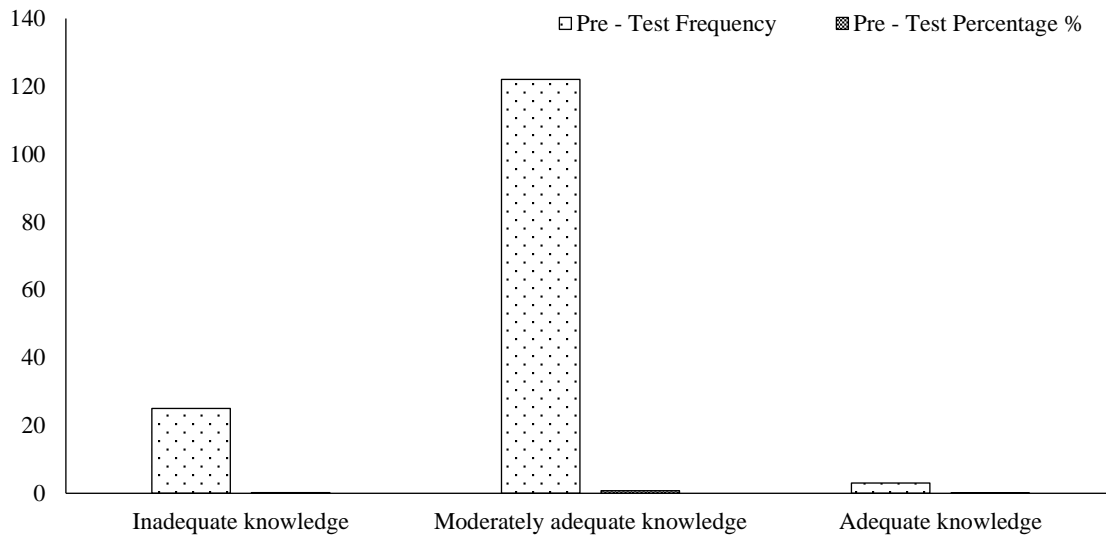
Level of Knowledge	Pre-Test	
	Frequency	Percentage %
Inadequate knowledge	25	17%
Moderately adequate knowledge	122	81%
Adequate knowledge	3	2%

**Table 12.** Frequency and percentage distribution of level of knowledge of the subjects in post-test (N=150).

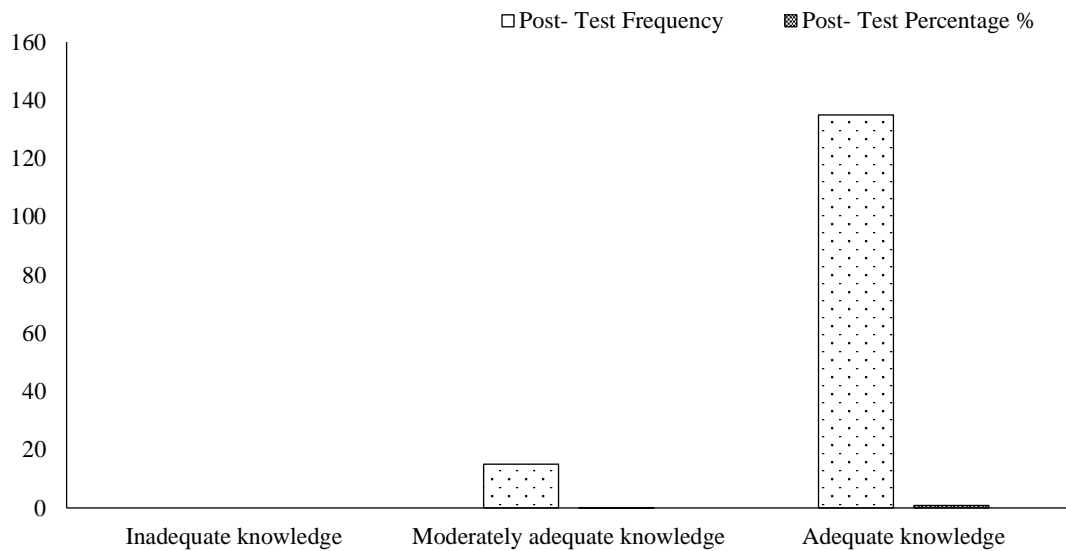
Level of Knowledge	Post-Test	
	Frequency	Percentage %
Inadequate knowledge	0	0%
Moderately adequate knowledge	15	10%
Adequate knowledge	135	90%

Data presented in Table 11 and Figure 11 depict that in pre-test, majority of students 81% had moderately adequate knowledge and 17% have inadequate knowledge and 2% had adequate knowledge regarding needle sticks injury.

In Table 12 and Figure 12, post-test majority of students 90% had adequate knowledge and 10% had moderately adequate knowledge and none of them have inadequate knowledge regarding needle sticks injury.



**Figure 11.** Distribution of Subjects in Pre-test Knowledge Score.



**Figure 12.** Distribution of subjects in post-test knowledge score.

**Table 13.** Distribution of knowledge score of the subjects in pre-test.

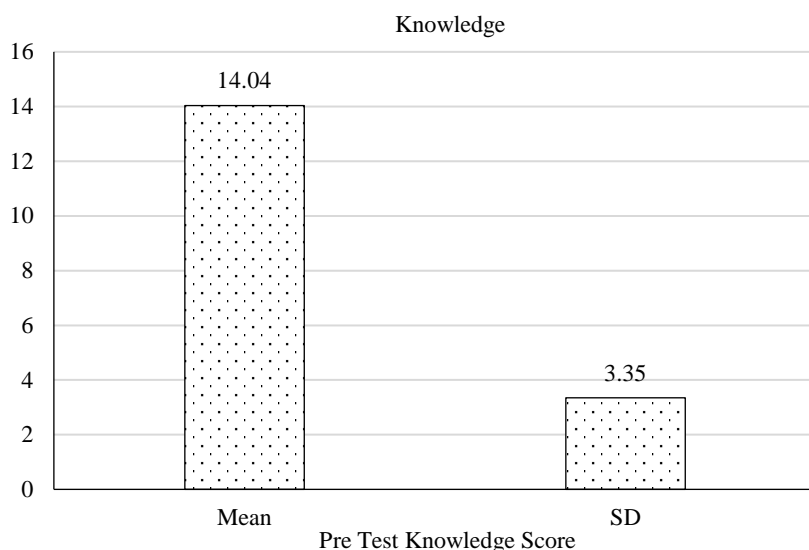
Outcome Variable	Pre-Test Knowledge Score	
	Mean	SD
Knowledge	14.04	3.35

**Table 14.** Distribution of knowledge score of the subjects in post-test.

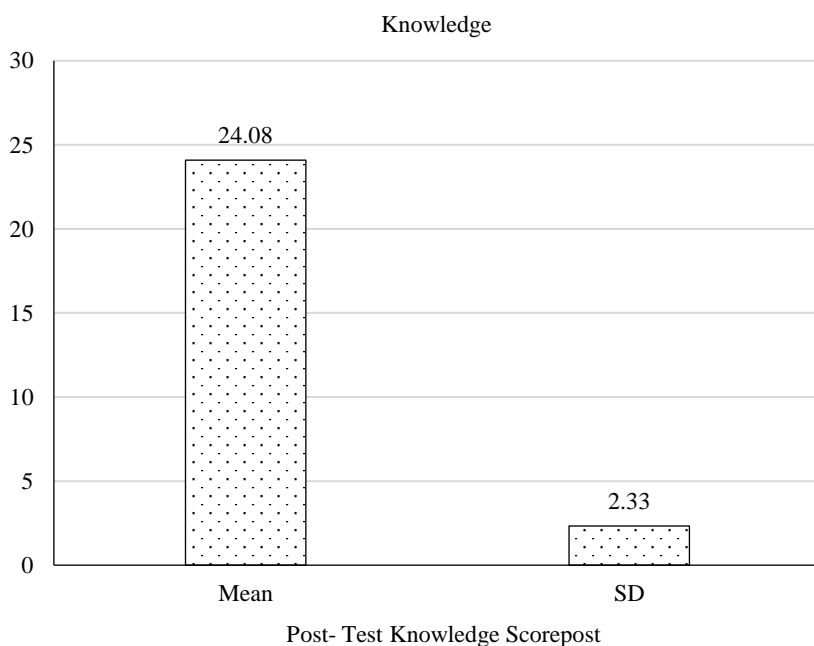
Outcome Variable	Post-Test Knowledge Score	
	Mean	SD
Knowledge	24.08	2.33

Data presented in this Table 13 and Figure 13 depicts that in pre-test, mean value of overall knowledge was 14.04 and standard deviation was 3.35.

Data presented in Table 14 and Figure 14 depicts that in post-test, mean was 24.08 and standard deviation was 2.33.



**Figure 13.** Represents overall knowledge of subjects before intervention in terms of mean and standard deviation.



**Figure 14.** Represents overall knowledge of subjects after intervention in terms of mean and standard deviation.

***Assessment of Practice of students regarding Prevention of Needle Stick Injury and Its Post Exposure Prophylaxis Treatment***

This part deals with the description of practice of students regarding prevention of needle stick injury and its post exposure prophylaxis treatment. It consists of 14 items checklist to assess the level of practice of nursing students regarding prevention and post exposure prophylaxis of needle stick injury. The total maximum score of checklist is 14. With one correct response score 1 is given. Interview method is used by the researcher to assess the practice. The obtained score were analysed in terms of mean, median and standard deviation. Also details regarding the content of practice assessment are presented in the description of score. According to the total score obtained by each subject practice was classified in to three sections (Table 15).

Data presented in Table 16 and Figure 15 depict that in pre-test on checklist, majority of students (67%) had moderately satisfactory practice and 32% had unsatisfactory practice and 1% had satisfactory practice regarding needle sticks injury.

Data presented in Table 17 and Figure 16 depict that in post-test, majority of students (85%) had moderately satisfactory practice, 14% had satisfactory practice, and 1% had unsatisfactory practice regarding needle sticks injury.

**Table 15.** Classification of level of practice according to practice score.

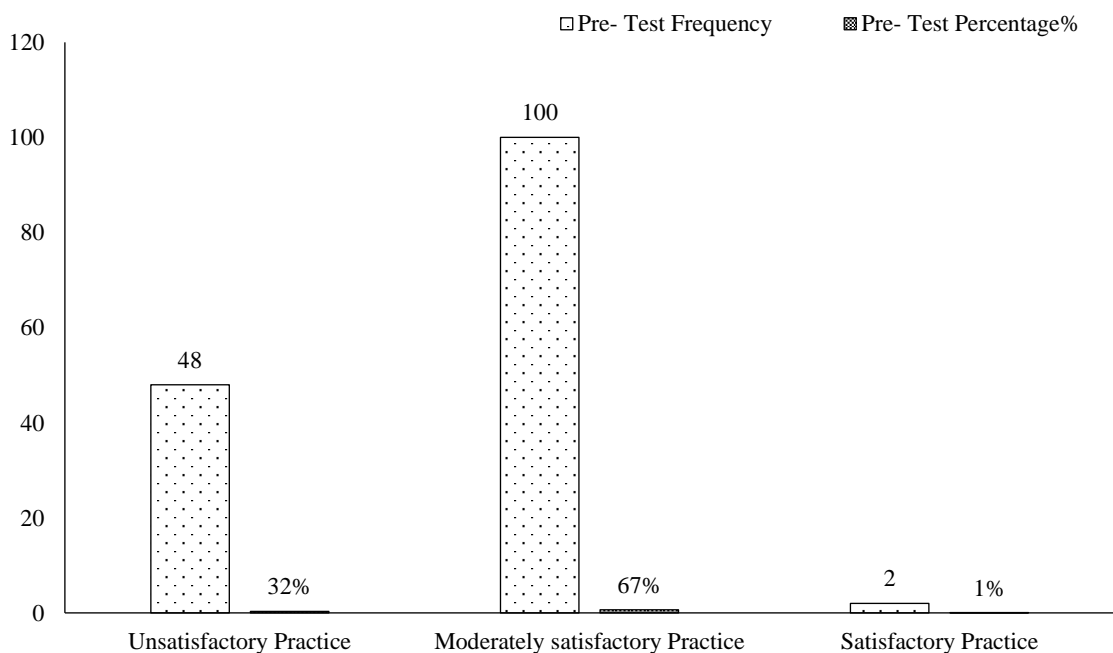
Level of Practice	Practice score
Unsatisfactory Practice	0–6
Moderately Satisfactory Practice	7–10
Satisfactory Practice	More Than 11

**Table 16.** Frequency and percentage distribution of level of practice of the subjects in pre-test N=150.

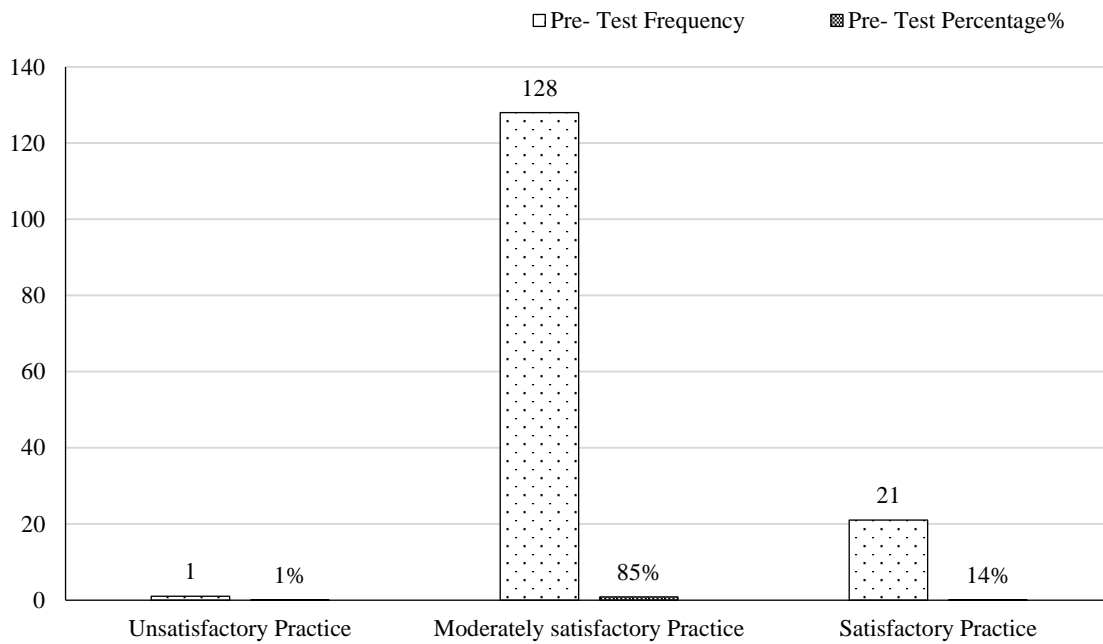
Level of Practice	Pre-Test	
	Frequency	Percentage%
Unsatisfactory Practice	48	32%
Moderately satisfactory Practice	100	67%
Satisfactory Practice	2	1%

**Table 17.** Frequency and percentage distribution of level of practice of the subjects in post-test.

Level of Practice	Post-Test	
	Frequency	Percentage%
Unsatisfactory Practice	1	1%
Moderately satisfactory Practice	128	85%
Satisfactory Practice	21	14%



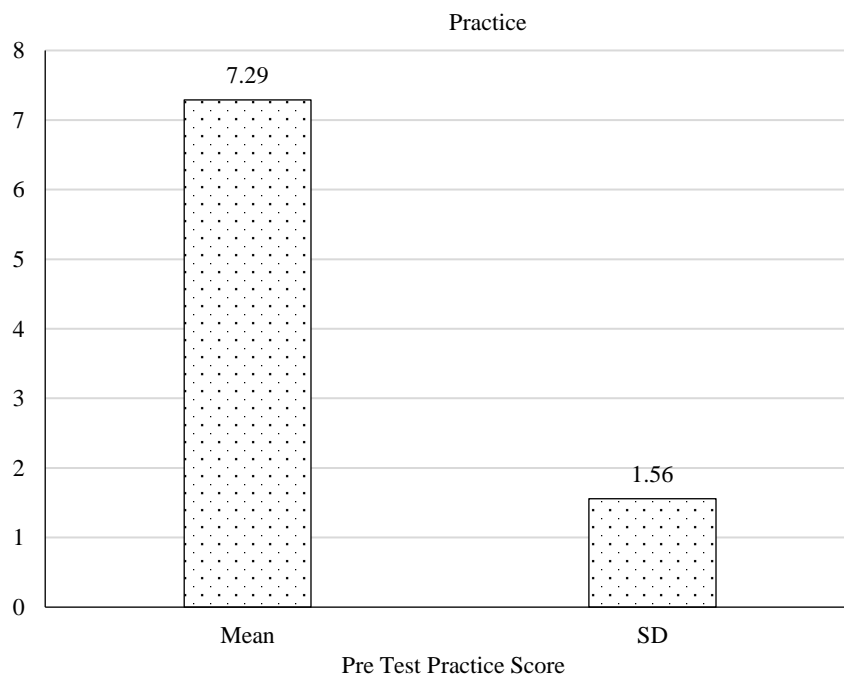
**Figure 15.** Distribution of subjects in pre-test practice score.



**Figure 16.** Distribution of subjects in post-test practice score.

**Table 18.** Distribution of practice score of the subjects in pre-test.

Outcome Variable	Pre-Test Practice Score	
	Mean	SD
Practice	7.29	1.56



**Figure 17.** Represents overall practice of subjects before intervention in terms of mean and standard deviation.

Data presented in Table 18 and Figure 17 depicts that in pre-test of practice, mean was 7.29 and standard deviation was 1.56.

Data presented in Table 19 and Figure 18 depicts that in post-test, mean was 8.93 and standard deviation was 1.37.

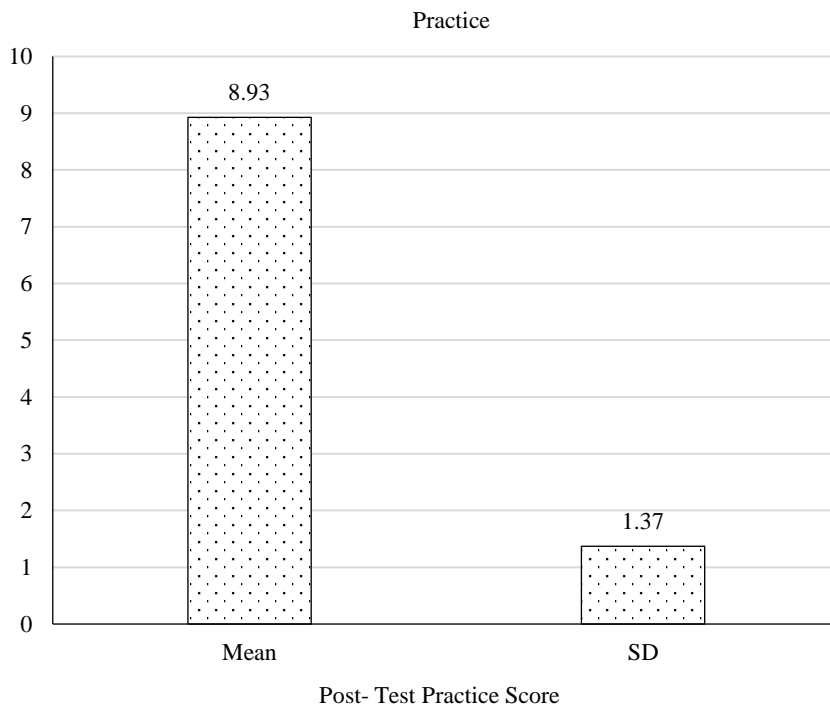
**Section-C: Effectiveness of Nurse Led Programme in Terms of Knowledge and Practice**

**Effectiveness of Nurse LED Programme in Terms of Knowledge**

Data presented in Table 20 and Figure 19 depict that in pre-test on structured knowledge questionnaire, majority of students (81%) had moderately adequate knowledge and 17% had inadequate knowledge and 2% had adequate knowledge regarding needle sticks injury. Whereas in post-test, majority of students 90% had adequate knowledge and 10% had moderately adequate knowledge and none of them had inadequate knowledge regarding needle sticks injury.

**Table 19.** Distribution of practice score of the subjects in post-test.

Outcome Variable	Post-Test Practice Score	
	Mean	SD
Practice	8.93	1.37



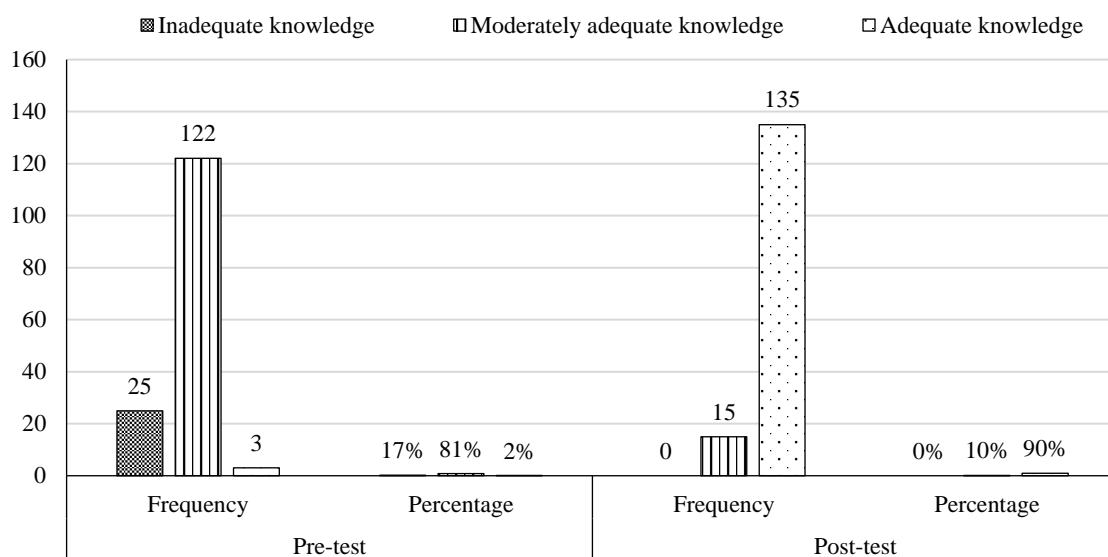
**Figure 18** Represents overall practice of subjects after intervention in terms of mean and standard deviation.

**Table 20.** Comparison of knowledge level of subjects before and after intervention.

Level of Knowledge	Pre Test		Post Test	
	Frequency	Percentage %	Frequency	Percentage %
Inadequate knowledge	25	17%	0	0%
Moderately adequate knowledge	122	81%	15	10%
Adequate knowledge	3	2%	135	90%

	Frequency	Percentage %	Frequency	Percentage %
Inadequate knowledge	25	17%	0	0%
Moderately adequate knowledge	122	81%	15	10%
Adequate knowledge	3	2%	135	90%

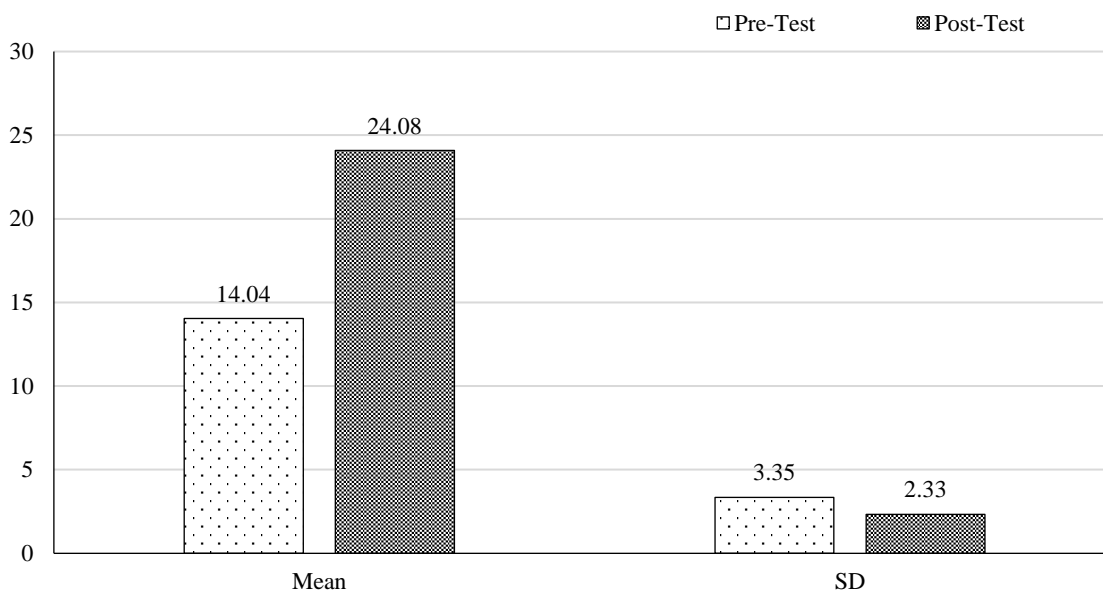


**Figure 19.** Comparison of knowledge in pre-test and post-test.

**Table 21.** Comparison of knowledge score of subjects before and after intervention.

Outcome variable	Pre-Test		Post-test		Mean Difference	df	t-value	p-value	Inference
	Mean	SD	Mean	SD					
Knowledge	14.04	3.35	24.08	2.33	10.04	149	-39.407	0.01	S*

S\* significant.

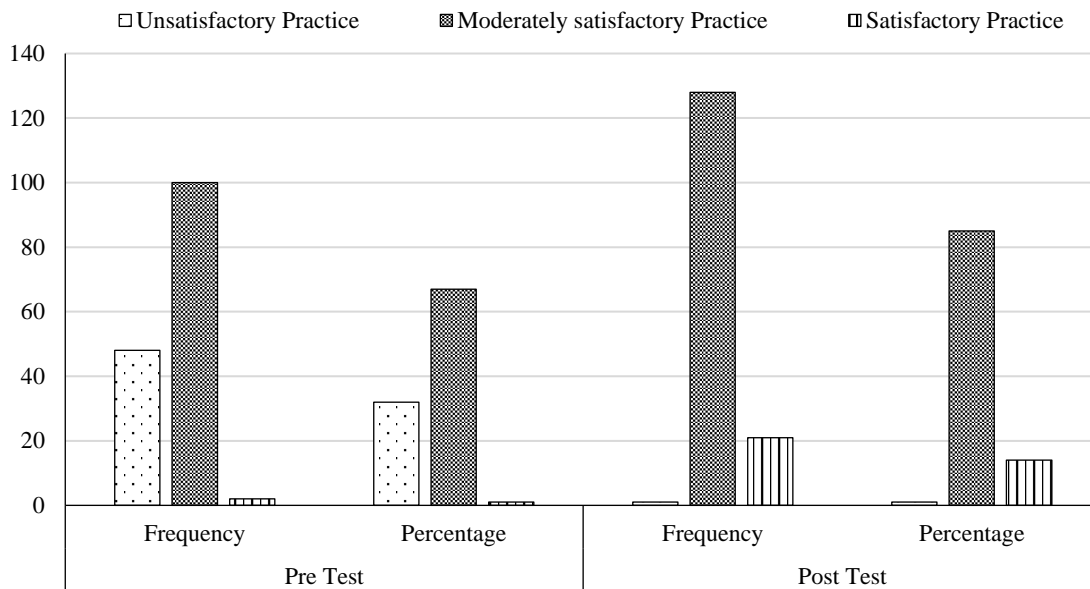


**Figure 20.** Comparison of knowledge score of subjects in pre- test and post-test in terms of mean and standard deviation.

The data presented in Table 21 and Figure 20 shows that the mean knowledge score in the pre-test was 14.04, with a standard deviation of 3.35. In contrast, the post-test mean was 24.08, with a standard deviation of 2.33. The mean difference between the pre-test and post-test scores was 10.04. The computed t-value was 39.407, which exceeds the critical value of 1.97 at a degrees of freedom (df) of 149. This indicates that there is a statistically significant difference between the pre-test and post-test knowledge scores concerning the prevention and post-exposure prophylaxis of needle stick injuries.

**Table 22.** Comparison of practice level of subjects before and after intervention.

Level of Practice	Pre Test		Post Test	
	Frequency	Percentage %	Frequency	Percentage%
Unsatisfactory Practice	48	32%	1	1%
Moderately satisfactory Practice	100	67%	128	85%
Satisfactory Practice	2	1%	21	14%



**Figure 21.** Comparison of practice in pre-test and post-test.  
*S\*significant*

**Table 23.** Comparison of practice score of subjects before and after intervention.

Outcome variable	Pre-Test		Post-test		Mean Difference	df	t- value	p-value	Inference
	Mean	SD	Mean	SD					
Practice	7.29	1.56	8.93	1.37	1.64	149	-17.313	0.01	S*

*Effectiveness of Nurse Led Programme in Terms of Practice*

Table 22 and Figure 21 present a comparison of the practice levels of subjects before and after the intervention. The data highlights any changes or improvements in the subjects' practices, providing a clear view of the intervention's impact. This comparison is crucial for evaluating the effectiveness of the intervention on the subjects' behaviour or performance.

The data shown in Table 23 and Figure 22 reveals that the mean score for knowledge in the pre-test was 7.29, with a standard deviation of 1.56. In the post-test, the mean score increased to 8.93, with a standard deviation of 1.37. The mean difference between the pre-test and post-test knowledge scores was 1.64. The calculated t-value was 17.313 which is larger than the tabulated value (1.97) at df 149, which inferred that there was a significant difference between pre-test and post-test practice score of subjects regarding prevention and post exposure prophylaxis of needle stick injury.

**Section-D: Association between pre-test knowledge and practice of subjects regarding needle stick injury and its prevention with selected demographic variables**

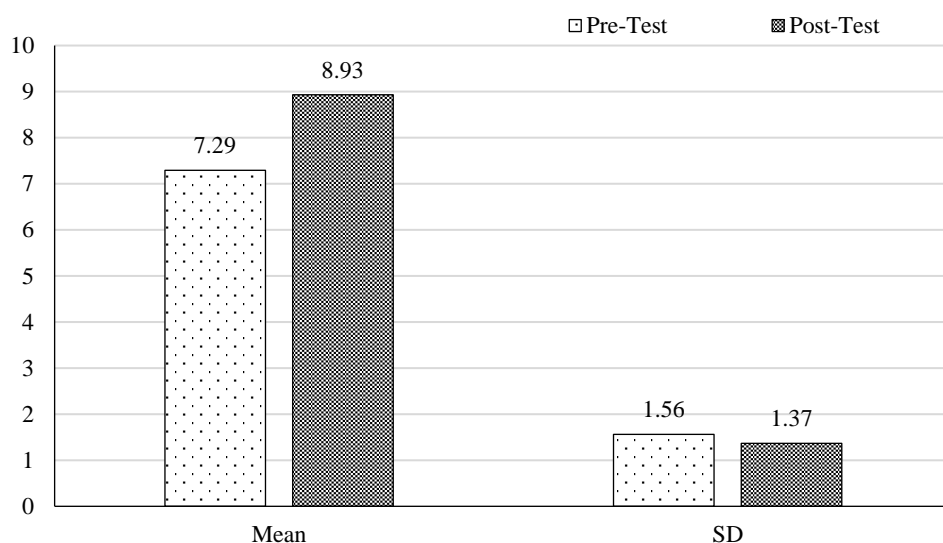
Table 24 reveals that:

1. The calculated chi square value (1.085) is less than the tabulated chi square value (9.49) at 4-degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is not significant association between pre intervention knowledge score and age of subjects.

2. No statistics are computed because gender is a constant.
3. No statistics are computed because marital status is a constant.
4. No statistics are computed because religion is a constant.
5. The calculated chi square value (0.232) is less than the tabulated chi square value (5.99) at 2-degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is not significant association between pre intervention knowledge score and residential area of subjects.
6. No statistics are computed because previous knowledge about needle stick injury is a constant.
7. The calculated chi square value (5.604) is less than the tabulated chi square value (9.49) at 4-degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is not significant association between pre intervention knowledge score and sources of information of subjects.
8. The calculated chi square value (7.187) is greater than the tabulated chi square value (5.99) at 2-degrees of freedom and 0.05 level of significance. So, null hypothesis is rejected. It proves that there is significant association between pre intervention knowledge score and vaccination of subjects.

**Table 24.** Association between pre-test knowledge of subjects regarding needle stick injury and its prevention with selected demographic variables.

	Socio Demographic Variables	Inadequate	Moderately adequate	Adequate	Chi Test	df	p-value	Table value	Result	
1	Age (in years)	17–18 years	2	1	1.085	4	0.897	9.49	NS	
		19–20 years	15	57						1
		Above 21 years	8	64						2
2	Gender	Male	0	0	-	-	-	-	NS	
		Female	25	122						3
		Transgender	0	0						0
3	Marital Status	Married	0	0	-	-	-	-	NS	
		Unmarried	25	122						3
4	Religion	Hindu	25	122	-	-	-	-	NS	
		Christian	0	0						0
		Muslim	0	0						0
		Others	0	0						0
5	Residential Area	Urban	13	65	0.232	2	0.890	5.99	NS	
		Rural	12	57						1
6	Previous Knowledge	Yes	25	122	-	-	-	-	NS	
		No	0	0						0
7	Sources of Information	Media	0	20	5.604	4	0.231	9.49	NS	
		Health Professional	25	101						2
		Family members and relatives	0	0						0
		Friends and neighbours	1	1						0
8	Vaccination status	Yes	20	116	7.187	2	0.027	5.99	S	
		No	5	6						0



**Figure 22.** Comparison of practice score of subjects in pre-test and post-test in terms of mean and standard deviation.

**Table 25.** Association between pre-test practice of subjects regarding needle stick injury and its prevention with selected demographic variables.

	Socio Demographic Variables	Practice Level			Chi Test	df	p-value	Table value	Result
		Unsatisfactory	Moderately satisfactory	Satisfactory					
1	Age (in years)	17–18 years	1	2	2.138	4	0.710	9.49	NS
		19–20 years	23	50					
		Above 21 years	24	48					
2	Gender	Male	0	0	-	-	-	-	NS
		Female	48	100					
		Transgender	0	0					
3	Marital Status	Married	0	0	-	-	-	-	NS
		Unmarried	48	100					
4	Religion	Hindu	48	100		-	-	-	NS
		Christian	0	0					
		Muslim	0	0					
		Others	0	0					
5	Residential Area	Urban	31	49	5.481	2	0.065	5.99	NS
		Rural	17	51					
6	Previous Knowledge	Yes	48	100	-	-	-	-	NS
		No	0	0					
7	Sources Information of	Media	5	15	1.445	4	0.836	9.49	NS
		Health Professional	43	84					
		Family members and relatives	0	0					
		Friends and neighbour	0	1					
8	Vaccination status	Yes	46	91	1.275	2	0.529	5.99	NS
		No	2	9					

---

Table 25 reveals that:

1. The calculated chi-square value (2.138) is less than the tabulated chi-square value (9.49) at 4 degrees of freedom and 0.05 level of significance. So, the null hypothesis is accepted. It proves that there is no significant association between pre-intervention practice score and age of subjects.
2. No statistics are computed because gender is a constant.
3. No statistics are computed because marital status is a constant.
4. No statistics are computed because religion is a constant.
5. The calculated chi-square value (5.481) is less than the tabulated chi-square value (5.99) at 2 degrees of freedom and 0.05 level of significance. So, the null hypothesis is accepted. It proves that there is no significant association between pre-intervention practice score and residential area of subjects.
6. No statistics are computed because previous knowledge about needle stick injury is a constant.
7. The calculated chi-square value (1.445) is less than the tabulated chi-square value (9.49) at 4 degrees of freedom and 0.05 level of significance. So, the null hypothesis is accepted. It proves that there is no significant association between pre-intervention practice score and sources of information of subjects.
8. The calculated chi-square value (1.275) is less than the tabulated chi-square value (5.99) at 2 degrees of freedom and 0.05 level of significance. So, the null hypothesis is accepted. It proves that there is no significant association between pre-intervention practice score and vaccination of subjects.

## RESULT

This study was conducted over a period of 4 weeks from 24-1-2024 to 23-2-2024 in Pt. B.D. Sharma PGIMS, Rohtak. The data was collected from 150 B.Sc. nursing 2nd year students who were studying in college of nursing PGIMS, Rohtak by using self-structured questionnaire and practice checklist. Nurse Led Programme was administered to the nursing students. Post-test was conducted after 7 days to assess the effectiveness of nurse led programme.

The study's findings have been discussed in relation to its objectives and compared with the results of other supporting studies.

### **The First Objective is to Assess the Knowledge and Practice Regarding Prevention of Needle Stick Injury Among B.Sc. Nursing 2nd Year Students**

The score of knowledge among nursing students was assessed. Out of 150 nursing students, 17% of subjects had inadequate knowledge, 81% had moderate adequate knowledge and 2% have adequate knowledge regarding prevention and post exposure prophylaxis of needle stick injury in pre-test. In the post-test, 0% of participants had inadequate knowledge, 10% had moderate knowledge, and 90% demonstrated adequate knowledge.

The practice scores of nursing students were evaluated. In the pre-test, 32% of the 150 nursing students displayed unsatisfactory practice, 67% had moderately satisfactory practice, and 1% exhibited satisfactory practice. In contrast, the post-test results showed that only 1% had unsatisfactory practice, 85% demonstrated moderately satisfactory practice, and 14% showed satisfactory practice.

A study on needle stick injury (NSI) knowledge, attitude, and practice among undergraduate medical students involved 450 participants from a medical college and tertiary hospital in a metropolitan city. Self-structured questionnaires were utilized and analysed using SPSS version 20. The average age of participants was 21.9 years. Findings revealed that 406 students were aware of diseases transmitted by NSI, with 189 identifying a Medicine Physician as the first person to contact in case of NSI occurrence. However, 208 students were unaware of post-exposure prophylaxis (PEP), and only 138 recognized PEP guidelines proposed by NACO or 101 by WHO. Most students (261) believed the emergency ward

presented the highest risk of NSI, and 363 emphasized the importance of NSI training before clinical exposure. Additionally, 345 students highlighted the need for healthcare worker insurance against diseases transmitted by NSI. The study underscores the vulnerability of medical students to NSI and highlights the imperative for comprehensive preventive measures and regular training on NSI and PEP for all healthcare workers.

Nursing students are particularly susceptible to needle stick injuries (NSIs) compared to other nurses, mainly due to their lack of experience and insufficient knowledge of occupational safety measures. A cross-sectional study was conducted with 400 nursing students to assess their knowledge, attitudes, and practices concerning the prevention of needle stick injuries (NSIs). The findings revealed that 67% of the nursing students had experienced at least one NSI during their internship. The most frequent causes of injury were the injection process, management of venous catheters, and disposal of various types of needle waste. Risk factors for NSIs included intentionally breaking needles after injection, recapping needles, and manually detaching needles from syringes. The study emphasizes the need to enhance occupational safety education and implement stricter regulations to prevent NSIs.

This study aimed to evaluate the knowledge of needle stick injury prevention guidelines and the incidence of needle stick injuries among students in PGIMS, Rohtak, Haryana. A cross-sectional online survey was conducted with 167 students from a government university. The findings showed an average knowledge score of 6.6 out of 10, and 18.2% of the students reported experiencing needle stick injuries, most commonly during medication preparation and administration. Recapping needles was identified as the leading cause of these injuries. The findings emphasize the need for enhanced infection control practices among nursing students and stress the importance of collaboration between academic and clinical settings to effectively tackle this issue.

### **The Second Objective is to Evaluate the Effectiveness of Nurse Led Programme on Needle Stick Injuries and its Prevention in Terms of Knowledge and Practice Among B.Sc. Nursing 2nd Year Students**

There was a significant improvement in the knowledge of nursing students, with their pre-test score rising from  $14.04 \pm 3.35$  to  $24.08 \pm 2.33$  after the nurse-led program. The calculated t-value of 39.407 indicated a substantial difference between the pre-test and post-test knowledge scores. Likewise, students' practices showed considerable improvement, with the pre-test score of  $7.29 \pm 1.56$  increasing to  $8.93 \pm 1.37$  in the post-test. The t-value for practice scores was 17.313, confirming a significant change in practice between the pre-test and post-test. The nurse-led program was highly effective in enhancing both the knowledge and practices of nursing students regarding the prevention and post-exposure prophylaxis of needle stick injuries.

### ***The Above Findings of the Study Were Supported by These Studies***

The World Health Report 2002 by WHO highlights the significant risk of needle stick injuries among healthcare workers, leading to infections such as Hepatitis B, Hepatitis C, and HIV/AIDS. Factors contributing to these injuries include overuse of injections, lack of disposable syringes, and insufficient training. Needle stick injuries not only endanger health workers but also cause emotional distress. Introducing health teaching programs is crucial to improving nurses' knowledge of safety procedures. A study involving 30 student nurses using a quasi-experimental design revealed that none had adequate knowledge of needle stick injuries, with 80% possessing moderate knowledge and 20% having inadequate knowledge.

### **The Third Objective is to Determine the Association Between Pre-test Knowledge and Practice Score with Selected Demographic Variables in Prevention of Needle Stick Injury**

The relationship between the pre-test knowledge level and the chosen socio-demographic variables was analysed using the chi-square test. None of the selected variables showed a statistically significant association with the pre-test knowledge scores.

---

## DISCUSSION

The aim of the present study was to assess the effectiveness of a nurse-led program on the knowledge and practices of B.Sc. Nursing students regarding the prevention and post-exposure prophylaxis of needle stick injuries at the College of Nursing, PGIMS, Rohtak.

This was a quantitative study conducted at the College of Nursing, PGIMS Rohtak, with a sample size of 150 B.Sc. Nursing students. The participants were selected using purposive sampling.

Data were collected using self-structured questionnaires and a checklist. The questionnaire consisted of three sections:

- Section A includes socio-demographic details such as age, gender, marital status, religion, residential area, prior knowledge of needle stick injuries, sources of information, and vaccination status.
- Section B consists of 30 multiple choice questions related to knowledge about prevention and post exposure prophylaxis of needle stick injury.
- Section C consists of 14 items regarding prevention of needle stick injury. Each correct response graded as 1 mark and incorrect response awarded 0 marks.

The prepared tool was validated by the subject's expert and reliability of the test was estimated by Spearman's brown Prophecy formula. The data obtained were analysed and interpreted in terms of the objectives of the study. Descriptive and inferential statistics were used for data collection.

### Key Findings Related to Socio-Demographic Variables

The results showed that 49% of the participants were in the age group of 19–20 years, while another 49% were older than 21 years. All participants were females and unmarried. Additionally, all participants were identified as Hindu. A majority, 53%, resided in rural areas. All participants (100%) had prior knowledge of needle stick injuries, with 96% having acquired this knowledge from healthcare professionals. Furthermore, 93% of the participants were vaccinated against hepatitis B.

### Key Findings on Knowledge and Practice in Pre-Test and Post-Test

In the pre-test, among the 150 nursing students, 17% had inadequate knowledge, 81% had moderate knowledge, and 2% had adequate knowledge regarding the prevention and post-exposure prophylaxis of needle stick injuries. In the post-test, 0% had inadequate knowledge, 10% had moderate knowledge, and 90% had adequate knowledge. Regarding practice, 32% of students had unsatisfactory practice, 67% had moderately satisfactory practice, and 1% demonstrated satisfactory practice in the pre-test. In the post-test, 1% had unsatisfactory practice, 85% had moderately satisfactory practice, and 14% had satisfactory practice.

### Key Findings on the Effectiveness of the Nurse-Led Program in Terms of Knowledge and Practice

There was a significant increase in the knowledge of nursing students, with the mean score rising from  $14.04 \pm 3.35$  in the pre-test to  $24.08 \pm 2.33$  in the post-test, as indicated by a t-value of 39.407. This suggests a significant improvement in knowledge after the nurse-led program. Similarly, students' practices improved significantly, with the mean score increasing from  $7.29 \pm 1.56$  in the pre-test to  $8.93 \pm 1.37$  in the post-test, supported by a t-value of 17.313. The results indicate that the nurse-led program was highly effective in enhancing both the knowledge and practice of nursing students regarding the prevention and post-exposure prophylaxis of needle stick injuries.

### Findings on the Association Between Pre-Test Knowledge and Practice Scores with Selected Socio-Demographic Variables

The chi-square test was used to analyse the relationship between pre-test knowledge scores and socio-demographic variables. However, no socio-demographic variables were found to have a statistically

significant association with the pre-test knowledge scores. However, the vaccination status of the students ( $\chi^2=7.187$ ,  $df=2$ ) was found to be significantly associated with the pre-test knowledge score at the 0.05 significance level.

Similarly, the association between pre-test practice scores and socio-demographic variables was analysed using the chi-square test. No significant relationships were found between the pre-test practice scores and the selected socio-demographic variables.

## **CONCLUSION**

Second-year B.Sc. Nursing students exhibited inadequate knowledge regarding the prevention and post-exposure prophylaxis of needle stick injuries. Therefore, it is recommended that regular lectures and proper supervision by faculty members and staff nurses in the clinical areas be implemented to enhance understanding of needle stick injury prevention and post-exposure management. The study concluded that the "nurse-led program" was effective in improving both the knowledge and practices of nursing students concerning the prevention and post-exposure prophylaxis of needle stick injuries.

## **Implication to Nursing**

The findings of the study have implications for nursing education, practice, administration and nursing research.

### ***Nursing Practice***

Nursing students are at a greater risk of sustaining sharps injuries. They carry out most of their time to provide direct patient care and undertake the majority of procedures that involve sharp devices, such as injections, manipulation and removal of intravascular devices. Nursing students can adopt measures and create awareness by understanding their own knowledge and practice level. In the field of nursing, nursing students can intervene effectively to create awareness regarding prevention and post exposure prophylaxis of needle stick injury.

### ***Nursing Education***

Nursing curriculum is mainly theory based and little is focused on practice, there is always a gap in between. Hence more emphasis should be given to conduct various education programmes to upgrade the knowledge of nursing students, which may help the nursing students to handle the sharp instruments in a better way. Nurse educators can focus on the importance of nursing students' knowledge and how to help them to create awareness and to increase practical efficiency.

### ***Nursing Administration***

It is important for the nurse administrator to facilitate programmes to improve the knowledge and practice of nursing students on prevention and post exposure prophylaxis of needle stick injury. Nurses as administrator should take great interest in formulating the policies and procedures for practice. The administrators should plan and organize educational program for nursing students, in order to prepare them to provide quality care and maintain their own health.

The nursing administrators should see the aspect of health promotion. Necessary administration support should be provided to conduct health education or written information to all the nursing students. Health education material such as leaflets and pamphlets should be made available to the nursing students.

### ***Nursing Research***

A profession seeking to improve the practice of its members and to enhance its professional strives for the continual development of a relevant body of knowledge. Professional contribution in nursing are convinced of the importance of nursing research as a major contribution of meeting the health of the nursing students.

By pursuing research, the nursing students could contribute towards enriching the knowledge about the efficiency of nursing intervention in relieving their difficulties. In western countries, many research studies have been done regarding prevention and post exposure prophylaxis of needle stick injury. But in India, very few studies have been done on knowledge and practice. So, the nursing leaders can motivate nursing student to do more research in this aspect.

### Recommendations

- A similar study can be conducted by using other strategies like self-instructional modules, planned teaching programmes etc.
- A comparative study can also be conducted by taking samples from any other government or private hospitals.
- A similar study can be conducted on nursing officers, interns and other paramedical staff.
- A similar study can be conducted on larger population to generalize the findings.
- A similar study can be conducted to assess the prevalence of needle stick injury.

### Limitations of the Study

- The study was confined to nursing students who are studying in college of nursing PGIMS, Rohtak.
- The study was confined to small number of subjects participating in the study.
- The period of data collection was limited to 4 weeks.
- The study was confined to nursing students who are willing to participate in the study.
- The study was limited only to assess the knowledge and practice of nursing students.
- The tool used for the data collection was structured. Hence the response were restricted.
- The intervention and assessment of the knowledge questions was done by the researcher.
- As there was no negative marking, there were chances of guessing to attend the questions in the knowledge questionnaire.

### REFERENCES

1. Wilburn SQ, Eijkemans G. Preventing needlestick injuries among healthcare workers: a WHO-ICN collaboration. *Int J Occup Environ Health*. 2004 Oct 1; 10(4): 451–6.
2. Wilburn SQ. Needlestick and sharps injury prevention. *Online J Issues Nurs*. 2004 Sep 30; 9(3): 5.
3. Waqar SH, ul Siraj M, Razzaq Z, Malik ZI, Zahid MA. Knowledge, attitude and practices about needle stick injuries in healthcare workers. *Pak J Med Res*. 2011 Jul 1; 50(3): 111–114.
4. Aziz AM. A change management approach to improving safety and preventing needle stick injuries. *J Infect Prev*. 2017 Sep; 18(5): 257–62.
5. Gupta A, Anand S, Sastry J, Krisagar A, Basavaraj A, Bhat SM, Gupte N, Bollinger RC, Kakrani AL. High risk for occupational exposure to HIV and utilization of post- exposure prophylaxis in a teaching hospital in Pune, India. *BMC Infect Dis*. 2008 Dec; 8: 142.
6. Abd El-Hay SA. Prevention of needle stick and sharp injuries during clinical training among undergraduate nursing students: Effect of educational program. *IOSR-J Nurs Health Sci*. 2015; 4(4): 19–32.
7. Juni MH, Amir Aiman M, Asma Nabilah A, Ng JH, Wong SJ, Ibrahim F. Perception regarding needle stick and sharp injuries among clinical year medical students. *International Journal of Public Health and Clinical Sciences (IJPHCS)*. 2015 Jan–Feb 2(1): 69–80. e-ISSN: 2289-7577.
8. Madhavan A, Asokan A, Vasudevan A, Maniyappan J, Veena K. Comparison of knowledge, attitude, and practices regarding needle-stick injury among health care providers. *J Family Med Prim Care*. 2019 Mar; 8(3): 840–845.
9. Makary MA, Al-Attar A, Holzmüller CG, Sexton JB, Syin D, Gilson MM, Sulkowski MS, Pronovost PJ. Needlestick injuries among surgeons in training. *New Engl J Med*. 2007 Jun 28; 356(26): 2693–9.

10. Abd-Ellatif Z, Radi F, Abdel Mowla H. Prevention of Needle Stick and Sharp Objects Injuries among Internship Nursing Students during their Clinical Exposure: An Educational Program at Assiut University Hospitals, Egypt. *J Nurs Health Sci*. 2018; 7(2): 93–100.
11. Zia M, Afzal M, Sarwar H, Waqua A, Gilani SA. Knowledge and Practice of Nurses about Needle Stick Injury at Lahore General Hospital. *Saudi J Med Pharma Sci*. 2017; 3(6B): 571–81.
12. Cheung K, Ching SS, Chang KK, Ho SC. Prevalence of and risk factors for needlestick and sharps injuries among nursing students in Hong Kong. *Am J Infect Control*. 2012 Dec 1; 40(10): 997–1001.
13. Vijay C, Joe A, Ramesh N. Knowledge of needle sticks injuries and its prevention among interns and post graduate students working at a tertiary health care centre, Bangalore. *Int J Community Med Public Health*. 2017 Jul; 4(7): 2443–8.
14. El-Hay A, Seham A, Abed Allah AK. Effect of Implementing Training Module on Competence of Internship Nursing Students Performance regarding Needle Stick and Sharp Injuries Safety Issues. *Tanta Sci Nurs J*. 2020 Nov 1; 19(1): 152–80.
15. Akyol A, Kargin C. Needle stick and sharp injuries among nurses. *Glob J Nurs Forensic Stud*. 2016; 1(4): 109.
16. Nawafleh HA, El Abozead S, Al Momani MM, Aaraj H. Investigating needle stick injuries: Incidence, knowledge and perception among South Jordanian nursing students. *J Nurs Educ Pract*. 2017 Nov; 8(4): 59–69.
17. Patel TC, Bagle TR, Maurya M, Sharma V. Knowledge, attitude and practice of needle stick injury and post exposure prophylaxis in undergraduate medical students. *Int J Basic Clin Pharmacol*. 2018 Jul; 7(7): 1297–1302.
18. Sardesai RV, Gaurkar SP, Sardesai VR, Sardesai VV. Awareness of needle-stick injuries among health-care workers in a tertiary health-care center. *Indian J Sex Transmit Dis AIDS*. 2018 Jul 1; 39(2): 107–10.
19. Sriram S. Study of needle stick injuries among healthcare providers: Evidence from a teaching hospital in India. *J Family Med Prim Care*. 2019 Feb 1; 8(2): 599–603.
20. Madhavan A, Asokan A, Vasudevan A, Maniyappan J, Veena K. Comparison of knowledge, attitude, and practices regarding needle-stick injury among health care providers. *J Family Med Prim Care*. 2019 Mar 1; 8(3): 840–5.
21. Shil R, Upashe SP. Nursing students knowledge regarding needle stick injury: Effectiveness of structured teaching plan. *Int. J. Med. Health Res*. 2020; 6(12): 159–163.
22. Bouya S, Balouchi A, Rafiemanesh H, Amirshahi M, Dastres M, Moghadam MP, Behnamfar N, Shyebak M, Badakhsh M, Allahyari J, Al Mawali A, Ebadi A, Dezhkam A, Daley KA. Global Prevalence and Device Related Causes of Needle Stick Injuries among Health Care Workers: A Systematic Review and Meta-Analysis. *Ann Glob Health*. 2020 Apr 6; 86(1): 35. doi: 10.5334/aogh.2698. PMID: 32346521; PMCID: PMC7181946.
23. Singh S. A pre-experimental study to assess the effectiveness of structured teaching programme regarding knowledge of needle stick injury and its prevention among nursing students in selected nursing Institutes Faridabad, Haryana. *Int J Sci Healthcare Res*. 2020 Apr; 5(2): 407–12.
24. El-Hay A, Seham A, Abed Allah AK. Effect of Implementing Training Module on Competence of Internship Nursing Students Performance regarding Needle Stick and Sharp Injuries Safety Issues. *Tanta Sci Nurs J*. 2020 Nov 1; 19(1): 152–80.
25. Ibrahim S, Salem N, Soliman S. Assessment of Safe Injection Practices and Needlestick Injury Among Nursing Students at Mansoura University. *Mansoura Nurs J*. 2021 Jan 1; 8(1): 59–76.
26. Khurshid MA, Parveen MA, Amin R, Rashid MN, Suhaib M, Ellahie N, Manzoor MB, Arshida M. A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Prevention of Needle Stick Injury among 1st Year B. Sc Nursing Students of Syed Mantaqi Memorial College of Nursing and Medical Technology Awantipora Kashmir. *Int J Eng Res App*. 2021; 1(9): 55–61.
27. AlJohani A, Karuppiah K, Al Mutairi A, Al Mutair A. Narrative review of infection control knowledge and attitude among healthcare workers. *J Epidemiol Glob Health*. 2021 Mar; 11(1): 20–25.

28. Wang D, Anuwatnonthakate A, Nilvarangkul K. Knowledge attitude and practice regarding prevention of needle stick injuries among nursing students in Henan province, China. *J Pak Med Assoc.* 2021 Oct 1; 71(10): 2420–2422.
29. Aswin PS, Vikranth V. Knowledge, Attitude, and Practices towards Needle Stick Injuries among Students and Staff in a Tertiary Medical Centre in Chennai, Tamil Nadu, India. *J Pharm Res Int.* 2021 Nov 5; 33(48A): 33–40.
30. Al Qadire M, Ballad CAC, Al Omari O, Aldiabat KM, Shindi YA, Khalaf A. Prevalence, student nurses' knowledge and practices of needle stick injuries during clinical training: a cross-sectional survey. *BMC Nurs.* 2021 Oct 4; 20(1): 187. doi: 10.1186/s12912-021-00711-2. PMID: 34607585; PMCID: PMC8491365.
31. Hassanipour S, Sepandi M, Tavakkol R, Jabbari M, Rabiei H, Malakoutikhah M, Fathalipour M, Pourtaghi G. Epidemiology and risk factors of needlestick injuries among healthcare workers in Iran: a systematic reviews and meta-analysis. *Environ Health Prev Med.* 2021 Apr 1; 26(1): 43. doi: 10.1186/s12199-021-00965-x. PMID: 33794759; PMCID: PMC8015057.
32. Datar UV, Kamat M, Khairnar M, Wadgave U, Desai KM. Needlestick and sharps" injury in healthcare students: Prevalence, knowledge, attitude and practice. *J Family Med Prim Care.* 2022 Oct 1; 11(10): 6327–33.
33. Huang J, Li N, Xu H, Liu Y, An N, Cai Z. Global prevalence, risk factors, and reporting practice of needlestick and sharps injuries among dental students: a systematic review and meta-analysis. *J Hosp Infect.* 2022 Nov; 129: 89–101. doi: 10.1016/j.jhin.2022.06.015. Epub 2022 Jul 1. PMID: 35781020.
34. Sharma MK, Mohammad T. Effectiveness of educational program on knowledge regarding needle stick injuries among nursing students. *World Journal of Advanced Research and Reviews (WJARR).* 2023; 18(1): 684–9.
35. Irshad R, Ateeb M, Bibi A, Asif M, Jabbar S. Assessment of Knowledge and practice about needle stick injury among nurses at Nishtar hospital in Multan; A hospital based cross-sectional study. *International Journal of Natural Medicine and Health Sciences.* 2023 Mar 30; 2(2): 27–34.
36. Rabuya Khatun, Ashik-Ur-Rahman SAM, Apu Chandra Shaha. Knowledge Regarding Needle Stick Injury & use of Personal Protective Equipment among Nurses at Dhaka Medical College Hospital, Dhaka. *International Journal of Medical Science and Clinical Research Studies.* 2023; 3(3): 373–379. <https://doi.org/10.47191/ijmscrs/v3-i3-18>
37. Ali M, Bibi A, Khan J, Arshad S, Durdana M, Musafir Y. Student Nurses Knowledge of Needle Stick Injuries at a Private Institute, Karachi: Nurses Knowledge of Needle Stick Injuries. *Pak J Health Sci-Lahore.* 2023 Apr 30; 4(04): 79–83. [Internet] Available from: <https://www.thejas.com.pk/index.php/pjhs/article/view/662> [cited 2025 Feb. 4]
38. Al-Mugheed K, Farghaly SM, Baghdadi NA, Oweidat I, Alzoubi MM. Incidence, knowledge, attitude and practice toward needle stick injury among nursing students in Saudi Arabia. *Front Public Health.* 2023 May 4; 11: 1160680. doi: 10.3389/fpubh.2023.1160680. PMID: 37213613; PMCID: PMC10192570.
39. Yazid J, Yaakub RM, binti Yusof S, Wilandika A. Knowledge, Attitude, and Practices towards Needle-stick Injuries among Nurses in a Public Hospital, Malaysia. *Environment-Behaviour Proceedings Journal (E-BPJ).* 2023 May 19; 8(24): 221–8.
40. Khan R, Pari B. Impact of Needle Stick Injuries on Student Nurses at Kth Hospital, Peshawar, Pakistan. *Quantum Journal of Social Sciences and Humanities (QJSSH).* 2023 Aug 28; 4(4): 268–76.
41. Qaisar A, Akram S, Khalid T, Alvi S, Masood M. Frequency of Needlestick and Sharp Injuries, Their Associated Risk Factors and Safety Measures among Healthcare Workers of Fauji Foundation Hospital, Rawalpindi. *Journal of Health and Rehabilitation Research (JHRR).* 2024 Feb 11; 4(1): 548–53.
42. Othman AH, Nur Adneen Muhammad Zan, Nur Athirah Zairin, Nur Fadhlina Abd Rahim, Lakshmi Sivashunmugam. Knowledge, Attitude, And Practice About Needle Stick Injury Towards Prevention And Management Among Clinical Students At Private University In Cyberjaya,

- Malaysia. *Glob J Public Health Med.* 2024 Mar 1; 6(1): 988–9. [Internet]. Available from: <https://www.gjphm.org/index.php/gjphm/article/view/248> [cited 2025 Feb. 4]
43. Anandadurai D, Praisie R, Venkateshvaran S, Nelson SB, Thulasiram M. Awareness, Perception, and Practice Regarding Needle-Stick Injury and Its Prevention Among Healthcare Workers in a Tertiary Care Hospital in Southern India. *Cureus.* 2024 Mar 8; 16(3): e55820. doi: 10.7759/cureus.55820. PMID: 38590462; PMCID: PMC10999507.
44. Osadolor Aiseosa Jr, Ugwoke GE, Obazee OC, *et al.* The Prevalence, Predictors, and Knowledge, Attitudes, and Practices Concerning Percutaneous Exposure Incidents among Healthcare Workers and Students in Africa: A Narrative Review. 2024 Jan 26. PREPRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-3897147/v1>]