

INCIDENT OF NEEDLE STICK INJURY WHILE ADMINISTERING MEDICATION TO STUDENTS NURSING PROFESSION: A DESCRIPTIVE STUDY BASED ON SELF-REPORT

Galang Agam Alamsyah, Ana Zakiyah, Ima Rahmawati

Bina Sehat PPNI University, Mojokerto, Indonesia

Corresponding Author: galangagam46@gmail.com

ABSTRACT

Needle *stick injury* (NSI) remains a safety issue for nursing students during clinical practice. This study aims to describe the incidence of NSI based on *self-report* and student perception using the *Student Nurse Needlestick Injury Prediction (SNNIP)*. A *quantitative descriptive study with a cross-sectional* approach was conducted on 51 clinical practice students at Bina Sehat University, PPNI Mojokerto, using a *total sampling technique*. Data were collected through a questionnaire on NSI characteristics and SNNIP, then analyzed descriptively using IBM SPSS Statistics. The results showed that all respondents had experienced NSI. The most frequent incidents occurred in the third clinical practice (58.8%), during needle *recapping* (39.2%), in the inpatient ward (66.7%), and were caused by empty syringes (49.0%). Most respondents reported the incident (76.5%), but 86.3% did not undergo blood tests or hepatitis B vaccination. The average scores for perceived severity, benefits, and barriers were 14.46; 10.66; and 39.70, respectively. These findings indicate the need to strengthen occupational safety education, compliance with *standard precautions*, and incident reporting systems.

Keywords: *needle stick injury, nursing students, clinical practice, occupational safety, SNNIP*

INTRODUCTION

Needle Stick Injury (NSI) is one of the most common forms of occupational accidents that occur in healthcare workers due to being pricked by a needle or sharp object that has been contaminated with the patient's blood or body fluids (Aisyiah et al., 2024). This injury is a serious concern because it has the potential to transmit blood-borne infectious diseases, such as Hepatitis B (HBV), Hepatitis C (HCV), and Human Immunodeficiency Virus (HIV) (Mengistu et al., 2021). Globally, millions of healthcare workers experience sharp object exposure every year, so NSI remains a challenge in implementing occupational safety and health in healthcare facilities (Bouya et al., 2020). This condition shows that NSI prevention is not only the responsibility of healthcare institutions, but also educational institutions that prepare prospective healthcare professionals (Kalabahi, 2025).

Nursing students are a high-risk group for experiencing non-invasive procedures (NSIs) due to their direct involvement in various invasive procedures during clinical practice, particularly drug administration through injection (Putri et al., 2022). Limited clinical experience, still-developing procedural skills, and poor decision-making skills in clinical situations make them more susceptible to injury than experienced healthcare workers (Qadire et al., 2021). A systematic review showed that approximately 35% of nursing students experienced non-invasive procedures (NSIs) during their clinical education (Xu et al., 2022). In addition to causing physical injury, these incidents also cause anxiety, fear of contracting infectious diseases, and reduce students' confidence in providing nursing care (Halimi et al., 2024). The practice of recapping needles after use is also still reported as a major cause of non-invasive procedures (NSIs) in nursing students (Al-Mugheed et al., 2023).

Various efforts have been developed to reduce the incidence of NSI in nursing students, including simulation-based clinical skills training, increased adherence to standard precautions, the use of personal protective equipment, and strengthened supervision by clinical supervisors (Alinejad et al., 2023; Kaknani-uttumchandani et al., 2021). The use of safety-engineered devices and the implementation of correct sharps disposal procedures have also been shown to reduce the risk of needlestick injuries (Keicher et al., 2024). In addition, incident reporting and post-exposure management are important parts of the occupational safety system to prevent complications and reduce the risk of recurrence (Pierce, 2024; Thomas, 2019). However, various studies have shown that unsafe behaviors, such as needle recapping, improper sharps disposal, and low adherence to standard precautions, are still frequently found among students during clinical practice (Saparwati & Syaifudin, 2025).

Research on NSIs in nursing students has focused more on the prevalence of incidents, risk factors, knowledge levels, and behaviors related to preventing needlestick injuries (Qadire et al., 2021; Xu et al., 2022). Information on the characteristics of NSI incidents based on self-reports, especially in nursing students during medication administration, is still relatively limited. However, the self-report approach can provide a more comprehensive picture of the cause of the incident, the location of the incident, the type of device causing the injury, incident reporting, post-exposure actions, and student perceptions of NSI prevention efforts (Bagnasco et al., (2020)). This information is needed as a basis for evaluating the implementation of occupational safety during clinical practice and developing more effective prevention strategies. Therefore, this study aims to describe the incidence of Needle Stick Injury based on self-reports in nursing students during medication administration during clinical practice in hospitals. The research results are expected to serve as a basis for nursing educational institutions and hospitals in developing educational programs, strengthening the implementation of standard precautions, improving incident reporting systems, and developing occupational safety policies to create a safer clinical practice environment for students (Alinejad et al., 2023; Putri et al., 2022).

METHOD

This study used a descriptive quantitative design with a *cross-sectional approach* to describe the incidence of *Needle Stick Injury* (NSI) based on *self-reports* among undergraduate Nursing students of Bina Sehat University, PPNI Mojokerto, class of 2022 who had undergone clinical practice at the hospital. The study was conducted from April to June 2026. The study population consisted of 200 students who had participated in clinical practice. Furthermore, respondents were recruited using a *purposive sampling technique* based on predetermined inclusion and exclusion criteria, resulting in a final sample of 51 respondents.

To obtain research data, researchers used the Student Nurse Needlestick Injury Prediction (SNNIP) questionnaire developed by Bagnasco et al., (2020). This instrument includes respondent characteristics, NSI experience and characteristics, and three dimensions of perception based on the *Health Belief Model*: perceived severity, perceived benefits, and perceived barriers. Furthermore, all data were collected online via Google Form after respondents received an explanation of the research objectives and provided voluntary *informed consent without pressure from any party*.

Next, the data were analyzed using IBM SPSS Statistics. Univariate analysis was used to describe respondent characteristics, NSI incidence, and perception dimensions. Categorical data were presented in the form of frequencies and percentages, while perception scores were presented in the form of means and standard deviations to provide an overview of respondents' perceptions of NSI incidence. The entire analysis process was conducted in accordance with the established research objectives. Throughout the study, the researchers applied ethical research principles through voluntary consent, anonymity, and confidentiality of all respondent data.

FINDING AND DISCUSSION

RESEARCH RESULT

Table 1. Frequency Distribution by Age

Variabel	n	Mean	Median	Std. Deviation	Min-Max
Usia	51	21.39	22.0	1.343	19-26

Based on Table 1, the average age of respondents was 21.39 years, with a median of 22 years and a standard deviation of 1.343. Respondents' ages ranged from 19 to 26 years.

Table 2. Frequency Distribution of Respondents Based on Gender and Having Been Stabbed at Bina Sehat PPNI Mojokerto University

Karakteristik Responden	Frekuensi (f)	Persentase (%)
Jenis Kelamin		
Laki-laki	14	27.5
Perempuan	37	72.5
Total	51	100
Pernah Tertusuk		
Pernah	51	100
Total	51	100

Based on Table 2, the majority of respondents were female, namely 37 respondents (72.5%). All respondents (100%) stated that they had experienced needlestick injuries, namely 51 respondents.

Table 3. Respondent Characteristics Based on the SNNIP Questionnaire

No.	Pernah Tertusuk Jarum Pada Praktik	f	%
1.	Pertama kali	15	29.4
2.	Kedua kali	6	11.8
3.	Ketiga kali	30	58.8
Total		51	100
No.	Waktu Kejadian	f	%
1.	Proses Reccaping (menutup jarum)	20	39.2
2.	Pasien tidak kooperatif	2	3.9
3.	Saat menyiapkan obat	12	23.5
4.	Saat pemeriksaan GDA	5	9.8
5.	Saat injeksi	6	11.8

6.	Proses pengambilan darah	4	7.8
7.	Saat membuang limbah medis	2	3.9
Total		51	100
No.	Tempat Kejadian	f	%
1.	Bangsal Rawat Inap	34	66.7
2.	Ruang Perawatan Intensif	10	19.6
3.	Ruang Gawat Darurat	4	7.8
4.	Ruang Operasi	3	5.9
Total		51	100
No.	Melapor	f	%
1.	Melaporkan	39	76.5
2.	Tidak Melaporkan	12	23.5
Total		51	100
No.	Lapor Siapa	f	%
1.	Dosen	1	2.0
2.	Teman-teman	32	62.7
3.	Perawat yang bertugas	4	7.8
4.	Tim PPI	2	3.9
5.	Saya Tidak Melaporkan	12	23.5
Total		51	100
No.	Waktu Kejadian		
1.	Spuit kosong	5	49.0
2.	Spuit yang sudah terisi	1	41.2
3.	Jarum Pengambilan Darah		2.0
4.	Jarum lainnya (jarum insulin, jarum infus, jarum jahit luka)		7.8
Total			
No.	Cek Darah Pasca Insiden	f	%
1.	Pernah	7	13.7
2.	Tidak Pernah	44	86.3
Total		51	100
No.	Status Vaksinasi	f	%
1.	Melakukan Vaksin Hepatitis B	7	13.7
2.	Tidak Vaksin	44	86.3
Total		51	100

Based on Table 3, most respondents experienced needlestick injuries during their third clinical practice (58.8%; n=30). The most frequent incidents occurred during needle *recapping* (39.2%; n=20) and mostly occurred in the inpatient ward (66.7%; n=34), while 19.6% (n=10) occurred in the intensive care unit. Most respondents reported needlestick injuries (76.5%; n=39). Among those who did report, most reported to a friend (62.7%; n=32), while 23.5% (n=12) did not report the incident to anyone. The most common instrument causing needlestick injuries was an empty syringe (49.0%; n=25). After exposure, almost all respondents did not undergo blood tests (86.3%; n=44). Furthermore, almost all

respondents did not have a history of vaccination as a preventative measure for needlestick injuries (86.3%; n=44).

Table 4. Overview of Respondents' Perceptions Based on the SSNIP Questionnaire

Dimensi	Mean	Standart Deviasi	Min-Max
Keparahan	14,46	3,59	5-20
Manfaat	10,66	2,71	3-15
Hambatan	39,70	9,69	18-55

Based on Table 12, respondents had an average perceived severity score of 14.46 with a standard deviation of 3.59. Perceived benefits had a minimum score of 3 and a maximum of 15. Meanwhile, the average score for perceived barriers was 39.70.

DISCUSSION

This study provides an overview of the characteristics of *needle stick injury* (NSI) incidents in nursing students during clinical practice as well as student perceptions of risk and injury prevention based on the Student Nurse Needlestick Injury Prediction (SNNIP) instrument. Respondents were predominantly female, reflecting the composition of students in nursing education programs. This condition is in line with research by Du et al., (2026) which explains that nursing students are generally more female. However, gender is not a factor that directly influences the occurrence of NSI. Research by Ms et al., (2020) explains that the risk of injury from sharp objects is more influenced by the frequency of performing invasive procedures, level of experience, quality of clinical supervision, workload, and adherence to *standard precautions* than biological factors.

Incident characteristics indicate that most students experienced NSI during their third clinical practice session. These findings suggest that the higher the level of clinical practice, the greater the students' exposure to invasive procedures such as administering injections, inserting IV lines, and taking blood samples. This does not imply that practical experience increases the risk of injury, but rather suggests that students at more advanced stages of practice have the opportunity to perform procedures more independently and with greater complexity. These findings align with those of Qadire et al. (2021). which states that the incidence of NSI is influenced by knowledge about prevention, adherence to *standard precautions* , and the quality of clinical teaching. These findings are also supported by a *systematic review* Xu et al., (2022) reported that practical experience was not always followed by a decrease in NSI rates due to the increased frequency of exposure to invasive procedures during clinical education.

This study also showed that the *recapping process* remains a major cause of NSIs. These findings indicate that students still practice recapping needles after use, even though this practice is not recommended by the principles of sharps injury prevention. Research by Al-Mugheed et al., (2023) reported that most NSI incidents in nursing students occurred during *recapping* , while Raden M et al., (2024) Studies also show that this practice is significantly associated with an increased risk of injury. Therefore, adherence to needle disposal procedures without *recapping* needs to be continuously reinforced through laboratory training and supervision during clinical practice.

Most of the NSI incidents in this study occurred in inpatient wards. This is understandable, as wards are service units with high nursing activity and involve various invasive procedures around the clock. Research (Auta et al., 2018) explains that the high frequency of sharps use in inpatient wards increases the chance of exposure if not balanced with the implementation of proper safety procedures. Similar results were also reported by (Mengistu et al., 2021) , who stated that the more students are involved in clinical procedures, the greater the risk of injury if skills, supervision, and adherence to safety procedures are not optimal.

Based on the characteristics of the injury-causing device, empty syringes are the most common cause of NSIs. This condition likely occurs because the syringe still has an open needle after the medication preparation process or after the procedure is completed, potentially causing injury if handled improperly. This finding aligns with research by Zhang et al. (2018) , which reported that the majority of NSI incidents in nursing students were caused by syringe needles. Research by Canli & Aydin (2013) also explained that the use of syringes is the most frequent action carried out by students during clinical practice so that good skills are needed in carrying, using, and disposing of sharp objects according to *standard precautions principles* .

This study also showed that the majority of students reported NSI incidents, although more often they reported them to friends than to clinical supervisors or authorized teams. This situation suggests that the incident reporting mechanism is not yet fully understood by students. (Thomas, 2019) explained that low reporting is influenced by the perception that the injuries experienced are not dangerous, a lack of knowledge regarding reporting procedures, and concerns about potential consequences. These findings are supported by research by Laariya et al., (2023). This suggests that students are often reluctant to report incidents for fear of receiving negative feedback from supervisors or being perceived as incompetent. Yet, reporting is a crucial first step in managing exposure and preventing complications from blood exposure.

In addition to low reporting to authorities, most students also did not undergo blood tests after experiencing NSI and did not have a history of hepatitis B vaccination. This condition indicates that post-exposure follow-up is still not optimal. Hada et al., (2018) explained that although students are aware of the risk of disease transmission due to NSI, not all of them underwent health checks or medical evaluations after exposure. The low hepatitis B vaccination coverage found in this study is also in line with research by Ali et al., (2023) , which reported that there are still students who have not received immunizations before clinical practice. Considering that NSI is one of the transmission routes of hepatitis B, hepatitis C, and HIV, educational institutions and hospitals need to strengthen policies regarding vaccination, post-exposure education, and incident reporting systems to minimize the risk of complications.

The results of measurements using the SNNIP questionnaire indicate that students have a good perception of the severity of NSI incidents and the benefits of preventive measures, but still experience various barriers in implementing safety behaviors during clinical practice. These findings are in accordance with the *Health Belief Model concept* that forms the basis for the development of the SNNIP instrument, where preventive behavior is influenced by perceptions of severity, perceived benefits, and barriers faced by Bagnasco et al., (2020) . Students who understand the serious consequences of NSI tend to believe that

implementing *standard precautions* , using personal protective equipment, and disposing of sharp objects according to procedures are effective measures in preventing injury. However, the perception of barriers remains high indicating that students still face obstacles, such as lack of experience, nervousness when performing invasive procedures, time constraints, and practice conditions that do not fully support the implementation of safe behaviors. These findings are supported by research by Yousafzai & Siddiqui, (2012). which explains that the lower the perception of barriers and the higher the perception of benefits, the better a person's compliance in implementing work safety practices.

Overall, the results of this study indicate that the incidence of *needle stick injuries* in nursing students remains a problem that requires attention because it is influenced by a combination of behavioral factors, clinical practice characteristics, and the implementation of a safety culture in educational and healthcare environments. Although students have a good perception of the severity and benefits of preventive measures, there are still obstacles in implementing safety behaviors as reflected in the still high incidence of *recapping* , suboptimal reporting to authorities, low post-exposure blood tests, and low hepatitis B vaccination coverage. Therefore, strengthening education regarding *standard precautions* , improving clinical supervision, habituating incident reporting, and vaccination policies before clinical practice are important steps to reduce the risk of NSI in nursing students.

CONCLUSION

This study showed that all nursing students who participated in the study had experienced needlestick injuries during clinical practice. The most frequent incidents occurred during the third clinical practice, during needle recapping, in the inpatient ward, and were most often caused by empty syringes. Although most students reported these incidents, they were generally reported to colleagues, while most respondents did not undergo post-exposure blood tests or hepatitis B vaccination. Based on the Student Nurse Needlestick Injury Prediction (SNNIP) questionnaire, students had a good perception of the severity of the incident and the benefits of preventive measures, but still experienced various barriers to implementing safety behaviors during clinical practice. These findings suggest that needlestick injury prevention among nursing students needs to be strengthened through increased adherence to standard precautions, strengthened clinical supervision, habituation of incident reporting according to procedures, education on post-exposure management, and increased coverage of hepatitis B vaccination before students participate in clinical practice.

REFERENCES

- Aisyiah, I. K., Sofina, N., Hatini, M., Permata, N. Z., Maharani, A., & Putra, R. (2024). *Penyuluhan Tentang Needle Stick Injury Di Rumah Sakit*. 2(9), 4052–4057.
- Al-Mugheed, K., Farghaly, S. M., Baghdadi, N. A., Oweidat, I., & Alzoubi, M. M. (2023). Incidence , knowledge , attitude and practice toward needle stick injury among nursing students in Saudi Arabia. *Frontiers in Public Health*, May. <https://doi.org/10.3389/fpubh.2023.1160680>
- Ali, J., Shah, H., Khalilullah, Ali, M., & Khan, J. (2023). *Hepatitis B Vaccination Status among Nursing Students in Karachi, Pakistan*. 13, 24–28.

- Alinejad, N., Bijani, M., Malekhosseini, M., Nasrabadi, M., & Harsini, P. A. (2023). Effect of educational intervention based on health belief model on nurses' compliance with standard precautions in preventing needle stick injuries. *BMC Nursing*, 1–10.
- Auta, A., Adewuyi, E. O., Tor-anyiin, A., Edor, J. P., Kureh, G. T., Khanal, V., & Oga, E. (2018). *Global prevalence of percutaneous injuries among healthcare workers : a systematic review and meta-analysis*. September, 1972–1980. <https://doi.org/10.1093/ije/dyy208>
- Bagnasco, A., Zanini, M., Catania, G., Watson, R., Hayter, M., Dasso, N., Dini, G., Agodi, A., Pasquarella, C., Maria, C., Paolo, Z., & Loredana, D. (2020). Predicting needlestick and sharps injuries in nursing students : Development of the SNNIP scale. *WILEY: Journal of Nursing Management*, May, 1–10. <https://doi.org/10.1002/nop2.540>
- Bouya, S., Balouchi, A., Rafiemanesh, H., Amirshahi, M., Allahyari, J., Mawali, A. Al, Ebadi, A., & Dezhkam, A. (2020). *Global Prevalence and Device Related Causes of Needle Stick Injuries among Health Care Workers : A Systematic Review and Meta-Analysis*. 86(1), 1–8.
- Canli, Z., & Aydin, H. (2013). Needlestick injuries during education period in nursing students in. *Procedia Social and Behavioral Sciences*, 46(0242), 3798–3801. <https://doi.org/10.1016/j.sbspro.2012.06.149>
- Du, Y., Liu, C., Chen, X., & Zhang, Y. (2026). Interacting Effects of Gender and Workplace Conflict on Subjective Social Status and the Mediating Role of Professional Benefits in Registered Nurses : A Cross-Sectional Study in China. *WILEY: Journal of Nursing Management*, 1–12. <https://doi.org/10.1155/jonm/3317801>
- Hada, V., Saurabh, K., Sharma, A., Nag, V. L., Gadepalli, R. S., & Maurya, A. K. (2018). *Nursing students : A vulnerable health - care worker for needlesticks injuries in teaching hospitals*. 717–720. <https://doi.org/10.4103/jfmmpc.jfmmpc>
- Halimi, A., Gheshlagh, R. G., Ansari, M., Zakariaee, S. S., & Zandi, M. (2024). Prevalence of needle-stick injury in Iranian nurses : an updated systematic review and meta-analysis of observational studies. *BMC Nursing*, 268(23), 1–11.
- Kaknani-uttumchandani, S., Guti, L., Carmona-segovia, A. M., & Martí-garcía, C. (2021). Nurse Education Today Nursing students' perceptions on the use of clinical simulation in psychiatric and mental health nursing by means of objective structured clinical examination (OSCE). *Nurse Education Today*, 100(March), 1–6. <https://doi.org/10.1016/j.nedt.2021.104866>
- Kalabahi, R. (2025). *Analisis Determinan Cedera Tertusuk Jarum Suntik pada Perawat di RSUD Kalabahi*. 8(3), 577–583.

- Keicher, F., Zirkel, J., Leutritz, T., & König, S. (2024). Combatting the occurrence of needle - stick injuries in a medical school : why is it still an issue ? *BMC Medical Education*, 1–9. <https://doi.org/10.1186/s12909-024-05309-1>
- Laariya, A., Maliki, F. A., Mawardi, F., & Yuniasih, D. (2023). *Needle Stick Injury among Medical Students : Scoping Review*. 4(2), 271–279.
- Mengistu, D. A., Tolera, S. T., & Demmu, Y. M. (2021). *Worldwide Prevalence of Occupational Exposure to Needle Stick Injury among Healthcare Workers : A Systematic Review and Meta-Analysis*. 2021, 1–10. <https://doi.org/10.1155/2021/9019534>
- Ms, H. H., Jiaojiao, R. N., Ms, C., Mingzhao, R. N., Mm, X., Ms, S. C., Qinghua, R. N., & Ms, Z. (2020). Experiences and responses of nursing students as second victims of patient safety incidents in a clinical setting : A mixed-methods study. *WILEY: Journal of Nursing Management*, July, 1317–1325. <https://doi.org/10.1111/jonm.13085>
- Pierce, A. (2024). *Management of occupational exposure to blood and body fluids in primary care*. 47(4), 113–118.
- Putri, C., Erwin, & Arneliwati. (2022). Gambaran Pencegahan Cedera Jarum Suntik Di Rumah Sakit Pada Mahasiswa Profesi Ners Fakultas Keperawatan Universitas Riau. *Jurnal Medika Utama*, 03(02).
- Qadire, M. Al, Ballad, C. A. C., Omari, O. Al, Aldiabat, K. M., & Shindi, Y. A. (2021). Prevalence , student nurses ' knowledge and practices of needle stick injuries during clinical training : a cross-sectional survey. *BMC Nursing*, 187(20), 1–7.
- Raden M, R., A, S., & M, S. (2024). Recapping actions, knowledge, and use of safety boxes with the incident of needle stick injuries in nurses. *Berita Kedokteran Masyarakat*, 2, 67–71.
- Saparwati, M., & Syaifudin, A. (2025). Behaviors to Prevent Needle Stick Injury Among Nursing Students : A Systematic Literature Review. *Indonesian Journal of Nursing Research (IJNR)*, 8(2), 1–17.
- Thomas, L. M. B. (2019). Underreporting of Bloodborne Pathogen Exposures in Nursing Students. *Nurse Educator*, 00(0), 1–5. <https://doi.org/10.1097/NNE.0000000000000696>
- Xu, X., Yin, Y., Wang, H., & Wang, F. (2022). Prevalence of needle-stick injury among nursing students : A systematic review and. *Frontiers in Public Health*, 1, 0–7. <https://doi.org/10.3389/fpubh.2022.937887> OPEN
- Yousafzai, M. T., & Siddiqui, A. R. (2012). *Health Belief Model to Predict Sharps Injuries Among Health Care Workers at First Level Care Facilities in Rural Pakistan*. August, 1–9. <https://doi.org/10.1002/ajim.22117>.

Zhang, X., Chen, Y., Li, Y., Hu, J., Zhang, C., Li, Z., & Stallones, L. (2018). *Needlestick and Sharps Injuries Among Nursing Students in Nanjing , China. June.*
<https://doi.org/10.1177/2165079917732799>