



## Status of practice on prevention and treatment of exposure to sharp objects among nursing students at Lang Son Medical College in 2022

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### ABSTRACT

**Objective:** To describe the status of practice on prevention and treatment of exposure to sharp objects among nursing students at Lang Son Medical College in 2022. **Methods:** Cross-sectional descriptive study was implemented among 120 nursing students at Lang Son Medical College from January to July 2022 using “Evaluation of Nursing Students’ Practices in Preventing Injuries Caused by Sharp Objects” measurement with the Cronbach’s alpha coefficient of 0.793. **Results:** The percentage of nursing students at Lang Son Medical College who satisfactorily practice on prevention and treatment of exposure to sharp objects was 36.7%. Of which: 64.2% of students used cotton or gauze to break glass tubes; The percentage of students using both hands to cover the needle cap before and after injecting medicine were 38.3% and 48.3%, respectively; 21.7% of students did not wear gloves when their hands were injured; 72.5% of students passed around sharp objects when performing procedures; 71.7% of students did not put injection needles or infusion needles into sharps containers/containers immediately after injection. **Conclusion:** Practice of preventing and treating exposure to sharp objects among nursing students at Lang Son Medical College was at a low level.

**Keywords:** Nursing student, Prevention and exposure treatment, Sharp objects

### INTRODUCTION

Occupational exposure involves direct contact with blood, secretions, and excretions (excluding sweat) containing pathogens while medical staff perform their duties, leading to the risk of infection <sup>1</sup>. A sharps injury is a penetrating stab wound from a needle, scalpel, or other sharp object that may result in exposure to blood or other body fluids. Any skin-piercing technique, including injection, carries the

risk of transmitting bloodborne pathogens such as hepatitis virus or HIV, endangering human life <sup>1</sup>. Studies from various countries worldwide presented that occupational injuries caused by sharp objects were an alarming problem. In Egypt, the rate of healthcare workers with at least one injury caused by sharp objects was 68%, while in Nepal, it was 70,3% <sup>2,3</sup>. Research conducted by Veronesi at 12 universities in Italy in 2018 on the epidemiology and prevention of

needlestick injuries showed that 316 students experienced at least one needlestick injury, with a proportion of 12.7. % in women, and 9.7% in men. The highest rate was in the first internship (25.3%) and gradually decreased as the training progresses. Injuries occurred during drug preparation (38% of cases), disposal of sharp objects (24%), capping needles (15%), blood sampling (13%), and other cases (10%)<sup>4</sup>.

Preventing injury to sharp objects for nursing students needs to pay attention to the following things: When performing procedures related to sharp object such as injection needles and sewing needles, nursing students need to pay attention to prevent injury due to sharp objects. It is necessary to strictly follow instructions on safe techniques and regulations on handling sharp objects<sup>1, 5</sup>. Research by Sanja in Croatia in 2017 indicated that it is necessary to have appropriate educational strategies to raise awareness among nursing students about preventing occupational injuries caused by sharp objects and minimizing injuries among them<sup>6</sup>.

Lang Son Medical College offers a 3-year college nursing program. During their hospital care duties, performing injections is a routine procedure that students do on patients, so they face a high risk of exposure to sharp objects and potential infection with HBV, HCV and HIV. The students study theoretical credits in lecture halls, and practical credits in practical facilities. The question is how student practice on preventing and handling exposure to sharp objects? Therefore, this study was conducted to describe the status of practice on prevention and treatment of exposure to sharp objects among nursing students at Lang Son Medical College in 2022

## RESEARCH PARTICIPANTS AND METHODS

**Research participants:** Participants in the study were nursing students at Lang Son Medical College

*Inclusion criteria:* First-year, 2nd-year, and 3rd-year nursing students who had completed the Basic Nursing and Infection control modules.

Students who voluntarily agreed to participate in the research.

*Exclusion criteria:* The students who did not fully participate in all steps of the research process.

**Research time and location:** The study was conducted at Lang Son Medical College from January to July 2022. Data collection period: April to June 2022.

**Research design:** Cross-sectional descriptive study.

**Sampling method:** the entire sample of nursing students at Lang Son Medical College, which currently has 150 enrolled nursing students. Out of these, 120 students met the inclusion criteria and agreed to participate in the study.

### Measurement:

Data collection measurement.

**Questionnaire Development:** The questionnaire was developed based on the infection control guidance document of the Ministry of Health (2012)<sup>7</sup>, the Ministry of Health's safe injection guidance document (2012), and the practice guidance document of WHO (2010)<sup>8</sup>, refer to the questionnaire by My Thi Hai (2016) on "Survey of injuries caused by sharp objects to nursing students practicing at the hospital"<sup>9</sup>.

A pilot survey was conducted on 30 students at Lang Son Medical College who met the inclusion criteria (these students did not participate in the research sample). The questionnaire was tested reliability with Cronbach’s alpha coefficient for the practice scale of 0.793.

*Evaluation of Nursing Students’ Practices in Preventing Injuries Caused by Sharp Objects:* Practices on prevention are practical actions to prevent and treat injuries caused by sharp objects during procedure that carry a risk of sharp injury when taking care patients.

The practice content includes 13 questions. Evaluate the level of satisfaction in the practice of prevention and treatment of exposure to sharp objects among nursing students, based on the answers to evaluate whether the practice is satisfactory or not. A student scoring 60% or more (8 points) was

considered to have satisfactory practice, while a score below that was deemed unsatisfactory <sup>10</sup>.

**Data analysis:** Data was entered into SPSS 20.0 software. Data analysis was conducted on quantitative and qualitative variables, calculating quantities and percentages.

**Ethical issues:** The study was approved by the Ethics Council in Biomedical Research of Nam Dinh University of Nursing under the Certificate No.: 784/GCN-HDDD dated April 04, 2022.

## RESULT

Research on 120 students at Lang Son Medical College, in which female students accounted for the majority of 70.8%, male students accounted for 29.2%. The average age of students was  $20.15 \pm 1.68$  years old.

**Table 1. Practice of preparation before implementing the technique (n = 120)**

| Content   | Satisfactory practice |      | Unsatisfactory practice |      |
|---|-----------------------|------|-------------------------|------|
|   | Number                | %    | Number                  | %    |
| Prepare a sharps container/container to hang on the injection trolley or where have sharp waste           | 83                    | 69.2 | 37                      | 30.8 |
| Ensure that the injection trolley is organized to prevent any obstacles from interfering with injections. | 82                    | 68.3 | 38                      | 31.7 |
| Use cotton/gauze to wrap around the top of the glass tube before breaking                                 | 77                    | 64.2 | 43                      | 35.8 |

The results of Table 1 showed that 69.2% of students prepared sharp objects containers/containers to hang on the injection trolley or where had sharp waste, 68.3% ensured the injection trolley is tidy to avoid putting injection needles through the obstacle; 64.2% of students used cotton/gauze to wrap around the top of the glass tube before breaking.

**Table 2. Practices during technique implementation (n = 120)**

| Content   | Satisfactory practice |      | Unsatisfactory practice |      |
|---|-----------------------|------|-------------------------|------|
|   | Number                | %    | Number                  | %    |
| Do not use both hands to cover the needle before injecting medicine | 46                    | 38.3 | 74                      | 61.7 |
| Wear gloves when your hand is injured during the procedure          | 94                    | 78.3 | 26                      | 21.7 |
| Focus on injection and infusion procedure                           | 106                   | 88.3 | 14                      | 11.7 |
| Do not put your hand in front of the needle during the procedure    | 57                    | 47.5 | 63                      | 52.5 |

Table 2 indicated that students performed satisfactory practice which is focusing on injections and infusions procedure and wearing gloves when their hands were injured during the procedure which accounted for 88.3% and 78.3% respectively. However, students implemented at a very low satisfactory level, such as the percentage of students still used both hands to cover the needle before injecting medicine accounted for 61.7%; Putting their hands in front of the needle during the procedure accounted for 52.5%.

**Table 3. Handling of needles and sharp objects after using (n = 120)**

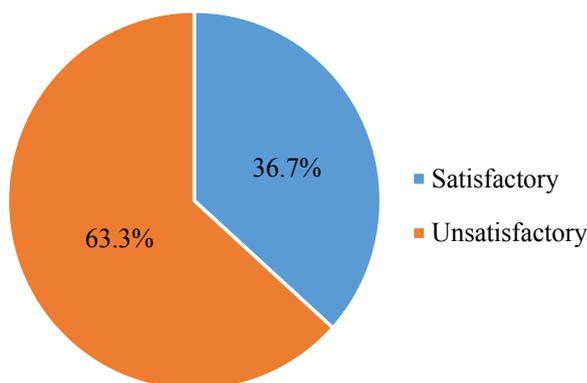
| Content   | Satisfactory practice |      | Unsatisfactory practice |      |
|---|-----------------------|------|-------------------------|------|
|   | Number                | %    | Number                  | %    |
| Do not use both hands to cover the cap after injection  | 58                    | 48.3 | 62                      | 51.7 |
| Do not remove the needle from the syringe after injecting   | 34                    | 28.3 | 86                      | 71.7 |
| Pick up needles by the forcept and put them in a safety box when the needles dropt on the floor after use | 70                    | 58.3 | 50                      | 41.7 |
| Do not pass around sharp objects  | 33                    | 27.5 | 87                      | 72.5 |

Table 3 presented the proportion of students with satisfactory practice in handling needles and sharp objects after using which was very low, with 72.5% of students passed around sharp objects; 71.7% of students removed the needle from the syringe after injecting; 51.7% used both hands to cover the cap after injection. The proportion of students picking up needles by the forcept and putting them in a safety box when the needle dropt on the floor after use was 58.3%.

**Table 4. Medical waste classification practices (n = 120)**

| Content  | Satisfactory practice |      | Unsatisfactory practice |      |
|--|-----------------------|------|-------------------------|------|
|  | Number                | %    | Number                  | %    |
| Medical waste according to regulations         | 102                   | 85.0 | 18                      | 15.0 |
| Empty sharps container/container with 3/4 full | 50                    | 41.7 | 70                      | 58.3 |

Table 4 showed that the majority of students classified medical waste according to regulations which accounted for 85%. However, only 41.7% of students emptied the sharp objects container/container with 3/4 full, and 58.3% of students emptied the sharp object container/ container with 2/3 full or completed full.



**Figure 1. Evaluation of results of practice in preventing and treatment of exposure to sharp objects of nursing students (n = 120)**

Figure 1 revealed that the proportion of students' practice on prevention and treatment of exposure to sharp objects was 36.7%; and 63.3% of students did not practice satisfactorily.

## DISCUSSION

### Preparation of sharp object container:

The research results indicated that 69.2% of students prepared sharps containers/containers to hang on injection trolley or where sharp waste, which was lower than findings from previous studies, such as a study by My Thi Hai showed that 99.3% of students prepared sharps containers/containers<sup>9</sup>; a study by Truong Thi Quynh Anh (2014) presented that 82.78% of students use containers for sharp objects while implementing techniques<sup>11</sup>. Most

of students are aware of the importance of equipping themselves with tools to prevent injuries caused by sharp objects. Using standard sharps containers is one of the standards for evaluating practice in countries around the world as well as in Vietnam. According to the 2012 guidelines on standard precautions in medical facilities of the Ministry of Health<sup>12</sup>, sharps containers must be suitable for the final disposal method.

Ensuring that the injection trolley was tidy is extremely necessary to help students

implement techniques more easily, limiting the need to put sharp objects through obstacles or taking out necessary tools during the process and made it easier to manage sharp objects. In addition, 68.3% of students kept the injection tidy which reported that students were aware of arranging the injection trolley properly to make their work easier and more convenient.

**Use of cotton or gauze for breaking glass tube:** Breaking glass tube with bare hands was one of the actions with a high risk of sharp injury. The results presented that 64.2% of students used cotton or gauze to break glass tubes, showing a higher percentage than those of Truong Thi Quynh Anh (2014) <sup>11</sup> with a proportion of 40.28%. My Thi Hai <sup>9</sup> showed that 88.2% of students who did not use gauze/cotton to wrap the top of the glass tube before breaking. Therefore, it is necessary to regularly monitor, remind and guide students during the internship process to be aware of possible dangers and know how to prevent them which help students avoid unnecessary injuries and ensure safety during clinical practice.

**Covering the needle before and after injection:** The percentage of students using both hands to cover the needle cap before and after injection was 38.3% and 48.3%, respectively. These results were higher than My Thi Hai's study which were 27.4% and 22.2% respectively <sup>9</sup>. Closing the needle cap with both hands (especially after an injection) was an action at a very high risk of sharp injury and was emphasized to be eliminated in nursing guidelines and training. According to the 2012 guidance on standard precautions in medical examination and treatment facilities of the Ministry of Health <sup>12</sup> on infection prevention during injections and handling of exposure to blood,

body fluids and sharp object, needle must not cover even before and after injection. Therefore, it is necessary to strengthen supervision and remind students to clearly understand safe practices and prevent high-risk techniques.

**Wearing gloves during procedures:**

The proportion of students wearing gloves when their hands were injured was 78.3%. Students were aware of not wearing gloves during injection and infusions which increased the risk of exposure to the patient's blood and fluids. It was especially more dangerous when their hand was injured. However, there was 21.7% of those did not wear gloves when their hands were injured. To solve this problem, it was necessary to equip students with basic knowledge about preventing sharp injuries and provide adequate equipment to ensure safety for students during the internship process.

**The process of working on the patient:**

The process of working on the patient needs to be focused to perform accurately and avoid accidents that can cause sharp injury and reducing the repetition of technique many times which may increase the risk of stress and sharp injury. On the other hand, do not put your hand in front of the needle and other sharp objects, especially during the injection procedure, do not use this hand to probe the veins above the skin, while the other hand was controlling the needle to find the location of the blood vessel <sup>5</sup>. The results presented that 88.3% focused on the injection procedure but 47.5% did not use their hands in front of the needle during the procedure. There were still 72.5% of students who passed sharp object when performing the procedure, this is also one of the actions that increased the risk of sharp injury.

**Dispose needles in a sharp container immediately after injection:** 71.7% of students did not put needles into the sharp container /container immediately after injection. The reason may be due to lack of sharp container or the urgency of the operation in which students subjectively did not bring the sharp container when performing the procedure. It could be explained by some reasons such as the students were not careful, lacking of sharp containers, or students' high workload. Therefore, teachers need to regularly remind students to implement safe practices to minimize the risk of injury.

**Waste classification:** Wrong classification of waste can harm medical staff during the waste collection process, can increase the possibility of contact with secretions, sharp objects mixed in waste causing injury to them. In addition, waste could also affect the community if it was not handled properly. It could be a source of transmission of dangerous infectious diseases and other toxic chemicals. According to research results, 85% of students classify waste according to regulations. This result is higher than My Thi Hai's study with 64.4% (2016) <sup>9</sup>. Thereby, it also shows that students have satisfactory practice in classifying medical waste which contributed to reducing the process of disease transmission and reducing the risk of sharp injury for medical staff collecting and treating waste.

**Satisfactory practice in preventing and treating sharp injuries:** The overall proportion of students practice satisfactorily ( $\geq 08$  contents) on prevention and treatment of sharp injuries was 36.7%. This proportion was similar to the study of Ho Van Luyen (2014) <sup>13</sup> which showed a result of 36.8%. However, it was lower than Truong Thi

Quynh Anh's study (2014) <sup>11</sup>, which showed that 52.5% of students practice satisfactorily in preventing sharp injuries, and My Thi Hai's research results had 46.7% of students practice satisfactorily in preventing sharp injuries <sup>9</sup>. In general, the results in the current study were lower than those of some other studies. This may be due to the lack of equipment in medical facilities, students' subjectivity and not fully equipped with the risk factors. In addition, it is possible that due to the high workload, students lack clinical practice experience. Therefore, to solve this problem, teachers need to increase education, regularly remind, and supervise students during the procedure, eliminate high-risk operations, and ensure safety for student, patients and medical staff.

According to experts from the World Health Organization and the International Nurses Association, the most effective measures to prevent transmission of blood-borne pathogens is to prevent exposure to sharp injury. Conducting health education, applying universal precautions, eliminating high-risk practices such as capping needles before and after injections and using sharp object container could reduce the risk of sharp injury <sup>8</sup>.

## CONCLUSION

The study reveals that the proportion of nursing students practicing satisfactorily in preventing and treating exposure to sharp objects is still low (36.7%). Of whom: 64.2% of students used cotton or gauze to break glass tubes; The percentage of students using both hands to cover the needle cap before and after injecting medicine was 38.3% and 48.3%, respectively; 21.7% of students did not wear gloves when their hands were

injured; 72.5% of students pass sharp object when performing procedures; 71.7% of students did not put injection needles or infusion needles into the sharp object box/container immediately after injection.

## REFERENCES

1. Ministry of Health. Instructions for safe injections in medical examination and treatment facilities (Issued together with Decision No. 3671/QD-BYT dated September 27, 2012 of the Ministry of Health), Hanoi, p. 2-28. 2012.
2. Hanafi M I., Mohamed A M., Kassem M S., Shawki M. Needle stick injuries among health care workers of Alexandria University Hospitals. *East Mediterr Health J.* 2011 Jan;17(1):26-35.
3. Singh B., Paudel B., Kc S. Knowledge and Practice of Health Care Workers regarding Needle Stick Injuries in a Tertiary Care Center of Nepal. *Kathmandu Univ Med J*, 2015, 13 (51), p.230. doi: 10.3126/kumj.v13i3.16813.
4. Veronesi L., Giudice L., Agodi A. et al. A multicentre study on epidemiology and prevention of needle stick injuries among students of nursing schools. *Annali Diigene*, 2018, 30(5), p.99-110. doi: 10.7416/ai.2018.2254.
5. Sanja Ledinski Ficko. Nursing Student's Knowledge about Understanding and Prevention of Needle Stick Injury. *Croat Nurs*, 2020, 4(1), 73-80. DOI: 10.24141/2/4/1/6.
6. Nguyen Thanh Ha and Nguyen Huy Nga. Continuous medical education and materials on medical waste management for medical staff, Medical Publishing House, Hanoi, p. 69 - 70. 2015.
7. Ministry of Health. Instructions for safe injections in medical examination and treatment facilities (Issued together with Decision No. 3671/QD-BYT dated September 27, 2012 of the Ministry of Health), Hanoi, p. 2-28. 2012.
8. WHO. WHO best practices for injections and related procedures toolkit, World Health Organization, Geneva, Switzerland. 2010.
9. My Thi Hai. Survey on injuries caused by sharp medical object among nursing students practicing at the hospital [Master's thesis in Nursing], Ho Chi Minh City University of Medicine and Pharmacy. 2016.
10. Seham A. Abd El Hay. Effect of Implementing Training Module on Competence of Internship Nursing Students Performance regarding Needle Stick and Sharp Injuries Safety Issues. *Tanta Scientific Nursing Journal*, 2020, 19(1), p.152-180.
11. Truong Thi Quynh Anh. Injuries caused by needle sticks and sharp objects among nursing students [Master's thesis in Nursing], University of Medicine and Pharmacy, City. Ho Chi Minh. 2014.
12. Ministry of Health. Decision No. 5771/BYT-K2DT Promulgating infection control programs and documents for grassroots health workers, Hanoi, August 30, 2012.
13. Ho Van Luyen). Rate of sharp injuries and knowledge and practice on prevention and treatment of medical students at Kien Giang Medical College. Faculty of Public Health, University of Medicine and Pharmacy, Ho Chi Minh City, Ho Chi Minh. 2014.