

A study to assess the effectiveness of structured teaching programme on knowledge regarding prevention of needle stick injuries among health science students at AVMC, Puducherry

K.S Sudha¹, Dr. Edna Sweenie J², Susmitha.G³, Swathi.M⁴, Tamilarasi.T⁵, Tejesvi.R⁶, Thibetha.S.⁷

1. Nursing Tutor, Department of Child Health Nursing, Vinayaka Mission's College of Nursing, Puducherry, India

2. Principal Cum Professor, Vinayaka Mission's College of Nursing, Puducherry, India

3-7. Students, Vinayaka Mission's College of Nursing, Puducherry, India

Corresponding Author Name: K.S Sudha¹, Email: sudhasitharthan@gmail.com

ABSTRACT

Needle stick injuries are a major occupational hazard among health science students due to frequent exposure to sharps during clinical training. These injuries increase the risk of transmission of blood-borne infections such as hepatitis B, hepatitis C, and HIV. Improving knowledge through educational interventions is essential for prevention. A quantitative approach with a pre-experimental one-group pre-test and post-test design was adopted. A total of 160 students were selected using convenience sampling. Data were collected using a structured questionnaire. After the pre-test, a structured teaching programme was administered, followed by a post-test after 7 days. The findings revealed that 55% of students had inadequate knowledge in the pre-test, while 85.6% achieved adequate knowledge in the post-test. The mean score increased from 7.90 to 18.85. Statistical analysis showed a highly significant improvement ($p < 0.001$). The study concluded that structured teaching programmes are highly effective in improving knowledge regarding prevention of needle stick injuries among health science students.

Keywords: Needle stick injury, structured teaching programme, knowledge, health science students, prevention.

How to cite this article: K.S Sudha¹ Dr. Edna Sweenie J² Susmitha.G³ Swathi.M⁴ Tamilarasi.T⁵ Tejesvi.R⁶ Thibetha.S.⁷. A study to assess the effectiveness of structured teaching programme on knowledge regarding prevention of needle stick injuries among health science students at AVMC, Puducherry. *Int J Drug Deliv Technol.* 2026;16(86s):1021-1024. DOI: 10.25258/ijddt.16.86s.99.

INTRODUCTION

Needle stick injury is a common occupational risk among healthcare workers and students. It refers to accidental puncture wounds caused by needles or sharp instruments contaminated with blood or body fluids. Health science students are particularly vulnerable due to lack of experience and improper handling techniques. These injuries can transmit serious infections like hepatitis B, hepatitis C, and HIV, leading to physical and psychological stress. Most injuries occur during procedures such as injections, blood sampling, IV cannulation, and improper disposal of sharps. Recapping needles and lack of awareness are major contributing factors. Prevention plays a key role in reducing such risks. Proper training, adherence to universal precautions, use of protective equipment, and safe disposal practices are essential. Structured teaching programmes provide systematic education that helps students improve knowledge and develop safe clinical practices.

NEED FOR THE STUDY

Global Perspective

Globally, needle stick injuries contribute significantly to occupational infections among healthcare workers. The World Health Organization reports that more than 2 million occupational exposures to sharp injuries occur annually among healthcare workers. Research evidence also shows that approximately 56.2% of healthcare workers experience needle stick injury at some point during their career, particularly in low- and middle-income

countries. The high prevalence of these injuries demonstrates gaps in knowledge and compliance with safety protocols. Therefore, implementing structured teaching programmes for students during clinical training is essential to reduce the risk of occupational exposure.

India Perspective

In India, needle stick injuries are a major occupational risk in healthcare settings due to high patient load and inadequate safety practices. Studies conducted among healthcare workers have reported that approximately 27% of healthcare professionals experienced at least one needle stick injury within a year. Nurses and nursing students are particularly vulnerable because they frequently handle injections, IV cannulation, and blood collection procedures. Lack of awareness, improper disposal of sharps, and recapping of needles are common causes. These findings emphasize the need for structured educational programmes to improve knowledge and safe practices among health science students.

State Level

In Tamil Nadu, healthcare workers including nurses and students face a considerable risk of needle stick injuries during clinical procedures. Studies conducted in teaching hospitals in the state have reported that a significant proportion of healthcare trainees experience accidental needle injuries during procedures such as injections and IV cannulation. Research findings indicate that lack of awareness regarding infection control measures and improper

sharps disposal practices contribute to the occurrence of these injuries. Educational programmes focusing on occupational safety are therefore recommended to improve knowledge and safe clinical practices among students.

Puducherry Context

Puducherry is an important medical education hub with several nursing and health science institutions where students undergo clinical training in hospitals. During clinical practice, students frequently perform procedures such as injections, blood sampling, and IV cannulation, which increase the risk of needle stick injuries. Studies in healthcare settings have indicated that occupational exposure to sharps remains a significant concern among healthcare trainees. Lack of adequate knowledge regarding infection control measures and prevention strategies contributes to these incidents. Therefore, structured teaching programmes are necessary to enhance awareness and ensure safe clinical practices among health science students.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of structured teaching programme on knowledge regarding prevention of needle stick injuries among health science at AVMC, Puducherry.

OBJECTIVES

To assess the level of knowledge regarding prevention of needle stick injuries

To evaluate the effectiveness of structured teaching programme

To find association between knowledge and demographic variables

HYPOTHESIS

H1: There is a significant difference between pre-test and post- test knowledge

H2 : There will be significant association between knowledge and selected variables.

II. METHODOLOGY

Approach: Quantitative

Design: Experimental (Pre- test and Post- test)

Setting: AVMC, Puducherry

Sample Size: 160 students

Sampling: Convenience sampling

Inclusion Criteria

Health science students (1 st year)

Who are all available at the time of data collection

Willing to participate

Exclusion Criteria

Who are all taken leave

Who have health problems

Tool

Structured questionnaire with 20 questions .

III. RESULTS AND DISCUSSION

Section A: Description of the socio-demographic variables among adults.

Table 4.1: Frequency and Percentage Distribution of Demographic variables among Health Science Students (N = 160)

S.No	Demographic Variable	Category	Frequency (n)	Percentage (%)
1	Age	17-18 years	40	25.0%
		18-19 years	65	40.6%
		19- 20 years	55	34.4%
2	Gender	Male	44	27.5%
		Female	116	72.5%
3	Education	UG	160	100.0%
4	Course	First year	160	100.0%
5	Duration of Course	Four year	160	100.0%
6	Knowledge about needle stick injury before	Yes	79	49.4%
		No	81	50.6%
7	Witnessed about needle stick injury	Yes	80	50.0%
		No	80	50.0%
8	Father's Income	Rs. < 10,000	36	22.5%
		Rs .< 10,000-20,000	43	26.9%
		Rs .<20,000-30,000	36	22.5%
		Rs .>30,000	45	28.1%

9	Father's Education	No formal education	50	31.3%
		Primary education	52	32.5%
		Higher secondary education	58	36.3%
10	Father's Occupation	Private employee	37	23.1%
		Government employee	35	21.9%
		Self-employed	48	30.0%
		Unemployed	40	25.0%
11	Source of information about needle stick injuries	Clinicals (Posting)	54	33.8%
		Books	48	30.0%
		Teacher	58	36.3%

Section B: Assessment of Pre-test and Post-test level of Knowledge regarding Prevention of needle stick injuries among Health Science Students.

Table 4.2: Frequency and Percentage Distribution of Pre-test and Post-test level of Knowledge regarding Prevention of needle stick injuries among Health Science Students (N = 160)

Knowledge Level	Pre-test Frequency (n)	Pre-test Percentage (%)	Post-test Frequency (n)	Post-test Percentage (%)
Inadequate knowledge	88	71.3%	0	0.0%
Moderate	72	25.0%	23	14.4%

Knowledge				
Adequate knowledge	0	3.7%	137	85.5%
Total	160	100%	160	100%

IV. CONCLUSION

The study concludes that structured teaching programmes are highly effective in improving knowledge regarding prevention of needle stick injuries among health science students. Educational interventions should be regularly implemented to promote safe clinical practices and reduce occupational risks.

V. NURSING IMPLICATIONS

Emphasizes the need for structured teaching programme in nursing education. Approach prepares students for real-world clinical settings. Strengthen overall clinical efficiency and professional responsibility. Contributes to advancing nursing science and improving healthcare outcomes.

VI. RECOMMENDATIONS

- Conduct regular training programmes.
- Include safety education in curriculum.
- Provide clinical supervision.
- Encourage further research.

REFERENCES:

1. Tarigan LH, Cifuentes M, Quinn M, Kriebel D. Prevention of needle-stick injuries in healthcare facilities: a meta-analysis. *Int J Occup Environ Health* 2015;21(1):4-12. Available from: <https://www.tandfonline.com/doi/full/10.1179/2049396714Y.000000009>.
2. Auta A, Adewuyi EO, Tor-Anyiin A, Aziz D, Ogbola E, Ogbonna BO, et al. Health-care workers' occupational exposures to body fluids in low- and middle-income countries: systematic review and meta-analysis. *Epidemiol Glob Health* 2017;7(4):285-296. Available from: <https://www.sciencedirect.com/science/article/pii/S2210600617300155>.
3. Saparwati M, Trimawati, Syaifudin A. Behaviors to prevent needle stick injury among nursing students: a systematic literature review. *Indones J Nurs Res* 2024;8(2). Available from: <https://jurnal.unw.ac.id/index.php/ijnr/article/view/4582>.
4. Janjua SS, Hanan A, Sarwar H, Afzal M, Ali A. Awareness in nursing students regarding prevention of needle stick injuries. *Nursearcher (J Nurs & Midwifery Sci)* 2022;2(1):20-24. Available from: <https://www.nursearcher.com/index.php/nrs/article/view/30>.
5. Othman AH, Zan NAM, Zairin NA, Abd Rahim NF, Sivashunmugam L. Knowledge, attitude and practice about needle stick injury towards prevention

and management among clinical students at a private university in Cyberjaya, Malaysia. Glob J Public Health. 2021;11(1):1-5. Download: <https://journals.sagepub.com/doi/pdf/10.1177/17474930211065917>.

6. Anjana AP, Thomas R, Renjitha. Effectiveness of structured teaching programme on knowledge regarding post exposure prophylaxis following needle stick injury among BSc nursing students. Indian J Forensic Med Toxicol. 2021;15(4):96-100. Available from: <https://medicopublication.com/index.php/ijfimt/article/view/16667>.

7. Nandan L, Katoch S. Effectiveness of structured teaching program regarding prevention of needle stick injury among nursing students. Indian J Holistic Nurs. 2019;10(1). Available from: <https://medicaljournalshouse.com/index.php/IndianJournal-HolisticNursing/article/view/210>.

8. 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. Int J Sci Health Res. 2020;5(2):407-412. Available from: https://ijshr.com/IJSHR_Vol.5_Issue.2_April2020/IJSHR_Abstract.0052.html.

9. Wi-Fi Talents. Needle stick injury statistics worldwide. Available from: <https://wifitalents.com/needle-stick-injury-statistics/>.

10. ZipDo Research Team. Needle stick injury statistics and global prevalence report. Available from: <https://zipdo.co/needle-stick-injury-statistics/>.

11. Bouya S, Balouchi A, Rafiemanesh H, et al. Global prevalence and device-related causes of needle stick injuries among healthcare workers: a systematic review and meta-analysis. Ann Glob Health. [https://pubmed.ncbi.nlm.nih.gov/32346521/682020;86\(1\):35](https://pubmed.ncbi.nlm.nih.gov/32346521/682020;86(1):35). Available .

12. WorldMetrics. Needle stick injury statistics report. Available from: <https://worldmetrics.org/needlestick-injury-statistics/>.

13. WorldMetrics. Occupational exposure to sharps injuries among healthcare workers. Available from: <https://worldmetrics.org/needle-stick-injury-statistics/>.

14. Kaur P, Kaur E, Kaur K. A descriptive study to assess the knowledge regarding needle stick injury among nursing students. Int J Res Rev. 2025;12(3):454-459. Available from: https://www.ijrrjournal.com/IJRR_Vol.12_Issue.3_March2025/IJRR-Abstract56.html.

15. Prasuna J, Sharma R, Bhatt A, Arazoo A, Painuly D, Butola H, et al. Occurrence and knowledge about needle stick injury in nursing students. J Ayub Med Coll Abbottabad. 2018;30(3). Available from: <https://ayubmed.edu.pk/jamc/index.php/jamc/article/view/74>.

16. Devi KV, Nandan J, Indhumathi KS. Prevalence and knowledge on needle stick injury among health care workers of a tertiary medical centre in India. Adv

Basic MedSci. 2025. Available from: <https://abms.kmu.edu.pk/index.php/abms/article/view/448>.

17. Sharma R, et al. Prevalence and awareness of needle stick injuries among nursing staff in a tertiary care hospital of North India. Indian J Community Health.

2019. Available from: <https://www.iapsmupuk.org/journal/index.php/IJCH/article/view/2232>.

18. Kermode M, Jolley D, Langkham B, Thomas MS, Holmes W, Gifford SM. Occupational exposure to blood and risk of blood-borne virus infection among healthcare workers in rural north Indian health care settings. Am J Infect Control. 2015;33(1):34-41. Available from: <https://pubmed.ncbi.nlm.nih.gov/15685127/>.

19. Talaat M, Kandeel A, Rasslan O, Hajjeh R, Hallaj Z, El-Sherif N, et al. Occupational exposure to needle stick injuries among healthcare workers in Egypt. Infect Control Hosp Epidemiol. 2018. Available from: <https://pubmed.ncbi.nlm.nih.gov/18254400/>.

20. Patil S, Kulkarni V, Patil P. Knowledge and awareness regarding needle stick injuries among nursing students in Maharashtra. Int J Community Med Public Health. 2022. Available from: <https://www.ijcmph.com/index.php/ijcmph/article/view/10040>.

21. Zhang M, Wang H, Miao J, Du X, Li T, Wu Z. Occupational exposure to needle stick injuries among medical students in China. J Hosp Infect. 2021. Available from: <https://pubmed.ncbi.nlm.nih.gov/21300508/>.

22. Al-Hussami M, Darawad MW, Almhairat II. Predictors of needle stick injuries among nursing students in Jordan. Int J Occup Environ Health. 2019. Available from : <https://pubmed.ncbi.nlm.nih.gov/25417360/>.