

INVESTIGATING THE ASSOCIATION BETWEEN NURSES' KNOWLEDGE OF NEEDLESTICK INJURIES AND THEIR ATTITUDES TOWARDS NSI PREVENTION AND MANAGEMENT: CORRELATES OF ATTITUDES

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ABSTRACT

Needlestick injuries remain a significant occupational hazard for nurses and other healthcare professionals due to their direct exposure to bloodborne pathogens such as Hepatitis B (HBV), Hepatitis C (HCV), and Human Immunodeficiency Virus (HIV). These injuries not only affect the physical and psychological health of nurses but also compromise the safety of the healthcare environment, there is an urgent need for efficient preventative strategies and educational initiatives to lower these risks. The aim of this study was to assess the association of nurses' knowledge regarding the causes, risk factors and appropriate management of NSI. A quantitative correlational research design was used to find the association between nurse' knowledge regarding needle stick injuries and their attitude towards its management. The study sample consisted of 51 nurses working in high-risk departments such as emergency wards. A structured questionnaire was administered to evaluate baseline knowledge. All the ethical guidelines were fulfilled using BERA framework. The collected data was analyzed on IBM SPSS version 21. The value of r , $r=0.725$, $p<0.001$ showing that there is a strong significant relationship and strong linear relationship between nurses 'knowledge of needle stick injury and their management attitude of NSI. The study concluded how mandatory it is to escalate the understanding and knowledge of nurses regarding NSI.

INTRODUCTION

Accidental skin-piercing wounds brought on by sharp objects in a medical setting are known as Needlestick and Sharp Injuries (NSIs) (Garg, 2025). A needle or another "sharp," such as a glass or scalpel, may cause a skin break (Palloş, 2024). Needlestick injuries occur

when the skin is inadvertently broken by a sharp item, such as a needle, syringe, or blade (Haji R. M., 2024). A needlestick injury can expose you to harmful substances like medications, narcotics, or chemicals, or blood-borne viruses including HIV,

hepatitis B, and hepatitis C (Hakeem, 2025). The severity, infection risk, and exposure type of needlestick injuries can all be used to categorize them. The three levels of severity are superficial, moderate, and severe; superficial injuries result in little to no bleeding, moderate injuries involve some bleeding, and severe injuries involve extensive bleeding or deep penetration (Jodhani, 2024). Factors such as the volume of blood conveyed and the source's bloodborne pathogen status (e.g., HIV, hepatitis B, hepatitis C) affect the risk of infection (Aziz, 2025). Both mucocutaneous (contact with mucous membranes or non-intact skin) and percutaneous (through the skin) exposure are possible.

Numerous workplace risks that can seriously affect nurses' health and safety are faced by healthcare professionals (Almaazmi, 2024). These risks, which can result in severe illnesses and injuries, include biological, chemical, ergonomic, and psychosocial ones (Knecht, 2024). To safeguard these employees and improve their working circumstances, effective mitigation techniques are necessary (Maher, 2024). Needlestick injuries and contact with contaminated materials can expose healthcare personnel to blood-borne diseases (Wang, 2025). Approximately two million healthcare workers experience sharps injuries annually, with prevalence rates of 10% to 30% in surgical and intensive care settings (Garus-Pakowska, 2024; Haji, 2024). Exposure to dangerous pharmaceuticals and chemicals can happen, especially in places where drugs are made or given (Colopi, 2024). Risks can be considerably decreased with regular training on safety procedures and how to handle hazardous items. Using the proper PPE, such as masks and gloves, can assist guard against chemical and biological exposures (Wang W. S., 2025). Workstation adjustments and ergonomic tool provision might lessen mental and physical strain (Kamala, 2025). The general well-being of employees can be enhanced by creating a supportive culture that tackles psychological dangers, such as stress management initiatives and channels for reporting violent incidents (Syahir, 2025).

Healthcare professionals, especially nurses, are at serious risk from needlestick injuries (NSIs), yet current reporting and treatment procedures have serious flaws that make it difficult to create effective

interventions (Zarei, 2025). These discrepancies are caused by underreporting, inconsistent data collecting, and a lack of knowledge about the dangers of NSI (Alabdli, 2024). Improving safety procedures and lowering injury rates require addressing these problems (Wong, 2025). Because of time restrictions or fear of consequences, many healthcare staff choose not to report NSIs (Richards-Edwards, 2025). An estimated 100,000 injuries in the UK alone are probably an underestimate, and estimates indicate that actual incidents may be much higher than those reported (Finkelstein, 2025; Åberg, 2024). Accurate data gathering is further complicated by the absence of mandated reporting obligations. The majority of the material currently in publication concentrates on hospital contexts, ignoring other settings with potentially distinct risk profiles, such as clinics and nursing homes. To create a trustworthy baseline for interventions, consistent techniques for recording NSIs in diverse healthcare settings are required (Alshammari, 2025). Inconsistent reporting and response procedures result from a lack of knowledge among many healthcare professionals regarding the dangers and management of NSIs (Zarei, 2025).

Healthcare workers' (HCWs') general well-being is greatly impacted by the long-term psychological effects of non-specific incidents (NSIs) (Masood, 2024). According to research, health care workers suffer from elevated levels of stress, anxiety, depression, and burnout (Cates, 2024). These psychological issues jeopardize patient safety and care quality in addition to having an impact on their mental health (Amodu, 2025). Rate of Mental health, according to studies, 41% of HCWs reported having depression, and nearly 50% reported having anxiety symptoms (Habtu, 2024). According to longitudinal evaluations, burnout rates rose over time, with 40.8% of healthcare workers displaying symptoms at the 18-month mark (Abushamat, 2024). Feelings of undervaluation are exacerbated by heavy workloads and inadequate support, which might result in early retirement and job transfers (Brophy, 2024). Improving the psychological well-being of healthcare workers requires effective interventions including mental health support and flexible work schedules, which leads to better implementation of NSIs and other occupational hazards (Abbas, 2024).

Research objectives

To assess the relationship between nurses' level of knowledge and the incidence of needlestick injuries (NSIs) and their management practices in a tertiary care hospital.

Research hypothesis:

H0: There is no significant association between nurses' level of knowledge regarding needlestick injury and their attitude towards needlestick injury.

H1: There is a significant positive association between nurses' level of knowledge regarding needlestick injury and their attitude towards needlestick injury.

Problem Statement

Needlestick injuries (NSI's) are a persistent and serious occupational hazard in healthcare settings, particularly among nurses, who are the most frequently exposed group due to their direct contact with needles and other sharp instruments. According to the World Health Organization (WHO), approximately 3 million healthcare workers are exposed to percutaneous injuries annually, placing them at risk for infections such as Hepatitis B, Hepatitis C, and HIV (WHO, 2020). In Pakistan and other developing countries, underreporting, lack of awareness, and poor post-exposure practices further exacerbate the problem (Khan et al., 2019). Despite the availability of post-exposure prophylaxis (PEP) and institutional protocols, studies indicate that many nurses lack adequate knowledge regarding the appropriate steps to take following an NSI, including first aid, reporting mechanisms, and follow-up procedures (Farazi et al., 2021). This gap in knowledge leads to delayed or inappropriate responses, increasing the likelihood of infection transmission and long-term health consequences. Educational interventions have been shown to significantly improve nurses' awareness and practices

related to NSI prevention and management (Rahman et al., 2022). However, there is limited data in the context of tertiary care hospitals in Pakistan assessing the effectiveness of such training. Therefore, this study aims to address the critical need to evaluate and enhance nurses' knowledge through a structured educational program, ultimately aiming to reduce the incidence of NSI's and promote a safer working environment for healthcare professionals.

Literature Review:

Theoretical Framework:

To comprehend and encourage participation in health-protective behaviors, the HBM is frequently utilized in public health initiatives and health behavior research. Social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal created the HBM at the US Public Health Service in the 1950s. HBM aligns with the research objective as research deals with risks of NSI among nurses and the association of their knowledge of NSI with their attitude of management and prevention. A psychological framework called the health belief model (HBM) is used to forecast and explain people's potentially harmful attitudes, behaviors, and beliefs regarding their health (Mokhtari, 2025). The concept, which was created in the 1950s by social psychologists working for the US Public Health Service, looks at how behavior is influenced by beliefs about one's vulnerability to disease, the seriousness of medical disorders, the advantages of preventative treatment, and the obstacles to receiving healthcare (Dsouza, 2025). Programs for disease prevention, early detection, and health promotion are among the many health behaviors that the HBM is used to comprehend and impact. By addressing the particular perceptions that shape a person's decisions regarding their health, it aids in the customization of interventions.

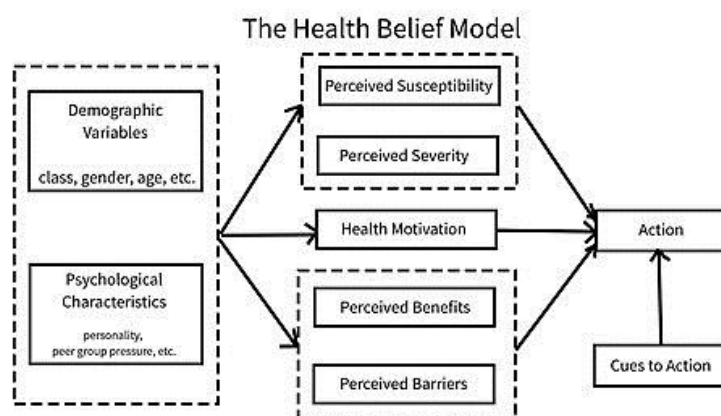


Fig 1: Health Belief Model

Role of Nurses in NSI Prevention and Management:

To prevent and treat needle stick injuries (NSIs), which present serious health risks to healthcare professionals, nurses are essential (Zarei, 2025). Their participation includes instruction, following safety procedures, and reacting quickly to situations. To ensure that all staff members are aware of optimal practices, nurses play a crucial role in educating their peers about NSI risks and prevention techniques (Turchioe, 2025). 88% of nurses have sufficient knowledge and abilities, according to training programs that increase their understanding of NSIs, yet some still do not follow the right procedures (Hakeem, 2025). Strict adherence to safety procedures, such as using personal protective equipment (PPE) and disposing of needles appropriately, is a component of effective nursing practices (Naeem, 2025). The implementation of infection control measures, which considerably lower the prevalence of hospital-acquired infections and NSIs, is the responsibility of nurses (Zou, 2025). Nurses are prepared to provide emergency care in the event of an NSI, which includes reporting the occurrence and adhering to post-exposure procedures to reduce health risks (Alabdli, 2024). Being the initial responders in clinical settings, they play a critical role in monitoring and managing complications from NSIs (Zarei, 2025). Although NSI prevention must be the first priority, it's also critical to acknowledge that structural problems, such as a lack of staff and insufficient training, can make it more difficult for nurses to manage these injuries

(Chari, 2024). Improving workplace safety requires addressing these issues. In healthcare settings, nurses' attitudes and expertise regarding needle-stick injuries (NSIs) have a big impact on how safety procedures are carried out and how well patients are protected (Asmar, 2025). Strong knowledge of safety procedures is linked to improved protocol adherence, which eventually improves patient safety, according to research.

Research indicates that nurses who possess a solid understanding of patient safety, especially NSIs, are more likely to put safety procedures into practice (Zarei, 2025; Alshammari, 2025). Better adherence to safety procedures is associated with more positive sentiments regarding patient safety (Kagan, 2025). The Value of Training Enhancing nurses' knowledge and attitudes requires ongoing education and training (Zhang, 2025). It has been demonstrated that NSI and safety protocol-focused programs improve nurses' knowledge and behavior (Bruce, 2025). Age and previous patient safety education were found to be significant determinants of positive attitudes, indicating that focused training can improve safety results (Alsobou, 2025).

Consequences of Needle Stick Injuries:

Needle stick injuries (NSIs) can spread blood-borne infections like HIV, hepatitis B (HBV), and hepatitis C (HCV), they provide serious short- and long-term health concerns to healthcare workers (HCWs) (Jassem, 2025). Nurses and housekeeping employees are the most afflicted groups, and these injuries are common in healthcare settings (Mahendran, 2025).

The risk of infection and the psychological effects of possible exposure to deadly diseases are among the acute health repercussions (Xu, 2025). Chronic infections and the related health issues may have long-term effects (Basaca, 2025). Immediate exposure to blood-borne infections can result from NSIs (Aziz, 2025). According to studies, a sizable portion of the needles used in NSIs are tainted with HIV, HBV, or HCV, making prompt post-exposure prophylaxis (PEP) necessary to reduce the risk of infection (Hakeem, 2025; Alshammari, 2025). HCWs' mental health may be impacted by the stress and anxiety brought on by a possible infection, which may have an effect on their general well-being and productivity at work. Chronic health problems may result from an infection like cirrhosis, liver damage, or even liver cancer can be brought on by chronic hepatitis (G'ofurjonov, 2025). Chronic health conditions may make it difficult for healthcare workers to carry out their responsibilities, which may result in early retirement or career adjustments (Anestina, 2025). Reducing NSI events requires the implementation of effective preventative measures, such as frequent training and the use of safety-engineered products (Kulik, 2025). The initial focus is frequently on the threats to physical health, but the effects of NSIs on one's job and mental health are just as important. Comprehensive approaches are needed to address these injuries, including support for impacted HCWs, efficient reporting systems, and preventative measures (Khairallah, 2025).

Research Methodology

Research Design: This study employed a **quantitative co-relational design** to assess the association between nurses' knowledge regarding the incidence and management of needlestick injuries (NSI's). The goal of the correlational study is to find the relationship between variables and to find if this relationship is positive or negative. Without changing any of the variables, a correlational analysis examines the relationship between two or more of them. It does not prove cause and effect; rather, it seeks to ascertain whether a relationship exists as well as its strength and direction. In essence, it tracks the collective changes of naturally occurring factors (Janse, 2021). Knowledge of nurses regarding NSI and their attitude towards NSI are two variables

in this study. A statistical analysis and expression of the relationship between these two variables is provided by correlation. It serves to elucidate fundamental relationships without the need for intervention.

Sampling Technique: The target population included **registered nurses** working in high-risk units such as emergency, intensive care units (ICUs), and wards. A **purposive sampling** technique was used to select **51 nurses** who met the inclusion criteria of having at least six months of clinical experience and willingness to participate in the study. Purposive sampling, sometimes referred to as judgmental or purposeful sampling, is a non-probability sampling technique in which the researcher deliberately chooses participants according to particular traits or standards pertinent to the study question. The emphasis is on selecting people who can offer the most insightful and useful data for the study, rather than using random selection (Andrade, 2021).

Data Collection Instrument: A **structured, self-administered Likert scale questionnaire** was used, developed and validated through a pilot test. The reliability of the questionnaire is tested using Cronbach Alpha. The questionnaire included sections on knowledge of NSI causes, prevention strategies, post-exposure management, and institutional protocol. Participants were asked to complete a structured questionnaire at a single point in time to assess their knowledge regarding needlestick injury prevention and management, as well as their reported practices and experiences. The data was collected using a self-administered Likert scale method. Confidentiality and voluntary participation were ensured throughout the process.

Ethical Consideration: All the ethical guidelines were strictly followed using BERA framework guidelines. The anonymity and confidentiality of the data was strictly maintained by keeping the data in password protected file. It was clearly communicated to the participants that data will be used only for research purpose and after 6 months data will be destroyed so that it can't be used for personal interests. Participants were given liberty to withdraw from the research at any point of time. Their

willingness for participation was taken prior to the data collection. All the ethical guidelines were communicated with participants in detail.

Data Analysis:

Data was analyzed using IBM SPSS version 21. The data is analyzed using step by step process to get accurate results. First of all, the Cronbach alpha test

was run to check the internal consistency of items. After the reliability test, the descriptive tests were run on the items to make the sense of data. The data met assumptions of parametric test and normality score fit parametric test. Since the data was normally distributed, the Pearson correlation test was run to check the association between knowledge and attitudes of nursing regarding

Results

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
NSI Knowledge	51	17.00	25.00	22.3137	2.22252	-.061	.333	-1.202	.656
NSI Attitude	51	9.00	25.00	21.1176	3.10900	-1.311	.333	3.534	.656
Valid N (listwise)	51								

The table 1 shows the descriptive score of NSI knowledge of nurses and their attitude towards management and practices of needle stick injuries. NSI knowledge has mean of 22.3137 with maximum 25.00 and minimum range of 17.00. The variance of scores and their spread around the mean is 2.22252. The NSI knowledge scores ranging between 15 to 25 are densely packed around the mean. The distribution of NSI score of nurses' knowledge is roughly symmetrical. The NSI attitude with mean

21.1176 indicates that nurses' attitude score is positive. The attitude of nurses seems dispersed and variability is found with the SD= 3.10900. The scores are more scattered in case of attitude. Fewer nurses have low scores while majority have higher levels. Scores of both the variables, Knowledge and attitude are found high according to the table although attitude differs from the knowledge. The scores of nurses 'knowledge are evenly distributed while attitude scores have variability.

Table 2: Correlations

		B1	B2
Nurses' Knowledge	Pearson Correlation	1	.725**
	Sig. (2-tailed)		.000
	N	51	51
Nurses' Attitudes	Pearson Correlation	.725**	1
	Sig. (2-tailed)	.000	
	N	51	51

** . Correlation is significant at the 0.01 level (2-tailed).

To understand the association between nurses 'knowledge and their attitude towards management and practices of needle stick injuries, Pearson correlation test was performed. The $r = 0.725$ suggest a strong linear relationship between nurses' knowledge of needle stick injuries versus nurses attitude towards needle stick injuries management and practices. There is positive relationship between

the two variables which means when nurses knowledge increases regarding needle stick injuries management and practices, they show positive attitude towards needle stick injuries management. The decrease in their knowledge also declines the attitude graph towards needle stick injuries management. A 2 tailed significance value $P = 0.00$. ($P < 0.01$) suggest that null hypothesis is rejected

confirming the fact that knowledge of nurses and their attitude are strongly correlated. The table suggest that nurses knowledge regarding NSI, its risks, prevention and management strategies help them develop positive and affirmative attitude towards managing and addressing the needle stick injuries which is a major occupational hazard.

Discussion:

The results of the study ($r=.076$, $p < 0.01$) shows that null hypothesis is rejected and there is a strong positive relationship between nurses' knowledge of NSI and their attitude towards NSI management and prevention. The study suggest knowledge of NSI directly affects nurses' behavior and adherence to safety protocols, which in turn lowers the risk of needle stick injuries (NSIs), healthcare workers (HCWs) must have a positive association between their knowledge and attitude regarding NSI prevention. These results align with previous studies which say more proactive and secure workplace is the result of having sufficient knowledge about NSI hazards and prevention techniques, as well as a constructive attitude toward putting those techniques into practice (Ismara, 2019; Akbari, 2023; Kutubudin, 2024). HCWs are more likely to regularly adhere to safety procedures when they are aware of NSI hazards, such as the possibility of blood-borne pathogen transmission, including HIV, Hepatitis B, and Hepatitis C, and when they have a positive attitude about taking preventative action (Jassem, 2025; Hakeem, 2025). This covers the safe handling of sharp objects, the use of personal protection equipment (PPE), and the appropriate disposal of needles and other sharp objects (Asmar, 2025). A higher desire to report events is associated with a more positive attitude toward NSI prevention (Sain, 2025; Hakeem S. H., 2025). According to studies, health care workers who are upbeat and recognize the significance of reporting NSIs are more likely to do so right away, which is crucial for post-exposure prophylaxis and stopping additional transmission (Akpaglo, 2025; Sheikh, 2025; Zheng, 2025). Healthcare institutions can establish a culture of safety that reduces the likelihood of NSIs and the consequent spread of infections by encouraging knowledge and a positive outlook (Alshammari, 2025; Hakeem S. H., 2025). Training programs on

NSI prevention are more effective when participants have positive views concerning safety precautions (Ismail, 2025; Jassem A. K., 2025). HCWs are more likely to absorb the knowledge and put it into practice if they are open to learning and think the training is important (Watyaba, 2025; Kumar, 2025; Ibrahim, 2025). By improving perceptions of severity and vulnerability, and increasing perceived behavioral control, quality knowledge can have a favorable impact on health behaviors (Alshehri, 2025).

The study also highlights that healthcare providers' attitudes and behaviors about health are greatly influenced by their level of knowledge and It affects how they treat patients, engage with the public, and support public health campaigns which aligns with the studies as follows. Healthcare workers are better able to make wise decisions, give precise advice, and encourage favorable health outcomes when they have a solid grasp of health facts (Kalra, 2024; Kothinti, 2024; Ullah, 2024; Ahmadi, 2024). Accurate diagnosis, appropriate treatment prescriptions, and effective patient care are made possible by healthcare professionals' knowledge (Ajibade, 2025; Alharbi, 2025; Nori, 2025). Better patient outcomes result from healthcare personnel adopting and implementing evidence-based practices with the support of a robust knowledge foundation (Alsadaan, 2025; Sebire, 2025; Madu, 2025; Ominyi, 2025; İzmir, 2025).

Conclusion:

A more favorable attitude toward the care and prevention of needle stick injuries (NSI) is typically linked to nurses' increased knowledge of these accidents. Better behaviors in terms of adhering to safety procedures and utilizing preventive measures like appropriate needle disposal follow from this optimistic outlook. Nurses are more likely to appreciate the significance of prevention when they are aware of the risks connected to NSIs, such as the possibility of bloodborne pathogen transmission and the seriousness of long-term effects. Preventive actions like utilizing safety devices, disposing of needles safely, and following post-exposure procedures are more likely to be taken by knowledgeable nurses. Knowledge-based optimism about NSI prevention motivates nurses to constantly

adhere to safety protocols and promptly report incidents. The incidence of NSIs among healthcare workers can be significantly decreased by promoting a culture of safety and awareness, which includes greater knowledge and a positive outlook. To guarantee efficient NSI prevention, knowledge is essential, but it must be combined with hands-on training and reinforcement of safety procedures.

Recommendations:

- Prioritize NSI modules training for nurses on regular basis.
- Policy makers and health care authorities should make sure the workshops material is applicable and useful.

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