

Effect of Nursing Intervention for Management and Prevention of Needle Stick Injuries among Student Nurses

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ABSTRACT

Background and Objectives: Needle stick injuries (NSIs) are a significant occupational hazard among student nurses. This study evaluates the effectiveness of a nursing intervention program designed to manage and prevent NSIs. NSIs pose a serious threat of infection transmission, including hepatitis B contagion (HBV), hepatitis C contagion (HCV), and mortal immunodeficiency contagion (HIV)(Al-Mugheed, Farghaly et al. 2023).

METHODOLOGY: A quasi-experimental design was employed involving student nurses from Nursing School. The intervention included education sessions, hands-on training.

RESULTS: Post-intervention data showed a significant reduction in the incidence of NSIs among the participants. Additionally, there was an improvement in knowledge and practices related to NSI prevention and management. The post survey showed the significant result of (<0.001).

CONCLUSION: The nursing intervention program was effective in reducing NSIs and enhancing preventive measures among student nurses.

KEYWORDS: Needle stick injuries (NSIs), Student nurses, Nursing intervention program, Prevention Hepatitis B (HBV), Hepatitis C (HCV), HIV, Quasi-experimental design, Education sessions

INTRODUCTION

Needle stick injuries (NSIs) are a significant occupational health concern, particularly for nursing internee students. NSIs pose a serious threat of infection transmission, including hepatitis B contagion (HBV), hepatitis C contagion (HCV), and mortal immunodeficiency contagion (HIV)¹. Although the majority of sharp object injuries are reported in developing countries, in developed countries, where advanced forestallment measures similar as real-time injury monitoring systems and standardized operating protocols are in place, sharp object injuries continue to do, and numerous reports coming from developed countries, which signifying that sharp objects injuries might be a global concern. Encyclopedically, 32.4 to 44.5% of healthcare professionals report passing at least one accidental sharp injury or needle stick annually. In the United States, an estimated 385,000 sharp object injuries do among healthcare workers annually². Needle stick injuries (NSIs) pose a serious risk for transmission of bloodborne pathogens. Student nurses are particularly vulnerable due to inexperience and lack of training. On

a global position, according to World Health Organization (WHO), 3 million nurses and nursing student are exposed annually to percutaneous fluid defiled with at least hepatitis B about exposures), HIV (roughly 170,000 exposures), and hepatitis C 9 about 900,000 exposures³. Futhermore, A global meta-analysis set up that 42.8 % of nurses and 46.4% of physicians reported sharps injuries. The overall prevalence of NSIs among nursing students was found to be 14.1% in a study involving 300 undergraduate nursing students in Saudi Arabia⁴. Despite the presence of preventive measures, needle stick injuries continue to occur among nursing students, highlighting the need for a interventional study to explore and understand the effects of s influencing the preventive measures and advance management of needle stick injuries. The incidence of needle stick injuries is higher among nurses with a low level of knowledge on the prevention of needle stick injury, and who have not received the relevant training during their undergraduate study. The aim of this study is to provide nursing intervention

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and check the effects of it in management and in preventive measures among the students of nursing in Ali Fatima Hospital. The high incidence of needle stick injuries among nursing students indicate a gap in current prevention and management strategies. There is a critical need to evaluate and enhance nursing interventions aimed at reducing needle stick injuries⁵.

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METHODOLOGY

A quasi-experimental study was conducted at a private hospital in Lahore from February 2024 to June 2024, aiming to assess the impact of preventive measures on the incidence of needle stick injuries among nursing internee students. The study involved a sample of 30 participants, selected through purposive sampling. The sample size was determined using the formula $n = N / (1 + N(e^2))$ with a 5% margin of error, as referenced from Statology. The dependent variable of the study was needle stick injuries, while the independent variable was the implementation of preventive measures. The work environment was considered a control variable to maintain consistency across participants. The interventional component of the study included 30 registered nurses working across various hospital wings. Data collection spanned five months, and a specialist committee comprising three members from the Safety Department of AFH was responsible for administering and evaluating the data. The inclusion criteria required participants to be internee nursing students and those engaged in malpractice practices, while the exclusion criteria ruled out students with health or emotional conditions that could hinder their safe or effective participation.

RESULTS

The study involved 30 female participants, all of whom had four years of study experience. Regarding injury history, 63.3% reported no history, 30% reported having a history, and 6.7% were uncertain. During tasks, injuries occurred primarily during the disposal of needles (50%), followed by recapping needles (26.7%), suturing (13.3%), and passing needles (10%). The causes of these injuries were attributed to time pressure (46.7%), lack of experience (23.3%), and equipment failure (30%).

Category	Score	Frequency	Percent%
poor	49%	11	39
average	50% -80%	10	33
good	80%-100%	7	25

The p test table shows that the mean pre-knowledge percentage is 51.20 with a standard deviation of 16.988. The mean post-knowledge percentage is 68.07 with a standard deviation of 6.918. The p-value associated with the comparison of pre and post knowledge percentages is less than 0.001, indicating statistical significance.

Paired Samples Test							
pre and post	Mean	Std. Deviation	95% Confidence Interval of the Difference		t	df	Sig
			Lower	Upper			
			15.71429	4.49664			

DISCUSSION

The study sample consisted of 30 female student nurses, representing 100% of the participants. This uniformity ensures that the findings are specifically applicable to female nursing students at a similar stage in their education.

The distribution of tasks during which needlestick injuries occurred was the disposal of needles was the most common activity (50.0%), followed by recapping needles (26.7%), suturing (13.3%), and passing needles (10.0%). This indicates that routine and frequent tasks like needle disposal and recapping pose the highest risk. These findings suggest that interventions should focus particularly on these high-risk activities, perhaps by revising protocols, enhancing training, and promoting the use of safer needle disposal systems. The educational intervention aimed at improving knowledge about needlestick injury prevention showed significant effectiveness.

The pre-intervention mean knowledge score was 51.20 (SD = 16.988), which increased to 68.07 (SD = 6.918) post-intervention. The paired samples t-test revealed a statistically significant improvement ($t(29) = -8.398, p < .001$), with a mean increase of 16.867 points. Whereas A total of 43 articles were included in the analysis. 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 work-

ers (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 6. Additionally The study by (Alfulayw, Al-Otaibi et al. 2021) revealed that the Incidence of NSIs over 26 months was 8.4% among all participants. Nurses were the most affected staff (52.5%) resulted commonly from disposing syringes (58.9%). In contrast, the incidence of NSIs among physicians was 24.9% where surgical devices were the primary source of NSIs among them (40%). Failure to complete all required hepatitis B vaccination was common among expatriates of the participants of this study. Needle recapping was the leading cause of sharp object injuries (36.30%), followed by medical waste treatment (21.92%). The left hand was the most commonly affected body part (56.84%)⁷. All injured individuals reported the incidents promptly, and no sero-conversions were documented during the study period Ibrahim, Kannan et al. 2024. The average age of the participating nurses was 29.7 years. The following 3 themes were identified: various needlestick injury experiences, post-needlestick injury coping, and expectations regarding needlestick injuries 8. Additionally Paramedical Workers and Staff Nurses constitute the highest percentages of NSIs at 27% and 12%, respectively. The locations where NSIs frequently occur include the Emergency Ward (26%) and Intensive Care (27%). Hypodermic needles are identified as the primary cause (39%), with procedures (38%) and recapping (22%) being the leading activities linked to NSIs. Lack of awareness about the reporting process is identified as a significant reason, with 6.38% of participant were not aware of the reporting procedures⁹. The study by (Al Qadire, Ballad et al. 2021) showed that , Of the participants, 81.2% were females; mean age was 23.3 (SD = 4.5) years. The mean total knowledge score was 6.6 out of 10 (SD = 2.1). In addition, 18.2% (n = 32) of the students experienced needle stick injury. Most of the injuries 71.9% (n = 24) occurred during medication preparation and administration. The main cause of NSI as reported by students was recapping the needles (59%, n = 19). The study findings revealed that the participants that are nursing internee students, showed relatively good mean scores in knowledge test (Mean=6.4, SD=1.4), and the students held positive

attitudes towards the learning program (Mean=27.1, SD=4.12). Students showed the low degree of handling the practice of needle stick (Mean = 14.10, SD = 2.0). The sample totaled 14.1% prevalence which was needle stick injuries. About 65.1% of them either had one of those two in the past 12 months, and 24.4% of them are those who had two of the injuries in the same period¹⁰.

CONCLUSION

The nursing intervention program significantly reduced needle stick injuries and enhanced the management and preventive practices among student nurses. Continued emphasis on education and training is essential for protecting healthcare workers from occupational hazards. This research on prevention of needle stick injury among students highlight several critical insights and practical recommendations. Needle stick injury represents a significant occupational hazard, with potential consequences of both physical and mental well being of nursing students. This study findings the underscore the importance of comprehensive educational programs that emphasize the needle handling techniques, the use of safety engineered devices and adherence to standard precautions. Recommendation

We recommend focusing on the effectiveness of safety-engineered devices, the impact of comprehensive training and simulation programs, the role of supervision and mentorship, the development of clear protocols for injury management, and the influence of environmental controls on injury rates. Exploring these areas can provide valuable insights for reducing NSIs.

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