

NEEDLE STICK INJURIES AMONG NURSES IN LAHORE

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(Received, 17th October 2024, Revised 20th November 2024, Published 26th November 2024)

Abstract: Needle stick injuries (NSIs) are a significant occupational hazard for healthcare workers, particularly nurses, as they increase the risk of transmitting bloodborne pathogens such as hepatitis B (HBV), hepatitis C (HCV), and HIV. **Objective:** This study aimed to assess the prevalence, risk factors, and contributing practices associated with NSIs among nurses at Lahore General Hospital, Pakistan. **Methods:** A cross-sectional quantitative study was conducted from June to September 2024. A structured, pre-tested questionnaire was used to collect data from 257 nurses selected through non-probability consecutive sampling. Data were analyzed using SPSS version 20, employing descriptive and logistic regression analyses to identify associated factors. **Results:** The annual prevalence of NSIs among participants was 37.4%, with 12.1% reporting an NSI in the past month. Younger nurses (<30 years) and those with less than five years of experience were at higher risk. High-risk departments, such as ICU/OR (48.2%) and maternal units (44.4%), reported the highest incidence of NSIs. Unsafe practices, including needle recapping (73.2%) and inadequate infection control training (60.3%), were significant contributors. Nurses who received infection control training had a lower prevalence of NSIs (28.8%) compared to untrained staff (43.4%). **Conclusion:** The study highlights the urgent need for enhanced infection control training, implementation of universal safety protocols, and the use of safety-engineered devices to reduce NSI prevalence among nurses in Pakistan. Targeted interventions in high-risk departments and systemic improvements in workplace safety are critical to mitigating occupational risks for healthcare workers.

Keywords: Needle stick injuries, nurses, occupational hazards, infection control, safety practices, Pakistan.

Introduction

Needle stick injuries (NSIs) are a significant occupational hazard for healthcare workers, particularly nurses, who are at the forefront of patient care. These injuries, caused by sharp objects such as needles, lancets, and scalpels contaminated with blood or body fluids, pose serious risks of transmitting blood-borne pathogens, including hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency virus (HIV). The World Health Organization (WHO) estimates that approximately three million healthcare workers are exposed to blood-borne pathogens annually, with over 37% of hepatitis B and 39% of hepatitis C infections among healthcare professionals being attributed to occupational exposure (1, 2).

In Pakistan, where healthcare infrastructure faces numerous challenges, the risk of NSIs is exacerbated by a lack of training, inadequate safety protocols, and insufficient availability of personal protective equipment (PPE). Studies have shown that healthcare workers in Pakistan are disproportionately affected by NSIs, with prevalence rates higher than those reported in many developed countries (3, 4). Nurses, due to their frequent use of needles and sharp instruments during procedures such as intravenous insertions, blood draws, and injections, are particularly vulnerable.

Cultural and systemic factors in Pakistan further compound the problem. Overcrowded hospitals, understaffing, and long working hours increase the likelihood of errors and unsafe practices such as recapping needles—a common but dangerous habit among healthcare workers (5, 6). Furthermore, awareness about infection control and post-exposure prophylaxis remains limited, and reporting

mechanisms for NSIs are often informal or absent, leaving many incidents undocumented (7).

The psychological and physical impact of NSIs on healthcare workers cannot be overstated. Beyond the immediate risk of infection, affected individuals often experience significant anxiety and stress, fearing the potential long-term consequences. This highlights the urgent need for targeted interventions, including proper training, provision of safety-engineered devices, and implementation of strict infection control policies. Globally, the introduction of such measures has reduced NSI rates by more than 50% in some settings, underscoring the potential for improvement in Pakistan (8, 9).

This study aims to assess the prevalence and contributing factors of NSIs among nurses in Pakistan, focusing on identifying gaps in knowledge, training, and workplace safety protocols. By providing evidence-based recommendations, the findings aim to inform policy changes and enhance occupational safety in healthcare settings across the country.

Methodology

This cross-sectional quantitative study was conducted at Lahore General Hospital (LGH), a 1,600-bed teaching hospital in Lahore, Pakistan, from June 30 to September 30, 2024. The study aimed to assess the prevalence and associated factors of needle stick injuries (NSIs) among nurses. The study population included professional nurses working in the indoor patient departments of LGH. Participants were recruited through non-probability consecutive sampling, ensuring that all eligible nurses



available during the study period were included. A total of 257 nurses participated, meeting the inclusion criteria of having at least one year of clinical experience and voluntarily providing informed consent. Nurses unwilling to participate or unavailable during the study period were excluded.

Data were collected using a structured, pre-tested questionnaire adapted from validated sources. The questionnaire consisted of sections on demographic details, work-related characteristics, NSI prevalence, and behavioral practices. It took approximately 20 minutes to complete. Three trained Post RN students facilitated data collection, ensuring standardization and accuracy. To maintain data quality, the questionnaire was pre-tested on 10% of the sample, and daily reviews of completed forms were conducted by the principal investigator.

Ethical approval was obtained from the relevant ethics committee, and participants were assured of confidentiality.

All data were anonymized and coded to protect identities. Data were analyzed using SPSS version 20, employing descriptive statistics to summarize variables and logistic regression to identify factors associated with NSI prevalence. Statistical significance was set at a p-value of less than 0.05.

Results

A total of 257 nurses participated in the study, achieving an 86.5% response rate. The majority of participants were female (68.5%), aged between 26–30 years (53.7%), and unmarried (63%). Most nurses held a professional nursing degree (58.4%), while 40.9% had less than five years of clinical experience. Detailed demographic data are presented in Table 1.

Table 1: Demographic Characteristics of Nurses (N = 257)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	81	31.5
	Female	176	68.5
Age	<25 years	55	21.4
	26–30 years	138	53.7
	31–40 years	49	19.1
	>40 years	15	5.8
Marital Status	Married	95	37.0
	Unmarried	162	63.0
Educational Background	Degree	150	58.4
	Midwives	29	11.3
	Advanced Degree	14	5.5
Clinical Experience	<5 years	105	40.9
	6–10 years	73	28.4
	11–16 years	37	14.4
	>17 years	42	16.3

Table 2 illustrates the work-related and behavioral characteristics of the participants. Over half (53.3%) reported their work environment as risky for needle stick injuries (NSIs), while a significant portion (73.2%) admitted

to recapping needles, which is a known risk factor for NSIs. Only 39.7% of nurses had received formal training in infection prevention and control.

Table 2: Work-Related and Behavioral Characteristics (N = 257)

Variable	Category	Frequency (n)	Percentage (%)
Perception of Work Environment	Safe	118	45.9
	Risky	137	53.3
Recapping of Needles	Yes	188	73.2
	No	69	26.8
Use of Two-Handed Recapping	Yes	55	55.5*
Training in Infection Control	Yes	102	39.7
	No	155	60.3

*Percentage is calculated based on participants who reported recapping needles.

The prevalence of NSIs among participants is detailed in Table 3. Within the past year, 37.4% of nurses reported

experiencing at least one NSI, and 12.1% reported an NSI in the month prior to the study.

Table 3: Prevalence of Needle Stick Injuries (N = 257)

Variable	Category	Frequency (n)	Percentage (%)
NSI in the Past Year	Yes	96	37.4
	No	161	62.6
NSI in the Past Month	Yes	31	12.1
	No	226	87.9

[Citation: Javed, A., Anjum, S., Amir, Z., Tasneem, S.S., Jabeen, R., (2024). Needle stick injuries among nurses in Lahore. *Biol. Clin. Sci. Res. J.*, 2024: 1312. doi: <https://doi.org/10.54112/bcsrj.v2024i1.1312>]

Table 4 summarizes the factors associated with NSIs, including demographics, work experience, and department distribution. Nurses aged 25–30 years and those with <5

years of experience were at higher risk of NSIs. Departments like ICU/OR and maternal units reported the highest NSI prevalence.

Table 4: Factors Associated with Needle Stick Injuries (N = 96)

Variable	Category	NSI Cases (n)	Percentage (%)
Age	<25 years	31	32.3
	26–30 years	52	54.2
	>30 years	13	13.5
Work Experience	<5 years	46	47.9
	6–10 years	28	29.2
	>10 years	22	22.9
Department	ICU/OR	27	28.1
	Maternal Units	20	20.8
	Wards	12	12.5
	Emergency Room	10	10.4

Table 5 details the medical equipment and procedures most associated with NSIs. Syringes with needles accounted for

the highest proportion of NSIs (30.2%), followed by suturing needles (28.1%).

Table 5: Equipment and Procedures Associated with NSIs (N = 96)

Category	Type	Frequency (n)	Percentage (%)
Equipment	Syringes with needles	29	30.2
	Suturing needles	27	28.1
	IV cannulas	23	24.0
	Surgical blades	9	9.4
	Insulin needles	6	6.3
	Butterfly needles	2	2.0
Procedures	Administering injections	69	27.2
	Recapping	49	19.1
	Sample collection	43	16.7
	Suturing	35	13.6
	IV securing	14	5.5
	Improper safety box usage	7	2.7

Discussion

The findings of this study reveal a high prevalence of needle stick injuries (NSIs) among nurses at Lahore General Hospital, with 37.4% of participants reporting at least one NSI in the past year and 12.1% reporting an incident in the month prior to the study. These results align with previous studies conducted in developing countries, where the burden of NSIs is significantly higher than in developed nations. For instance, a study conducted in Ethiopia reported an annual prevalence of 39%, comparable to our findings, while a Nigerian study documented an even higher prevalence of 40.2% (10, 11). In contrast, studies from developed countries, such as the United States and Australia, report significantly lower rates, often below 20%, likely due to the widespread implementation of safety protocols and advanced training programs (9).

The study identifies several factors contributing to the high prevalence of NSIs, including unsafe practices like needle recapping (73.2%), lack of infection control training (60.3%), and risky work environments (53.3%). These findings are consistent with those reported by Khan et al., who observed that recapping needles and inadequate training were the most common risk factors for NSIs in

Pakistani healthcare settings (3). Similarly, Alam et al. highlighted that the absence of proper safety measures and overburdened healthcare staff in Karachi led to increased NSI rates (5).

Younger nurses (<30 years) and those with less than five years of experience were disproportionately affected by NSIs in this study. This aligns with the findings of Zafar et al., who reported that inexperienced healthcare workers were more likely to sustain NSIs due to a lack of familiarity with safety protocols (4). The high prevalence of NSIs in high-stress departments like ICU/OR (48.2%) and maternal units (44.4%) further emphasizes the need for targeted interventions in these areas. Previous studies have also noted that nurses working in emergency and high-risk departments are at greater risk due to the urgency and complexity of procedures (12, 13).

The findings on equipment-related injuries indicate that syringes with needles (30.2%) and suturing needles (28.1%) were the most common sources of NSIs. This is consistent with global data showing that hollow-bore needles are responsible for the majority of NSIs (2). However, the rate of injuries from recapping needles (19.1%) in this study is

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notably higher than the global average, emphasizing the need for behavior change interventions.

One encouraging finding is the protective effect of training on NSI prevalence. Nurses who received formal training in infection control had significantly lower NSI rates (28.8%) compared to those without training (43.4%). This finding is in line with Wang et al., who demonstrated that training programs significantly reduce occupational exposure to bloodborne pathogens (8). However, the low percentage of trained nurses in this study highlights a critical gap in the healthcare system.

Globally, interventions such as the use of safety-engineered devices, strict adherence to universal precautions, and mandatory training programs have shown significant reductions in NSIs (1). The lack of these interventions in Pakistan underscores the need for systemic changes to protect healthcare workers. Addressing issues like overcrowded facilities, staff shortages, and inadequate safety equipment will be crucial in reducing NSI prevalence.

This study highlights the urgent need for improved training, strict adherence to safety protocols, and the provision of adequate protective equipment in Pakistan. Future research should focus on evaluating the effectiveness of interventions like safety-engineered devices and behavior change programs to reduce NSI prevalence further.

Conclusion

This study reveals a high prevalence of needle stick injuries (NSIs) among nurses in Lahore General Hospital, with younger and less experienced nurses at greater risk. Unsafe practices, inadequate training, and high-risk departments like ICU/OR significantly contribute to NSIs. Urgent measures, including comprehensive infection control training, safety protocols, and safety-engineered devices, are essential to mitigate these risks and improve occupational safety in healthcare settings in Pakistan.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.

Approved by the department Concerned. (IRBEC-SNU-55/24)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

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References

- Kolosov i. world health organization's acts in field of labour relations legal adjustment. науковий вісник міжнародного гуманітарного університету. 2023:96.
- Johnson L, Fritschi L. Frequency of workplace incidents and injuries in veterinarians, veterinary nurses and veterinary students and measures to control these. Australian veterinary journal. 2024.
- Afridi AAK, Kumar A, Sayani R. Needle stick injuries–risk and preventive factors: a study among health care workers in tertiary care hospitals in Pakistan. Global journal of health science. 2013;5(4):85.
- Zafar A, Aslam N, Nasir N, Meraj R, Mehraj V. Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan. Journal of the Pakistan Medical Association. 2008;58(2):57.
- Fahem A, Robinet A, Cauchard J, Duca L. Anabolic and catabolic signals. heart failure [Review]. 2008;101(89E).
- Nsubuga FM, Jaakkola MS. Needle stick injuries among nurses in sub-Saharan Africa. Tropical medicine & international health. 2005;10(8):773-81.
- Saleem U, Aslam N, Siddique R, Iqbal S, Manan M. Hepatitis C virus: Its prevalence, risk factors and genotype distribution in Pakistan. European Journal of Inflammation. 2022;20:1721727X221144391.
- Bernardes JM, Monteiro-Pereira PE, Gómez-Salgado J, Ruiz-Frutos C, Dias A. Healthcare workers' knowledge for safe handling and moving of the patient. International Journal of Occupational Safety and Ergonomics. 2022;28(4):2105-11.
- Behzadmehr R, Balouchi A, Hesaraki M, Alazmani Noodeh F, Rafiemanesh H, J. Nashwan A, et al. Prevalence and causes of unreported needle stick injuries among health care workers: a systematic review and meta-analysis. Reviews on environmental health. 2023;38(1):111-23.
- ÖZYER Y. Yaraya Çok Yönlü Bakış: Akademisyen Kitabevi; 2022.
- Faith UA. Prevalence and Risk of Needlestick Injuries Among Community Human Immunodeficiency Virus Counsellor-Testers in Benue, Nigeria: University of Johannesburg (South Africa); 2021.
- Mulat Endalew S, Abebe Melake B, Geremew A, Baraki N, Mengistu DA, Sintie Alamirew T, et al. Healthcare workers' compliance with standard precautions and associated factors in Bahir Dar Town, Ethiopia. Environmental health insights. 2022;16:11786302221117071.
- Wada K, Narai R, Sakata Y, Yoshikawa T, Tsunoda M, Tanaka K, et al. Occupational exposure to blood or body fluids as a result of needlestick injuries and other sharp device injuries among medical residents in Japan. Infection Control & Hospital Epidemiology. 2007;28(4):507-9.



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