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Knowledge and attitudes on needlestick and sharps injury prevention among healthcare workers at Hai Phong International general Hospital

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ABSTRACT

***Objective**: To describe the knowledge and attitudes toward sharp object exposure prevention among healthcare workers at Hai Phong International General Hospital in 2025. **Methods**: A cross-sectional descriptive study was conducted among 353 healthcare workers from March to May 2025 using convenience sampling. A structured questionnaire included 16 knowledge questions (total score 25) and 22 attitude items. Adequate knowledge and a positive attitude were defined as scores >60% of the total possible score. Data were analyzed using frequency, percentage, and mean ± standard deviation. **Results**: Healthcare workers aged ≤30 years accounted for 58.6%; 72.2% were female, and 75.4% had a university degree or higher. A significant gap was observed between high theoretical knowledge (94.9%) and moderate positive attitudes (53.0%). No participant achieved a perfect score in the "preventive measures" knowledge domain (0%). The main perceived barriers were staff shortages (46.1%) and patients' lack of cooperation (39.9%). **Conclusion**: Healthcare workers demonstrated high knowledge but a relatively low level of positive attitude toward needlestick and sharps injury prevention. The hospital should strengthen training, communication, and staffing support to improve occupational safety practices.*

***Keywords** : Knowledge, attitude, needlestick injuries; sharps; healthcare workers.*

INTRODUCTION

Healthcare workers (HCWs) play a crucial role in providing healthcare for patients; however, they face numerous occupational risks during patient care [1]. Clinical tasks such as surgery, injections/ infusions, and blood collection place HCWs at a high risk of acquiring infectious diseases due to occupational exposure to needles and other sharps [2]. The consequences of sharps exposure include infection and potentially life-threatening conditions for HCWs [3]. A study in China reported that occupational exposure to sharps among HCWs negatively affects satisfaction with the work environment [4]. In addition, studies show that HCWs who experience sharps exposure may suffer adverse mental health effects, including anxiety and depression related to infection risk or fear of transmitting infection to family members, which consequently reduces quality of life. The cost associated with occupational exposure among HCWs is also substantial [5].

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Needlestick injury is a percutaneous wound caused by a needle or other sharp instrument in healthcare settings. Approximately 3 million HCWs experience needlestick and sharps injuries each year [6]. In Vietnam, nurses have the highest frequency of exposure to sharps from patients; in particular, nurses who frequently perform injections and infusions are at high risk of occupational exposure. The hepatitis B virus infection rate among HCWs has been reported to be 5.5% [7]. Previous studies have shown that HCWs' knowledge and attitudes are associated with occupational exposure to sharps during patient care and treatment [4, 8, 9]. However, some studies indicate that gaps remain in HCWs' knowledge and attitudes toward sharps injury prevention, such as knowledge of the maximum fill level of sharps containers, recapping needles before placing them into sharps containers, and reluctance to report sharps injuries [8, 9]. In Vietnam, several studies have investigated HCWs' knowledge and attitudes regarding the prevention of occupational exposure to sharps; nevertheless, findings have been inconsistent [10].

Hai Phong International General Hospital has a team of qualified physicians and healthcare staff. The hospital provides care for a large number of patients, and HCWs frequently perform procedures involving sharps (e.g., injections/infusions and blood collection). Do gaps still exist in HCWs' knowledge and attitudes toward sharps injury prevention in this setting? To address this question, we conducted the study with the aim to describe the knowledge and attitudes toward needlestick and sharps injury (NSSI) prevention among healthcare workers at Hai Phong International General Hospital in 2025.

SUBJECTS AND METHODS

Study participants: Participants were healthcare workers currently working in the hospital's clinical departments.

Inclusion criteria: HCWs working in clinical departments who agreed to participate.

Exclusion criteria: HCWs not directly involved in patient care; those absent during data collection; those on maternity leave; or those attending full-time training courses.

Study period and setting: The study was conducted from March to May 2025 at Hai Phong International General Hospital.

Study design: A cross-sectional descriptive study was used.

Sample and sampling methods

Apply the formula:

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

Where: n: minimum sample size required for the study. Z: Confidence coefficient. p: proportion. d: desired error.

The minimum sample size was calculated using a single-proportion formula with 95% confidence (Z = 1.96), expected proportion p = 0.924 (from a prior study) [11], and allowable error d = 0.03; the minimum required sample size was 300. The hospital had 410 HCWs working in clinical departments; 30 HCWs participated in the pilot test of the instrument. The study applied census sampling, and 353 HCWs were included in the final survey.

Data collection instrument: The instrument included two parts:

- General information (age, sex, professional qualification, years of service, training, etc.).

- Knowledge and attitudes toward sharps injury prevention.

The questionnaire was developed based on the Standard Precautions guideline in healthcare facilities (Decision No. 3671/QĐ-BYT dated September 27, 2012) and a prior study tool. Content validity was assessed by three infection control experts (I-CVI = 1; S-CVI/UA = 1). Reliability testing among 30 HCWs showed a test–retest Kappa coefficient of 0.562 for the knowledge section ($p < 0.001$) and Cronbach's alpha of 0.918 for the attitude section.

Scoring and classification: Knowledge: 16 questions; 1 point for each correct answer and 0 for incorrect; total maximum score 25. Adequate knowledge was defined as a total score > 60%; inadequate knowledge was defined as a total score ≤60%.

Attitudes: 22 items on a 5-point Likert scale. For certain domains, responses were recoded into binary scores (positive attitude = 1; neutral/negative = 0) with reverse coding applied where appropriate (e.g., sensitivity and perceived barriers). A positive attitude was defined as a total attitude score > 60% of the maximum..

Data analysis: Data were analyzed using SPSS 22.0. Frequency, percentage, and mean ± SD were used for descriptive analyses

Ethics considerations: Participants were informed about the study objectives, confidentiality was ensured, and participation was voluntary. Ethical approval was granted under Decision No. 939/GCN-HĐĐĐ from Nam Dinh University of Nursing and Hai Phong International General Hospital.

RESULTS

Table 1. General characteristics of healthcare workers (n = 353)

Variable		n	%
Age (year)	≤ 30	207	58.6
	> 30	146	41.4
Sex	Male	98	27.8
	Female	255	72.2
Professional qualifications	Intermediate/college	87	24.6
	University degree or higher	266	75.4
Years of service at the hospital	≤ 5 years	152	43.1
	> 5 years	201	56.9
Training on NSSI prevention	Received training	342	96.9
	Not yet trained	11	3.1
Training within the past year	Yes	306	86.7
	No	47	13.3

Variable		n	%
History of needlestick/sharps exposure	No	333	94.3
	Yes	20	5.7
Department group	Medical departments	246	69.7
	Surgical departments	107	30.3

A total of 353 healthcare workers were surveyed. Participants aged ≤30 years accounted for 58.6%; 72.2% were female; and 75.4% held a university degree or higher. More than half (56.9%) had worked at the hospital for >5 years. Most participants had received training on NSSI prevention (96.9%), and 86.7% had been trained within the past year. The majority (94.3%) reported no prior sharps exposure. Most participants worked in medical departments (69.7%).

Table 2. Correct knowledge about NSSI prevention (n = 353)

Content	n	%	Mean ± SD
Risk factors for sharps exposure	217	61.5	4.9 ± 1.6
Consequences of sharps exposure	112	31.7	3.3 ± 0.5
Preventive measures	0	0	8.8 ± 1.4
Post-exposure management	93	26.3	2.7 ± 0.9

Healthcare workers most frequently achieved full marks in the risk factors domain (61.5%;). No participant achieved full marks in the preventive measures domain (0%), although the mean score for this domain was 8.8 ± 1.4/11. Full marks were less common for post-exposure management (26.3%)

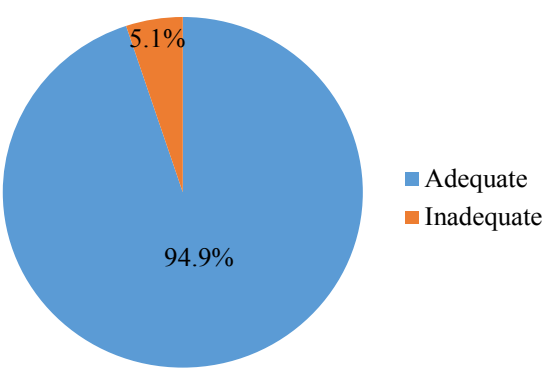

Figure 1. Classification of healthcare workers' knowledge about NSSI prevention

Most healthcare workers (94.9%) have knowledge about NSSI prevention.

Table 3. Attitudes toward NSSI prevention (n = 353)

Content	Agree	Neutral	Disagree	Mean ± SD
	n (%)	n (%)	n (%)	
Perceived severity of sharps exposure				
Sharps exposure affects health	341 (96.6%)	9 (2.5%)	3 (0.9%)	4.49 ± 0.64
Sharps exposure can result in infection with ~20 diseases	345 (97.8%)	4 (1.1%)	4 (1.1%)	4.45 ± 0.62
Sharps exposure causes stress.	344 (97.5%)	4 (1.1%)	5 (1.4%)	4.48 ± 0.64
Sharps exposure affects work	338 (95.8%)	9 (2.5%)	6 (1.7%)	4.44 ± 0.69
Sharps exposure wastes time	337 (95.5%)	9 (2.5%)	7 (2%)	4.40 ± 0.71
Perceived susceptibility (sensitivity) to sharps exposure				
I believe I will not be exposed to sharps	142 (40.2%)	81 (22.9%)	130 (36.9%)	2.98 ± 1.18
I believe I will not be exposed to serious bloodborne diseases	143 (40.5%)	70 (19.8%)	140 (39.7%)	2.97 ± 1.17
I believe I will not be worried	127 (35%)	57 (16.1%)	169 (48.9%)	2.82 ± 1.20
I believe it won't take time.	128 (36.3%)	54 (15.3%)	171 (48.4%)	2.80 ± 1.23
I believe sharps exposure does not affect work.	130 (36.9%)	51 (14.4%)	172 (48.7%)	2.80 ± 1.24
Perceived importance of prevention measures				
Eliminating injections makes sharps unnecessary	291 (82.4%)	39 (11%)	23 (6.6%)	3.91 ± 0.87
Do not recap needles using two hands	297 (84.1%)	37 (10.5%)	19 (5.4%)	4.00±0.81
Immediately dispose of used sharps into a sharps container	312 (88.4%)	33 (9.3%)	8 (2.3%)	4.12 ± 0.71
Proper waste segregation and management	316 (89.5%)	31 (8.8%)	6 (1.7%)	4.14 ± 0.68
Reporting sharps exposure	308 (87.3%)	37 (10.5%)	8 (2.2%)	4.06 ± 0.69
Hepatitis B vaccination	317 (89.8%)	32 (9.1%)	4 (1.1%)	4.22 ± 0.68
Apply measures to prevent sharps exposure	313 (88.7%)	35 (9.9%)	5 (1.4%)	4.16 ± 0.68

Content	Agree	Neutral	Disagree	Mean ± SD
	n (%)	n (%)	n (%)	
Perceived barriers to implementing prevention measures				
Lack of medical supplies and safety equipment	137 (38.8%)	101 (28.6%)	115 (32.6%)	3.08 ± 0.96
Lack of knowledge about sharps exposure	135 (38.3%)	107 (30.3%)	111 (31.4%)	3.09 ± 0.94
Work overload	136 (33.1%)	91 (25.8%)	145 (41.1%)	2.85 ± 1.07
Many patients are uncooperative.	141 (39.9%)	104 (29.5%)	108 (30.6%)	3.09 ± 0.98
Staff shortage	163 (46.1%)	103 (29.2%)	87 (24.7%)	3.22 ± 0.97

Most HCWs agreed that sharps exposure is dangerous and affects health (96.6%; 4.49 ± 0.64). Regarding prevention, high agreement was observed for hepatitis B vaccination (89.8%; 4.22 ± 0.68) and immediate disposal of used sharps into a sharps container (88.4%; 4.12 ± 0.71). The most frequently reported barriers were staff shortage (46.1%; 3.22 ± 0.97) and patient uncooperativeness (39.9%; 3.09 ± 0.98).

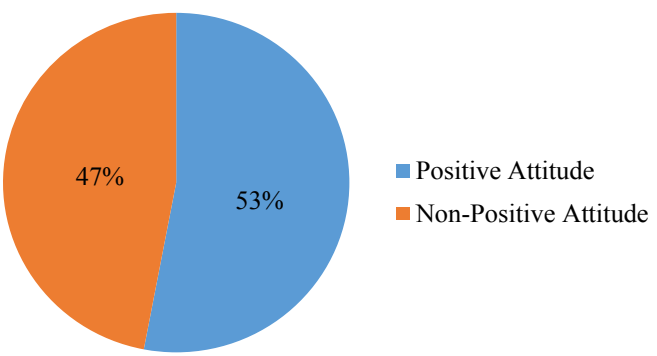

Figure 2. Classification of attitudes regarding exposure prevention to NSSI

53% of HCWs had a positive attitude, while 47% had a non-positive attitude toward NSSI prevention as the main obstacle.

DISCUSSION

General characteristics of healthcare workers: This study surveyed 353 HCWs, of whom those aged ≤30 years accounted for 58.6%. Females constituted the majority (72.2%), and 56.9% had worked at the hospital for more than 5 years. These findings are broadly comparable to the study by Hoang Trung Tien (2019) conducted at Lam Dong Provincial General Hospital, in which the < 30 and 30–39 age groups accounted for 43.0% and 49.7%, respectively, and females accounted for 86.6% [9].

In our study, 75.4% of HCWs had a university degree or higher, while intermediate/college education accounted

for 24.6%. This may be related to the hospital's "hospital–hotel" model with modern equipment, which requires a relatively high proportion of well-trained personnel to meet service demands.

Regarding training, 96.9% of HCWs reported having received training on NSSI prevention and 86.7% had been trained within the past year. This differs from Hoang Trung Tien (2019), where 100% had been trained but 52.2% had not received training within the previous year [9]. Overall, these figures suggest that continuing education on occupational safety is emphasized in hospitals; however, the frequency and recency of training may vary by setting.

Knowledge and attitudes toward needlestick and sharps injuries (NSSIs)

Knowledge: In our study, most HCWs demonstrated adequate knowledge about NSSIs (94.9%), and only 5.1% had inadequate knowledge. This proportion is higher than that reported by Jheffany Yazid (2022) in Malaysia (83.7% with high knowledge) [4], Le Thanh Mong (2021) in Soc Trang (82.7% adequate knowledge) [8], Hoang Trung Tien (2019) (80.5% adequate knowledge) [9], and Phan Thi An Dung (2023) (77.5% adequate knowledge) [13]. One possible explanation is that our study included all HCWs in clinical departments, whereas some other studies focused mainly on nurses, which may lead to differences in baseline training exposure and job roles.

With respect to risk factors, 61.5% of HCWs achieved full marks for this domain. This is considerably higher than the findings of Hoang Trung Tien (2019), where only 20.8% correctly identified all six causes of sharps injuries [9], and Phan Thi An Dung (2023), where only 22.5% correctly identified all six causes [13].

However, knowledge gaps remained in post-exposure management: only 26.3% answered all post-exposure questions correctly, which is much lower than the 95.6% reported by Le Thanh Mong (2021) regarding wound management after sharps exposure [8]. This suggests that practical preparedness for emergency response following an exposure incident may still be limited in the study setting. Notably, all HCWs answered correctly that sharps exposure should be reported (100%). This level is higher than that in Abdullah Alsabaani (2022), in which most respondents either "strongly agreed" (59.4%) or "agreed" (30.9%) that all workplace sharps injuries should be reported immediately [14]. The high awareness of reporting in our study is encouraging; nevertheless, the low overall correctness in post-exposure management indicates the need for more hands-on, periodic training on post-exposure procedures and supervision of compliance with established protocols.

The 0% result indicates that no healthcare worker achieved a perfect score in the preventive measures domain, rather than a complete lack of knowledge, as the mean score remained relatively high.

Attitudes: In this study, only 53% of HCWs had a positive attitude toward NSSI prevention. This proportion is substantially lower than that reported by Jheffany Yazid (2022), where 81.2% of nurses had a positive attitude [4], and Phan Thi An Dung (2023), where 71.8% of nurses had a positive attitude [13]. The discrepancy between high knowledge and less positive attitudes may reflect an imbalance between technical training and professional/behavioral reinforcement, combined with system pressures and a work environment that may not sufficiently support safe practice.

Regarding perceived severity, most HCWs agreed that NSSIs can lead to infection with blood-borne pathogens (97.8%) and cause stress and emotional disturbance (97.5%). These perceptions are consistent with evidence on occupational exposure risks, including documented HIV exposures and transmission risk, as well as the substantial burden of HBV and HCV infections in healthcare workers attributable to occupational exposures in resource-limited settings [5].

Attitudes toward the importance of preventive measures were generally favorable (e.g., high agreement with hepatitis B vaccination and immediate disposal of used sharps into sharps containers). However, perceived barriers were prominent. The main reported barriers were staff shortages (46.1%) and patients' lack of cooperation (39.9%). Given the hospital's high service volume, these barriers are plausible and indicate that improving occupational safety requires not only training but also organizational support. A similar pattern was reported by Hoang Trung Tien (2019), where staff shortage (57%) was identified as a major barrier [9]. In addition, a considerable proportion of respondents perceived a lack of safety equipment and work overload as barriers [9].

Study limitation and implication

Because this was a cross-sectional descriptive study, the findings mainly describe the current status of knowledge and attitudes and do not evaluate actual preventive practices. Future studies should assess practice/compliance with preventive measures and post-exposure procedures to provide a more comprehensive picture of occupational safety and to guide targeted interventions.

CONCLUSION

HCWs at Hai Phong International General Hospital demonstrated high knowledge regarding NSSI prevention, but the proportion with a positive attitude was relatively modest. Knowledge gaps were most evident in domains related to preventive measures (no participant achieved full marks) and post-exposure management, and the main perceived barriers to prevention were staff shortages and patients' lack of cooperation.

RECOMMENDATIONS

Given the relatively low level of positive attitudes toward NSSI prevention, the hospital should:

(1) Continue providing high-quality training on sharps injury prevention and post-exposure management, with regular annual updates of relevant hospital guidelines;

(2) Strengthen communication and counseling to promote patient cooperation during procedures involving sharps; and

(3) Consider recruiting additional HCWs to reduce workload pressure and support safer practice.

REFERENCES

1. World Health Organization. Occupational infections [Internet]. Geneva: World Health Organization; 2022 [cited 2025 May 10]. Available from: https://www.who.int/tools/occupational-hazards-in-health-sector/occupational-infections

2. Pham S. Basic, modern and updated information on viral hepatitis A, B, C, D, E, B. Hanoi: Hanoi Medical Publishing House; 2009.

3. Serdar T. Occupational exposure in healthcare workers in University Hospital Dubrava – 10 year follow-up study. Cent Eur J Public Health. 2013 Sep;21(3):150-4. doi: 10.21101/cejph.a3803.

4. Yazid J. Knowledge, attitude, and practices toward needle-stick injuries among nurses in a public hospital, Malaysia. E-BPJ. 2023 May;8(24):221-8. https://doi.org/10.21834/ebpj.v8i24.4732.

5. Mbah CC. Reporting of accidental occupational exposure to blood and body fluids by doctors and nurses in the public primary health care setting of sub district of Johannesburg metropolitan district [dissertation]. Johannesburg (South Africa); 2014.

6. World Health Organization. The world health report 2002 [Internet]. Geneva: World Health Organization; 2002 [cited 2025 May 15]. Available from: http://www.who.int/whr/2002/chapter4/en/index8.html

7. Nguyen MH. The current situation of occupational diseases among healthcare workers in some medical facilities in Hanoi. Vietnam Med J. 2022;514.

8. Le TM. Knowledge of prevention and management of exposure to bacterial infections during intravenous infusions among clinical nurses at Soc Trang Provincial General Hospital in 2021. J Nurs Sci. 2021:9-14.

9. Hoang TT. Knowledge and practice of preventing injuries caused by NSSI of nurses at Lam Dong Provincial General Hospital in 2019. J Nurs Sci. 2019;2(3)

10. Nguyen TBN. Survey of occupational injuries caused by NSSI and initial treatment procedures of healthcare workers in hospitals in Nam Dinh city area. In: Proceedings of the Youth Science and Technology Conference of Universities and Colleges; 2014; [place unknown]. [publisher unknown]; 2014.

11. Cao TTL. Survey of knowledge and attitudes on standard prevention of healthcare workers at Thu Duc City Hospital in 2024. J Community Med. 2024;65(12):90-97. https://doi.org/10.52163/yhc.v65iCD12.1825.

12. Ministry of Health (VN). Guidelines for safe injection in medical examination and treatment facilities (Decision No. 3671/QD-BYT dated Sep 27, 2012). Hanoi: Ministry of Health; 2012. p. 2-28.

13. Phan TAD. Knowledge and practice of occupational injury prevention due to VSN among nurses at Vinh University Medical Center Hospital. Vietnam Med J. 2024 Mar;(2). https://doi.org/10.51298/vmj.v536i2.8927.

14. Alsabaani A. Incidence, knowledge, attitude and practice toward needle stick injury among health care workers in Abha City, Saudi Arabia. Front Public Health. 2022;10:771190. doi: 10.3389/fpubh.2022.771190.