

CURRENT STATUS OF KNOWLEDGE ON MANAGING SHARP EXPOSURE OF 3RD-YEAR NURSING STUDENTS AT A COLLEGE IN HANOI

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ABSTRACT

Background: Exposure to sharp objects (NSI) poses a risk of HBV, HCV, and HIV transmission and affects health and psychology. Third-year nursing students at a college in Hanoi are at high risk but lack knowledge of how to handle it. The study aims to survey third-year nursing students' current knowledge of handling sharp object exposure at a college in Hanoi.

Objective: Describe the current status of knowledge of sharp object exposure handling of third-year nursing students at a college in Hanoi in 2025. **Subjects and Methods:** Cross-sectional descriptive study, conducted on 360 third-year nursing students from January 2025 to May 2025 at a college in Hanoi using a convenience sampling method.

Results: Survey results showed that the majority of third-year nursing students at a college in Hanoi had good knowledge of handling sharps exposure (86.9%) and blood-borne pathogens (86.9%), but limited knowledge of vaccines (41.1%). Correct awareness of safe practices, such as breaking ampoules, inserting/removing IV needles, transporting and capping needles, and not picking up needles by hand, was high (from 81.1% to 96.1%), but knowledge of puncture-resistant containers, when to reuse safety containers, and handling IV needles after use was still suboptimal (49.7% - 64.4%). The rate of correct first-aid understanding after NSI was only 58.6%, while most students knew how to report incidents (97.8%) promptly.

Conclusion: Research suggests a need to improve training and practice in NSI prevention and management, especially in areas where content is limited.

Keywords: Sharps exposure management, knowledge, students, college.

1. INTRODUCTION

Needle Stick Injuries (NSI) are a condition of direct contact with sharp instruments such as needles, scalpels, glass pieces from medicine tubes, test tubes... contaminated with blood, secretions, or excretions (except sweat) containing pathogens [1],[2],[3]. This is one of the most dangerous occupational accidents in the health care environment, with the potential risk of transmitting serious infectious diseases such as *hepatitis B* virus (HBV), *hepatitis C* virus (HCV), and *human immunodeficiency* virus (HIV). According to the World Health Organization (WHO), each year about 3 million health workers are exposed to blood-borne pathogens, of which 2 million are infected with HBV, and 0.9 million are infected with HIV [4]. NSI not only affects physical health but also negatively impacts the exposed person's psychology, quality of life, and career.

Nursing students regularly come into direct contact with

patients during their studies and clinical practice, so the risk of NSI is inevitable. However, many students are not fully equipped with the knowledge and skills to handle incidents when they occur. Domestic and international studies have shown that the rate of students who have suffered from NSI ranges from 51-55%. Still, only about 38% correctly identify the time for post-exposure prophylaxis (PEP), and nearly 15% correctly understand the method of safe sharps handling. The majority are still confused about standard operating procedures (SOP). This limited knowledge increases the risk of NSI and the serious consequences that follow.

At a college in Hanoi, third-year nursing students are the main force participating in clinical practice at the hospital, a facility with high work intensity and a large number of patients, so the risk of NSI is always present. Although many studies worldwide and in the country have

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examined knowledge of NSI management among nursing students, no study has specifically evaluated third-year nursing students at a college in Hanoi. Based on that reality, this study was conducted to survey the current status of knowledge of NSI management and some related factors in this group.

2. METHODS

2.1. Research design: Cross-sectional.

2.2. Research location and time: The research was conducted from January 2025 to May 2025 at a college in Hanoi.

2.3. Research subjects: 3rd-year nursing students at a college in Hanoi.

- Inclusion criteria: All third-year nursing students at a college in Hanoi. Volunteered to participate in the study.
- Exclusion criteria: Students who have reserved and withdrawn their application. Students who are sick, hospitalized, or not healthy enough to participate in the study at the time of the survey.

2.4. Sample size, sample selection

Apply the sample size formula to estimate a proportion:

$$n = Z^2_{1-\alpha/2} \frac{p(1-p)}{\Delta^2}$$

In there: $Z_{1-\alpha/2} = 95\%$ ($\alpha = 0.05$) corresponds to 1.96, $\Delta = 5\%$ (0.05).

+ P: estimated ratio (the ratio of students with good knowledge of NSI prevention and treatment is $p = 0.621$ - based on research by Nguyen Thi Ha (2019) [5]. Substituting into the formula, we get a sample size of 360. Sampling used a convenient approach.

2.5. Research tools

The study used a toolkit built on KoboToolbox.

Toolkit used according to Nguyen Thi Ha's (2019) research [5].

The toolkit is divided into two parts:

+ Part 1: General information about the research subjects.

+ Part 2: Includes 25 questions on practical knowledge of NSI prevention, divided into three parts: Knowledge of viruses transmitted through blood and fluids; Knowledge of NSI prevention measures; Knowledge of NSI treatment.

2.6. Research variables

Variables included general information about the study subjects (age, gender, and education level) and knowledge of NSI management.

2.7. Data collection process

- Step 1: The researcher gets the list of 3rd year nursing students from the school's website.
- Step 2: Monitor the weekly schedule to capture the time the research subject is present at school.
- Step 3: The researcher meets the research subject

directly to introduce the purpose, content, methods, and benefits of the research. Guide the research subject to answer honestly and as closely as possible to their actual situation.

If participants agreed to participate in the study, they were informed about the study participation form and then instructed on how to complete the questionnaire in KoboToolbox. The researcher was present at the study site to ensure that participants did not discuss among themselves and to answer any questions directly.

- Step 4: Research participants scanned the QR code and participated in answering questions via the KoboToolbox link with the built toolkit.

The information, data, and answers of each research subject were coded for the study. The information was encoded in the questionnaire. The QR code was retrieved immediately after the research subject completed all the questions.

- Step 5: Enter, process, and analyze data.

2.8. Data analysis

Check all raw data processing survey forms before entering data.

Check for duplicate information, data errors, and data encryption.

Data analysis was performed using SPSS 22.0 software. Descriptive statistics (frequency, percentage, mean...) were used to analyze the knowledge scores of NSI treatment of third-year nursing students. Data were exported and presented in tables and charts.

2.9. Research ethics

Students were clearly informed about the research objectives and the voluntary nature of participation in the study, and they had the right to refuse to participate without explanation. The choice of whether to participate in the study was not related to academic results, graduation exam scores, or the confidentiality of student information.

The research process was conducted independently. The information collected was coded with a series of numbers (IDs), stored securely at the research site, and used only for research purposes.

3. RESULTS

3.1. General characteristics of the research subjects

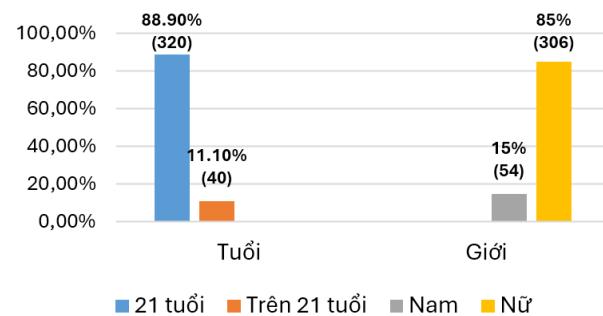


Figure 1. Gender and age of study subjects (n = 360)

Regarding gender, female students comprised the majority of research subjects (85%), while male students comprised 15%. Regarding age, 88.9% of students in the survey group were 21 years old, and 11.1% were over 21.

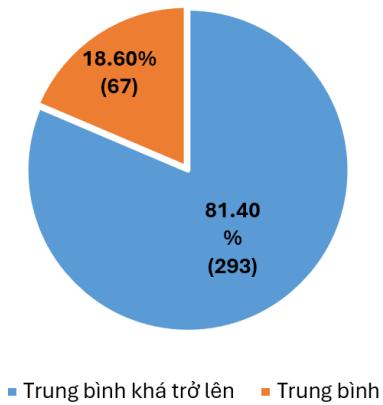


Figure 2. Academic performance of research subjects (n = 360)

The analysis results show that the majority of students participating in the study had average or above-average academic performance (81.4%), while only 18.6% had average academic performance.

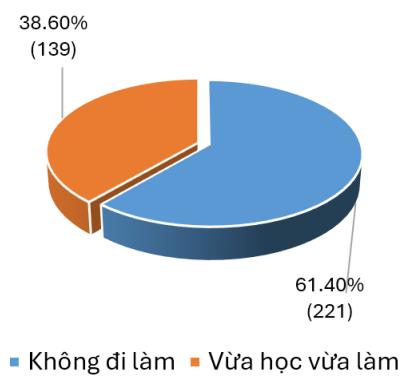


Figure 3. Employment status of research subjects (n = 360)
61.4% of students do not work; the remaining 38.6% study and work.

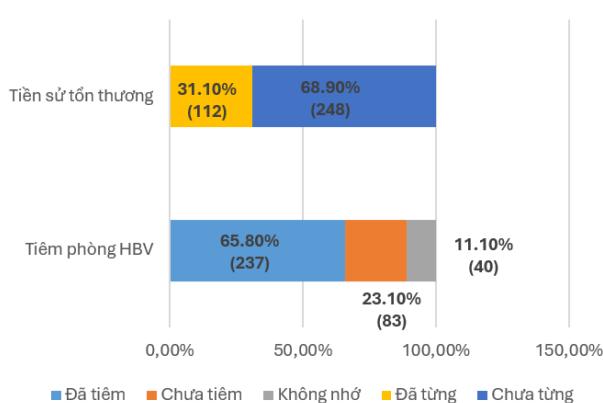


Figure 4. HBV vaccination and injury history of third-year nursing students (n = 360)

The percentage of students who had been vaccinated against HBV was 65.8%, while 23.1% had not been vaccinated, and 11.1% did not remember.

VSN had injured 31.1% of students, and 68.9% of students had never been injured.

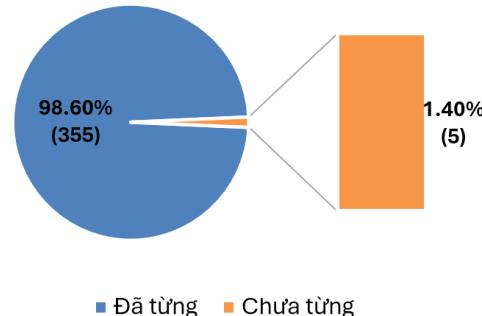


Figure 5. Learning of NSI treatment knowledge of 3rd year students (n = 360)

The majority of third-year nursing students (98.6%) had learned about NSI management; only 1.4% had never learned.

Table 1. Learning resources on NSI management knowledge of third-year nursing students (n = 360)

Information		
Classify	Quantity (n = 360)	Ratio (%)
Learning resources		
Read the document yourself	209	58.1%
Learn theory at school	278	77.2%
Clinical learning during hospital internship	317	88.1%

Students primarily access knowledge through clinical hospital internships (88.1%), followed by theoretical learning (77.2%) and self-directed reading of documents (58.1%).

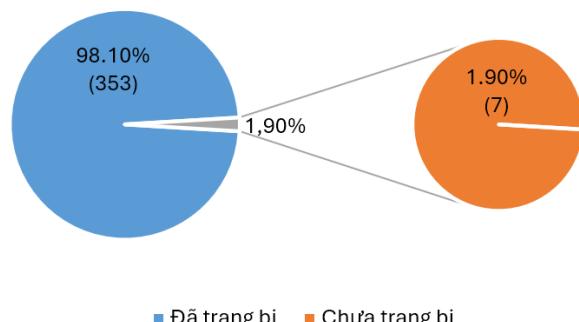


Figure 6. Knowledge of NSI treatment of third-year nursing students (n = 360)

98.1% of third-year nursing students knew NSI management. However, 1.9% still lacked knowledge of NSI management.

Table 2. Time to equip knowledge on NSI treatment of 3rd year nursing students (n = 360).

Information		
Classify	Quantity (n = 360)	Ratio (%)
Time to equip knowledge to handle VSN exposure		
Under 1 month	21	5.8%
Over 1 month	332	92.2%
Not equipped	7	1.9%

The majority of third-year nursing students (92.2%) have had knowledge of NSI management for over 1 month. However, there are still some students who have not had access to this knowledge for long, less than 1 month (5.8%), and 1.9% have not been equipped with knowledge of NSI management.

3.2. Current status of NSI management knowledge of third-year nursing students at a college in Hanoi in 2025

3.2.1. Ants awake about Concepts and prevention of NSI among third-year nursing students at a college in Hanoi in 2025

Table 3. Ants awake about Bloodborne viruses, body fluids of 3rd year nursing students (n = 360)

Information	Classify	Correct answer (n = 360)	Ratio (%)
Viruses that cause disease through blood and body fluids	HBV	358	99.4%
	HCV	317	88.1%
	HIV	356	98.9%
Number of students who answered all three questions correctly		313	86.9%

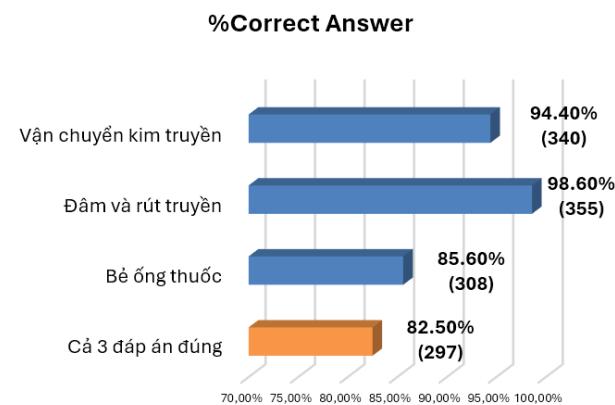
Students have good knowledge of blood-borne viruses, with 99.4% correctly answering about HBV, 98.9% about HIV, and 88.1% about HCV. 86.9% of students correctly answered that all three viruses, HBV, HCV, and HIV, are blood-borne.

Table 4. Knowledge of blood-borne diseases and preventive vaccines of third-year nursing students (n = 360)

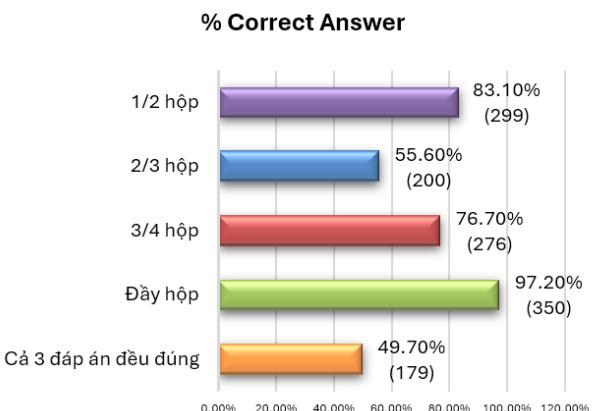
Information	Classify	Correct answer (n = 360)	Ratio (%)
Bloodborne diseases, preventive vaccines	HBV	355	98.6%
	HCV	163	45.3%
	HIV	247	68.6%
Number of students who answered all three questions correctly		149	41.4%

98.6% of students knew about the HBV vaccine, but knowledge about the HCV vaccine was 45.3% and HIV was 68.6%. Only 41.4% of students answered all three questions correctly.

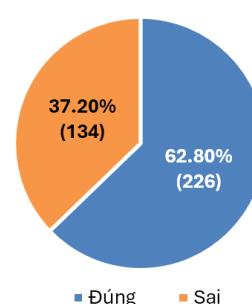
3.2.2. Knowledge of NSI prevention measures of third-year nursing students at a college in Hanoi.

**Figure 7. Knowledge of the likely timing of NSI among third-year nursing students (n = 360)**

The majority of students had correct knowledge about the times when NSI is likely to occur. Specifically, 98.6% correctly perceived the risk when “inserting and withdrawing IVs”, 94.4% when “transporting IV needles”, and when “breaking ampoules” (85.6%). 82.5% chose all three correct answers.

**Figure 8. Regulations on the use of puncture-resistant boxes for third-year nursing students**

The percentage of students who knew about the regulation requiring the use of puncture-resistant boxes filled with at least 3/4 of the box was 76.7%. The highest rate of correct answers was in the “full box” group (97.2%), and the lowest was in the group with all three answers correct (49.7%).

**Figure 9. Time of reuse of puncture-resistant containers by third-year nursing students (n = 360)**

62.8% of students answered correctly regarding the time to reuse puncture-resistant boxes; however, 37.2% still did not clearly understand this time.

Table 3.5. Knowledge of safe handling of VSN of third-year nursing students (n = 360)

Information	Correct answer (n = 360)	Ratio (%)
Direction France cover lid needle safe whole Okay recommend proposal	292	81.1%
Safe method of breaking medicine tubes	198	55%
Dispose of used IV needles when they fall on the floor	346	96.1%
Dispose of IV needles after use	232	64.4%

81.1% of students answered correctly about how to cap a needle safely, and 96.1% responded correctly about how to handle a needle that falls on the floor. The percentage of students who answered correctly about safely breaking a medicine tube (55%) and how to handle an IV needle after use (64.4%).

3.2.3. Knowledge of NSI management of third-year nursing students at a college in Hanoi in 2025

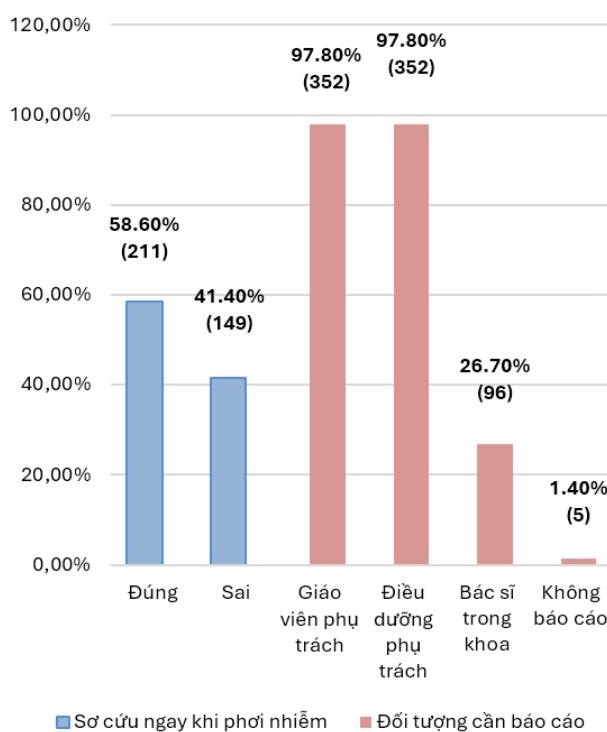


Figure 10. First aid for VSN injuries and reporting subjects of 3rd year nursing students (n = 360)

58.6% of students provided first aid correctly when injured by VSN, and 41.4% did not. Most students would report to their teachers and nurses in charge (97.8%). Only 26.7% reported to their doctors, and 1.4% did not report after NSI.

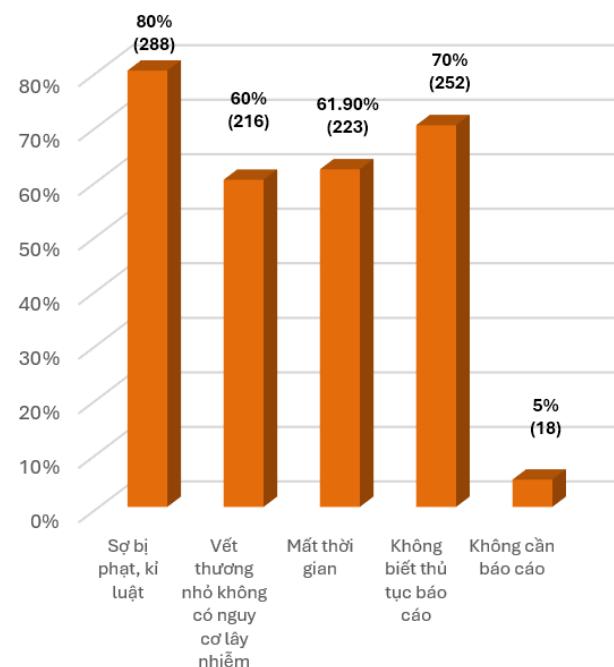


Figure 11. Reasons for not reporting to the supervisor after NSI of third-year nursing students (n = 360)

The majority of students did not report because they were afraid of being disciplined (80%), of wasting time (61.9%), and of the wound being at risk of infection (60%), and 70% did not know about the reporting procedure. Only 5% thought it was unnecessary to report.

Table 6. Knowledge of post-NSI risk assessment among third-year nursing students (n = 360)

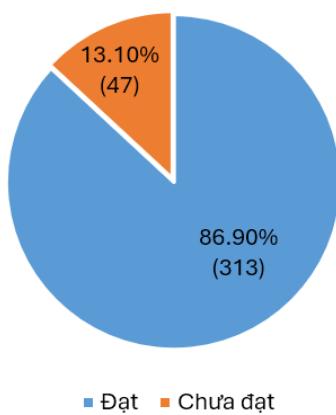
Content	Correct quantity (n = 360)	Ratio (%)
After exposure, the exposed person tested positive for HIV/HBV/HCV, which is due to the exposure	190	52.8%
People who are exposed and HIV negative should have an HIV antibody test after 3 and 6 months	317	88.1%
The risk of exposure to a blood-contaminated needle depends on the type of needle and the extent of the wound injury	320	88.9%

The majority of students had good knowledge of risk assessment after NSI, with 88.1% knowing that HIV testing should be done after 3-6 months, and 88.9% of students understanding that the risk depends on the type of needle and the extent of injury. However, only 52.8% of students correctly identified the source of infection when the patient tested positive.

Table 7. Post-NSI prevention knowledge of third-year nursing students (n = 360)

Content	Correct answer	
	Quantity (n = 360)	Ratio (%)
HBV prophylaxis is best given within 24 hours	293	81.4%
The optimal time for prophylaxis after exposure to blood or body fluids of an HIV (+) patient is within 72 hours	306	85%

The majority of students had correct knowledge about the timing of PEP: 81.4% knew that HBV prophylaxis is effective within 24 hours, and 85% knew the optimal timing for HIV prophylaxis within 72 hours.

**Figure 12. General knowledge of NSI treatment of 3rd year students (n = 360)**

The majority of students achieved general knowledge of correct handling in NSI, accounting for 86.9%. However, 13.1% of students still did not reach the required knowledge.

4. DISCUSSION

4.1. Characteristics of research subjects

The survey results of 360 third-year nursing students at a college in Hanoi showed that women had an absolute predominance (85%), higher than the study by Mohammad Al Qadire [6] and similar to the general trend of the nursing industry in Vietnam, but lower than Nguyen Hai Lam (2020) with 92.7% [7]. This reflects the characteristics of the nursing profession that continue to attract mainly female workers. By age, the 21-year-old group accounted for 88.9%, consistent with the standard training roadmap and similar to the study by Nguyen Thi Hong Hanh (2023), which reported 91.8% of students ≤ 22 years old [8].

The majority of students' academic performance was at the level of Average or above (81.4%), higher than the studies of Nguyen Thanh Trung (2022) (75.3% good or above) and Nguyen Thi My Phuong (73.9% good or above) [9], showing stability in academic performance. However, the rate of Average academic performance still

accounted for 18.6%, reflecting the need to improve learning methods and motivation, which have been shown to influence academic performance strongly.

The rate of students studying while working is 38.6%, lower than Vu Dinh Cong's (2023) study (76.8%) but close to Pham Dang Linh's results, indicating that part-time work is a popular trend but not absolutely dominant.

4.2. Knowledge of prevention of sharps exposure (NSI)

The majority of students (86.9%) correctly identified all three blood-borne viruses (HBV, HCV, HIV), higher than Pham Dang Linh's study (62.3%) and equivalent to Nguyen Thi Ha Thu's (88.5%), surpassing the international survey of Datar, Uma Vasant (2022) (32%). This may be due to the school's early integration of infectious diseases and infection control in the curriculum.

However, only 41.4% of students had correct knowledge about vaccines, similar to Nguyen Thi Ha Thu (40.4%) but higher than Nguyen Thi Ha (15.8%) [5]. The rate of students mistakenly thinking that HIV and HCV have vaccines is still high (54.7% and 31.4%), indicating the need to increase training and update evidence-based knowledge.

Correct awareness of high-risk situations leading to NSI (intravenous needle insertion/removal, needle transport, and drug tube breaking) reached 82.5%, significantly higher than that of Nguyen Thi Ha Thu (59.4%) and students of Logistics College 1 (20.5%). The rate of correct understanding of the method for safely capping needles (81.1%) was much higher than that of Nguyen Hai Lam (50.3%) [7] and was close to that of Nguyen Thi Ha Thu (83.7%) [10]. This reflects the effectiveness of the curriculum integrating clinical practice.

However, knowledge of the principles of puncture-resistant containers (49.7%) and of handling used IV needles (64.4%) remains limited, consistent with results from some studies. The reason may be that students have not had enough practice or have not been exposed to much about the medical waste collection process in the infection control department.

4.3. Knowledge of post-exposure management

Only 58.6% of students performed first aid correctly according to standard procedures (washing with soap under running water, not squeezing blood), higher than the rates reported by Khalid Al-Mugheed (20.6%) and the College of Logistics 1 (37%), but about 41.4% still performed incorrectly. This shows that although theoretical awareness has improved, initial response skills when NSI occurs are not uniform.

The rate of reporting incidents to the right subjects (lecturers and nurses in charge) reached 97.8%, much higher than Nguyen Thanh Trung (71% and 72%), equivalent to Doan Manh Linh's study (98.3%). However, the reasons for not reporting were still common, such as fear of being fined, lack of knowledge of procedures, wasting time, or low risk assessment, similar to international reports.

Regarding risk assessment after NSI, students had a

better understanding of practical elements (88.9% knew that the risk depends on the type of needle and the level of injury) than conceptual elements (52.8% knew how to identify the cause of exposure). This suggests that clinical simulation scenarios should be added to enhance the ability to analyze cause and effect.

Knowledge of PEP was high: 81.4% knew the optimal time for HBV prophylaxis (within 24 hours), 85% knew the optimal time for HIV prophylaxis (within 72 hours). This result was higher than domestic studies and far exceeded international studies by Datar, Uma Vasant (38.5% and 32.5%), showing the positive impact of the training program integrating infectious disease modules and pre-clinical training sessions.

4.4. Overview of the review

The total rate of students meeting the general knowledge requirements for NSI management was 86.9%, higher than many domestic and foreign studies (Nguyen Thi Ha Thu: 76.3% [10], Doan Manh Linh: 62.5%, Pham Dang Linh: 68.5%, Mohammad ALQadire: 66%). This superiority may be related to the specificity of the training program at the Hospital, with a close combination of theory and clinical practice, and a large, multidisciplinary hospital environment with high practice intensity.

However, there are still gaps in knowledge of vaccines, puncture-resistant container principles, post-use needle disposal procedures, and first aid skills. Therefore, it is necessary to strengthen emergency practice, integrate clinical simulation, and conduct periodic examinations to consolidate students' knowledge and skills before graduation.

5. CONCLUSION

The majority of students had satisfactory knowledge, with 86.9% demonstrating good knowledge of NSI treatment and 13.1% demonstrating inadequate knowledge.

86.9% of students have correct knowledge about viruses that cause diseases through blood and body fluids; however, only 41.1% have correct knowledge about vaccines.

The percentage of students who answered correctly when breaking a medicine tube, inserting/removing an IV needle, and transporting a syringe, knowing the correct method of capping a needle, and not using their hands to pick up a needle when it falls on the floor were 82.5%, 81.1%, and 96.1%, respectively.

55% of students answered correctly about safe operations when breaking medicine tubes, handling IV needles after use (64.4%), and knowing when to reuse safety boxes (62.8%). In comparison, the principle of puncture-resistant boxes (49.7%) was relatively low.

In addition, the percentage of students who understand first aid after injury: washing hands with soap under running water, not squeezing blood, is 58.6%. Students know how to report to the nurse and lecturer in charge after NSI (97.8%).

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