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Research Article

Knowledge, attitudes, and practices regarding blood exposure among preventive medicine students

Conocimientos, actitudes y prácticas sobre la exposición a la sangre en estudiantes de medicina preventiva

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ABSTRACT

Introduction: Blood exposure remains a major concern for infection control in Vietnam and is routinely addressed during preventive medicine training.

Objective: To assess knowledge, attitudes, and practices regarding blood exposure prevention among preventive medicine students.

Methods: A cross-sectional study was conducted among 230 preventive medicine students from the second to sixth academic years at Tra Vinh University, Vietnam. Data were collected through a structured questionnaire assessing knowledge (15 items), attitudes (8 items), and practices (12 items). Outcome levels were categorized as "adequate" or "inadequate" using cut-off values of ≥ 70% for knowledge and ≥ 50% for practices.

Results: Adequate levels of knowledge, attitudes, and practices were observed in 80.0%, 90.0%, and 78.7% of participants, respectively. Inadequate knowledge was associated with access to only one information source (aOR = 3.84; 95%CI: 1.88–7.83). Inadequate practices were associated with inadequate knowledge (cOR = 3.17; 95% CI: 1.56-6.43), previous blood exposure during

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training (aOR = 2.16; 95% CI: 1.07-4.36), male sex (aOR = 3.22; 95% CI: 1.52-6.82), and access to only one information source (aOR = 2.32; 95% CI: 1.11-4.84).

Conclusions: Preventive medicine students demonstrated generally adequate levels of knowledge, attitudes, and practices regarding blood exposure prevention. However, inadequate knowledge and unsafe practices were associated with limited information sources, male sex, and previous exposure history. Improving access to reliable infection control information during training may help strengthen knowledge and promote safer preventive practices.

Keywords: infection control; medical students; occupational exposure; standard precautions.

RESUMEN

Introducción: La exposición a la sangre es una preocupación importante para el control de infecciones en Viet Nam y se aborda de manera sistemática durante la formación en medicina preventiva.

Objetivo: Evaluar el nivel de conocimientos, actitudes y prácticas sobre la prevención de la exposición a la sangre en estudiantes de medicina preventiva.

Métodos: Estudio transversal, en 230 estudiantes de medicina preventiva, de segundo a sexto año académico, de la Universidad de Tra Vinh, Viet Nam. La información se obtuvo mediante un cuestionario estructurado que evaluó conocimientos (15 ítems), actitudes (8 ítems) y prácticas (12 ítems). Los niveles se clasificaron como “buenos” o “pobres”; valores de corte de ≥ 70 % para conocimientos y ≥ 50 % para prácticas.

Resultados: Se observaron niveles buenos de conocimientos, actitudes y prácticas en 80,0 %, 90,0 % y 78,7 %, respectivamente. Los conocimientos pobres se asociaron con acceso a una sola fuente de información (aOR= 3,84; IC95 %: 1,88-7,83). Las prácticas pobres se asociaron con conocimientos pobres (cOR= 3,17; IC 95%: 1,56–6,43), exposición previa a la sangre durante las prácticas (aOR= 2,16; IC 95%: 1,07–4,36), sexo masculino (aOR= 3,22; IC95 %: 1,52-6,82) y acceso a una sola fuente de información (aOR= 2,32; IC95 %: 1,11-4,84).

Conclusiones: Los estudiantes mostraron niveles adecuados de conocimientos, actitudes y prácticas sobre exposición a la sangre. Las prácticas inseguras se asociaron con información

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limitada, sexo masculino y exposición previa. Mejorar el acceso a información confiable puede promover prácticas más seguras.

Palabras clave: control de infecciones; estudiantes de medicina; exposición ocupacional; precauciones estándar.

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INTRODUCTION

According to the World Health Organization, approximately 16 billion injections are administered globally each year. Needle stick injuries are considered among the most serious occupational hazards for healthcare workers, with over 2 million occupational exposures occurring among an estimated 35 million healthcare personnel.[1] In Vietnam, a study by *Thoa V*[2] on occupational exposures at Cho Ray Hospital during 2015–2020 reported that the most common exposure incidents involved needle stick injuries during intramuscular or intravenous injections (68.2%) and blood or body fluids splashing onto the eyes or mucous membranes (11.7%).

Among health science students, several studies in Vietnam have also indicated that knowledge and practices regarding occupational exposure prevention remain limited,[2,4] for example, a study in 2021 by *Vu L* et al.[3] at Nam Dinh University of Nursing reported that 63.7% of students had moderate level of knowledge, whereas only 36.3% demonstrated adequate knowledge. Similarly, a study in 2023 by *Thanh D*[4] reported that only 3.4% of nursing students demonstrated adequate knowledge, while 11.4% exhibited a positive attitude. At Tra Vinh University, a multidisciplinary institution with over 20,000 students, nearly 5,000 students are enrolled in health science programs;[5] previous studies, such as that by *Tuyen B*[6] in 2021 among medical and nursing students, indicated that 63.8% of students had adequate knowledge regarding the prevention and management of sharp object exposures during injections, with 81.7% showing a positive attitude

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and 87.9% demonstrating proper practices. However, data on preventive medicine students remain lacking, as this is a relatively new program recently implemented at the university.

In practice, preventive medicine students, like their clinical counterparts, frequently participate in technical procedures on patients, which increases their risk of occupational blood exposure.[7] In addition to direct patient care during clinical rotations, preventive medicine students are also involved in vaccination activities, specimen collection, community-based screening programs, and health promotion campaigns where accidental exposure to blood and body fluids may occur. These training activities require consistent adherence to standard precautions and infection control procedures in both hospital and community settings. Furthermore, because preventive medicine students are future public health professionals responsible for disease prevention and health education, inadequate knowledge or unsafe practices during training may negatively affect both occupational safety and the effectiveness of future infection prevention programs. Therefore, strengthening students' awareness and preventive behaviors remains an important component of undergraduate medical education.

Assessing students' knowledge, attitudes, and practices is therefore essential to inform strategies that enhance awareness, promote safe practices, reduce transmission risk, and protect both personal and community health.[8]

Considering the limited evidence available for preventive medicine students, the present study was conducted to describe factors associated with knowledge, attitudes, and practices regarding blood exposure prevention among preventive medicine students.

METHODS

Study design

This cross-sectional study was conducted among all preventive medicine students at Tra Vinh University, Vinh Long Province, Vietnam, in 2025.

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Study subjects

The study included male and female preventive medicine students at Tra Vinh University in 2025, all of whom had participated in clinical practice at hospitals during their training.

Sample size

The sample size was calculated using the formula for estimating a proportion. A previous study among nursing students reported a prevalence of 74.2% for the relevant preventive behavior regarding needlestick injuries,[9] this proportion was used as the reference estimate for sample size calculation. With a margin of error (d) of 0.06, the minimum required sample size was calculated to be 205 participants. After adding 10% to compensate for potential nonresponse and incomplete questionnaires, the final estimated sample size was 226 participants. To ensure adequate representation across academic years, the sample size was rounded up to 230 participants.

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

Sampling method

A stratified sampling method was employed, with strata defined by academic year: second, third, fourth, fifth, and sixth year (first year students were excluded as they had not yet participated in clinical practice). Among a total of 316 preventive medicine students from second to sixth year, the sample for each stratum was proportionally allocated as follows: second year: (64/316) × 230 = 46 students; third year: (40/316) × 230 = 29 students; fourth year: (90/316) × 230 = 66 students; fifth year: (69/316) × 230 = 50 students; sixth year: (53/316) × 230 = 39 students. Within each stratum, participants were selected using the Kish method.

Variables and data collection methods

Data were collected through face-to-face interviews using a structured questionnaire specifically adapted for preventive medicine students. The questionnaire was developed based on previous research conducted in Viet Nam[3,4,6] and current national guidelines on standard precautions and infection control, including Decision No. 3671/QĐ-BYT on safe injection practices,[10] Continuing

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Education Materials on infection control for grassroots healthcare workers (Document No. 5771/BYT-K2ĐT),[11] and Circular No. 20/2021/TT-BYT on medical waste management in healthcare facilities.[12]

Outcome variables: The primary outcome variables were levels of knowledge, attitudes, and practices regarding blood exposure prevention.

Knowledge: assessed through 15 items. Each correct response received one point (range 0-15). Scores ≥ 70% were classified as "adequate knowledge" and < 70% as "inadequate knowledge".

Attitudes: assessed using 8 Likert-type items (range 0-8). Higher scores reflected more favorable attitudes. Scores ≥ 90% of the total were classified as "positive attitudes" and < 90% as "negative attitudes".

Practices: assessed through 12 items scored according to the adequacy of the reported behavior (range 0-12). Scores ≥ 50% were classified as "adequate practices" and <50% as "inadequate practices".

Potential independent variables included age, sex, academic year, prior history of blood exposure during training, sources of information on infection control, and compliance with institutional training. Sex: male/female; History of blood exposure: yes/no; Sources of information: multiple vs. single; Academic year: second to sixth year. Variables meeting the predefined criterion of $p<0.20$ in bivariate analysis were considered for inclusion in the multivariable models.

This operational framework was used to ensure consistency between variable measurement, classification, and subsequent statistical analysis.

Statistical analysis approach

Data were entered using Epidata version 3.1 and analyzed using Stata version 13.0. Descriptive statistics were used to summarize participant characteristics and levels of knowledge, attitudes, and practices using frequencies and percentages. Bivariate logistic regression analysis was performed to assess associations between independent variables and outcomes related to knowledge, attitudes, and practices regarding blood exposure prevention. Variables with p-values < 0.20 in bivariate analysis were included in multivariable logistic regression models to identify factors independently associated with the outcomes. Crude odds ratios (cORs), adjusted odds ratios (aORs), and

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corresponding 95% confidence intervals (95% CIs) were calculated. Statistical significance was considered at $p < 0.05$.

Ethical considerations

The study protocol was approved by the Ethics Committee in Bio Medical Research at Tra Vinh University (approval number 26/GCT-HĐĐĐ, dated February 26, 2025). All procedures were conducted in accordance with the ethical standards of the institutional and national research committees and with the Declaration of Helsinki and its later amendments. This study is part of a broader research project assessing knowledge, attitudes and practices regarding blood exposure prevention among preventive medicine students at Tra Vinh University. Descriptive findings from the same dataset have been reported separately in a national journal to support local training improvement. The present study focuses specifically on analytical modelling of associated factors.

RESULTS

Baseline characteristics of participants in the survey

The number of male and female students was nearly balanced, with 53.91% male and 46.09% female. Approximately 30.43% of students reported having experienced at least one occupational exposure to sharp objects during clinical practice, while 69.57% had never been exposed. The majority of students (77.83%) acquired their knowledge from multiple sources, including the curriculum, clinical instructors, and media such as television, books, and the internet (table 1).

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Table 1 - Demographic characteristics of participants [*N* = 230, *n* (%)]

Variables	*n*	Percentage (%)
Sex		
Male	124	53.91
Female	106	46.09
Information source		
From one information source	51	22.17
From multiple information sources	179	77.83
Exposure		
Not previously exposed	160	69.57
Previous exposure	70	30.43
Departments/rooms where students were exposed during study (n = 70)		
Internal medicine department	20	28.57
Surgery department	17	24.29
Obstetrics department	3	4.29
Infectious disease department	7	10.00
Emergency department	8	11.43
Clinical skills laboratory	12	17.14
Others	3	4.29
Knowledge level on preventing blood exposure		
Adequate	184	80.00
Inadequate	46	20.00
Attitude level on preventing blood exposure		
Positive	207	90.00
Negative	23	10.00
Practices level on preventing blood exposure		
Adequate	181	78.70
Inadequate	49	21.30

Factors associated with the knowledge level of the study participants

Students who accessed information from only a single source were more likely to have inadequate overall knowledge compared with those who accessed multiple sources (cOR = 4.31; 95% CI: 2.14–8.68) (table 2).

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Table 2 - Logistic regression analysis of factors associated with knowledge on preventing blood exposure among preventive medicine students [*N* = 230, *n* (%)]

Factors	Knowledge level on preventing blood exposure		*Crude OR (95% CI)*	*P*–value	*Adjusted OR (95% CI)*
	Inadequate (*n* = 46)	**Adequate (*n* = 184)**			
Sex					
Male	30 (24.19)	94 (75.81)	1.79 (0.91 – 3.51)	0.088	–
Female	16 (15.09)	90 (84.91)	*Ref*		
Information source					
From one information source	21 (41.18)	30 (58.82)	4.31 (2.14 – 8.68)	<0.001	3.84 (1.88 – 7.83)
From multiple information sources	25 (13.97)	154 (86.03)	*Ref*		
Exposure					
Previous exposure	19 (27.14)	51 (72.86)	1.83 ((0.98 – 3.06)	0.076	–
Not previously exposed	27 (16.88)	133 (83.13)	*Ref*		

CI: Confidence Interval.

Factors associated with the attitude level of the study participants

The results indicated that the majority of students demonstrated a positive attitude toward preventing blood exposure. No statistically significant differences in attitude were observed according to sex, history of exposure, or number of information sources accessed (table 3).

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Table 3 - Logistic regression analysis of factors associated with attitude on preventing blood exposure among preventive medicine students [*N* = 230, *n* (%)]

Factors	Attitude level on preventing blood exposure		*Crude OR (95% CI)*	*P*–value	*Adjusted OR (95% CI)*
	Negative (*n* = 23)	**Positive (*n* = 207)**			
Sex					
Male	13 (10.48)	111 (89.52)	1.12 (0.47–2.68)	0.791	–
Female	10 (9.43)	96 (90.57)	*Ref*		
Information source					
From one information source	5 (9.80)	46 (90.20)	0.97 (0.34–2.76)	0.958	–
From multiple information sources	18 (10.06)	161 (89.94)	*Ref*		
Exposure					
Previous exposure	10 (14.29)	60 (85.71)	1.88 (0.78–4.53)	0.157	–
Not previously exposed	13 (8.13)	147 (91.87)	*Ref*		

CI: Confidence Interval.

Factors associated with the practice level of the study participants

Students who accessed information from only a single source were more likely to demonstrate inadequate preventive practices compared with those who accessed multiple sources (cOR = 3.34; 95% CI: 1.68–6.64). Male students were more likely to exhibit inadequate practices than female students (cOR = 3.33; 95% CI: 1.63–6.80). Students with a history of exposure were more likely to demonstrate inadequate practices than those without prior exposure (cOR = 2.25; 95% CI: 1.17–4.33) (table 4).

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Table 4 - Logistic regression analysis of factors associated with practices on preventing blood exposure among preventive medicine students [*N* = 230, *n* (%)]

Factors	Practices level in preventing blood exposure		*Crude OR (95% CI)*	*P*–value	*Adjusted OR (95% CI)*
	Inadequate (*n*=49)	Adequate (*n*=181)			
Sex					
Male	37 (29.84)	87 (70.16)	3.33 (1.63 – 6.80)	0.001	3.22 (1.52 – 6.82)
Female	12 (11.32)	94 (88.68)	*Ref*		
Information source					
From one information source	20 (39.22)	31 (60.78)	3.34 (1.68 – 6.64)	0.001	2.32 (1.11 – 4.84)
From multiple information sources	29 (16.20)	150 (83.80)	*Ref*		
Exposure					
Previous exposure	22 (31.43)	48 (68.57)	2.25 (1.17 – 4.33)	0.014	2.16 (1.07 – 4.36)
Not previously exposed	27 (16.88)	133 (83.12)	*Ref*		
Knowledge level on preventing blood exposure					
Inadequate	18 (39.13)	28 (60.87)	3.17 (1.56 – 6.43)	0.002	2.15 (0.99–4.68)
Adequate	31 (16.85)	153 (83.15)			
Attitude level on preventing blood exposure					
Negative	6 (26.09)	17 (73.91)	0.75 (0.28–2.00)	0.56	–
Positive	43 (20.77)	164 (79.23)	*Ref*		

CI: Confidence Interval.

DISCUSSION

This study provides additional analytical evidence regarding factors associated with knowledge, attitudes, and practices related to blood exposure prevention among preventive medicine students at Tra Vinh University. The relatively balanced gender distribution observed in the study population may support the representativeness of the sample.

Knowledge and attitudes regarding blood exposure prevention

In this study, preventive medicine students demonstrated higher levels of knowledge and attitudes compared with previously reported data from nursing students at Tra Vinh University. According

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to *Tuyen B*[6] in 2021, rates of adequate knowledge, positive attitudes, and proper practices among nursing students were 63.8%, 81.7%, and 87.9%, respectively. This comparison suggests that preventive medicine students demonstrated higher knowledge and attitudes but lower correct practice rates, which may reflect the specific characteristics of each discipline (nursing vs. preventive medicine) and the specialized skills trained. Furthermore, when compared with other similar studies in Vietnam, the current study indicates higher levels of knowledge and proper practices. For instance, *Thuy V*[13] in 2018 reported limited knowledge and practices (below 60%), with correct practices below 20% in certain aspects such as sharp object handling or hand hygiene, whereas preventive medicine students at Tra Vinh showed clear understanding of transmission agents, personal protective equipment, and appropriate post exposure behaviors. Regarding exposure rates, compared with a study by *Thanh D*[4] in 2024 involving 298 nursing students in Ho Chi Minh City, which reported a history of exposure in 28.5% of participants, the rate observed in Tra Vinh was similar at 30.43%. Thus, the findings at Tra Vinh University appear largely consistent with, and in some indicators even surpass, other similar studies conducted in Vietnam, and align with certain international reports, suggesting that institution-based training in hospital infection control and safety is meeting current standards.

The proportion of correct practices in this study was 78.7%, reflecting a moderate ability to translate knowledge into action. This is comparable to the study by *Tuyen B*[6] at Tra Vinh University, which reported a correct practice rate of 87.9%. However, it should be noted that Tuyen's study focused specifically on exposure to sharps during injections, a narrower scope than the present study, which included a broader range of blood exposure scenarios, possibly explaining the difference in rates. In this study, the level of adequate practice did not fully correspond with the level of correct knowledge. This discrepancy between knowledge and practice has been reported in several studies in Vietnam and the region.[14,15] Similarly, a 2021 study at Can Tho University of Medicine and Pharmacy found that only 57.2% of students achieved adequate knowledge regarding HIV/AIDS exposure prevention, while just 14.1% demonstrated correct practice.[16] Conversely, research at Nam Dinh University of Nursing reported very high knowledge levels (95.6%) but practice did not fully match.[3] Similar patterns have been reported

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internationally, where healthcare students showed adequate knowledge about blood borne pathogen transmission but notable gaps in translating that knowledge into safe practice, especially regarding post exposure management.[8,17] Nonetheless, a common finding across regional studies is that individuals with better knowledge generally exhibit higher likelihood of correct practice.[16,18]

In this study, we identified the source of information as a key factor associated with correct knowledge. Students who relied primarily on a single information channel (e.g., only classroom based theoretical instruction) often did not fully grasp the latest protocols and guidelines related to laboratory safety, infection control, and exposure management. In contrast, students accessing multiple sources (textbooks, lectures, practical materials, internet resources, workshops, clinical guidance) benefited from complementary learning, which likely enhanced both retention and correct application in practice. Comparatively, *Tuyen B*[6] at Tra Vinh also reported that "information source" was related to both knowledge and practice, although it was not included as a separate variable in multivariate analysis for knowledge. Similarly, *Phu T* et al.[18] in Tra Vinh found that accessing diverse sources was associated with better knowledge, and *Thanh D*[4] reported that final year students with prior exposure who actively consulted materials and received multiple guidance demonstrated higher rates of adequate knowledge.

Practices regarding blood exposure prevention and associated factors

Regarding preventive practices, the study found a gender effect, with male students at higher risk of inadequate practice compared to females (aOR = 3.22). Several studies indicate that females tend to be more cautious in procedures involving sharps, hand hygiene, and medical waste management.[19,20] Male students may be less compliant with standard precaution protocols in some clinical settings, potentially overlooking some safety protocols.[20] *Tuyen B*[6] also reported better practice among females (cOR = 1.79 in univariate analysis), though it only approached statistical significance. These findings align with numerous international studies, highlighting gender as a significant predictor of adherence to safety procedures.[21] Additionally, students with a history of exposure were at higher risk of inadequate practice compared to those without prior exposure (aOR = 2.16). This finding suggests that previous blood exposure was independently associated

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with inadequate preventive practices after adjustment for the variables retained in the multivariable model. Several explanations may account for this finding: first, previously exposed students may become complacent, thinking "I've already experienced this," leading to less vigilance in standard precautions; second, post exposure, there may be insufficient support, retraining, or skills reassessment, so unsafe practices persist. This reflects a gap in linking incident detection, intervention, and skills reassessment. *Tuyen B*[6] similarly observed that previously exposed students tended to have lower practice scores, although the association was not statistically significant. In our study, with an adequate sample size and multivariate analysis, the observed association may indicate the need for timely post-exposure support, retraining, and reassessment of preventive practices among students with previous exposure.

Comparable international evidence also highlights discrepancies between knowledge and practice regarding blood exposure prevention among healthcare trainees. A cross-sectional study of healthcare students in India found adequate awareness of blood borne pathogen transmission and needlestick prevention, yet noted gaps in translating this knowledge into safe practices.[17] Similarly, nursing students in Saudi Arabia demonstrated adequate knowledge and positive attitudes toward needlestick injury prevention, while actual practice levels remained comparatively lower.[22] A systematic review and meta-analysis among dental students also reported high pooled prevalence of needlestick injuries worldwide, along with inadequate knowledge of post exposure management.[23] Recent work developing a competency based framework for preventing blood borne pathogen exposures in medical students further emphasizes the importance of tailored education to bridge gaps between knowledge and practice.[7]

Study limitations

This study has several limitations. Due to its cross-sectional design, it only reflects associations between factors at a single point in time and cannot establish causal relationships between knowledge, attitudes, and practices and the associated factors. Although the study included almost all cohorts of preventive medicine students at the university, the total sample size was limited to 230 students due to the size of the training program, which may affect the precision and generalizability of the results to a larger population. Additionally, the relatively small sample size

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limits the ability to detect associations between variables. Furthermore, due to resource constraints, including funding, time, and personnel, the study was unable to incorporate supplementary qualitative methods to further explore the underlying causes of inadequate knowledge and practices among the study population. Nevertheless, this research may serve as a foundational study for future investigations employing qualitative approaches and more in depth analyses to identify specific underlying factors.

In conclusion, preventive medicine students demonstrated generally adequate levels of knowledge, attitudes, and practices regarding blood exposure prevention. However, inadequate knowledge and unsafe practices remained associated with limited information sources, male sex, and previous exposure history. Strengthening infection control education and improving access to reliable training resources may help promote safer preventive practices among future healthcare professionals.

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BIBLIOGRAPHIC REFERENCES

1. Hosseinipalangi Z, Golmohammadi Z, Ghashghaee A, Ahmadi N. Global, regional and national incidence and causes of needlestick injuries: a systematic review and meta–analysis [Internet]. East Mediterr Health J. 2022;28(3):233–41. DOI: https://doi.org/10.26719/emhj.22.024

2. Thoa VTH. Survey of occupational exposure among healthcare workers at Cho Ray Hospital, 2015–2020 [Internet]. Proceedings of the Hospital Infection Control Scientific Conference; 2025. [access: 14/05/2026]. Available from: https://www.hics.org.vn/sites/default/files/hics-2025-ky_yeu_hoi_nghi.pdf

Bajo licencia Creative Commons

3. Vu TL, Thai HTM. Knowledge of final–year nursing students on prevention of blood and body fluid exposure [Internet]. Vietnam J Med. 2021;502(2):142–7. DOI: https://doi.org/10.51298/vmj.v502i2.619

4. Thanh DLN. Knowledge and attitudes toward prevention of blood and body fluid exposure among nursing students and associated factors [Internet]. Vietnam J Med. 2024;534(1):172–7. DOI: https://doi.org/10.51298/vmj.v534i1.8063

5. Nguyen MK, Tao GP, Vo KP, Nguyen VT. Premarital sexual practice and associated factors among fourth–year students at Tra Vinh University [Internet]. Tra Vinh Univ J Sci. 2023;13(5):70–7. DOI: https://doi.org/10.35382/TVUJS.13.5.2023.139

6. Tuyen BTK. Knowledge, attitudes and practices regarding prevention and management of sharps injuries among medical and pharmacy students at Tra Vinh University [Internet]. Vietnam Health J. 2021 [access: 14/05/2026]. Available from: https://suckhoeviet.org.vn/kien-thuc-thai-do-thuc-hanh-ve-phong-va-xu-tri-phoi-nhiem-voi-vat-sac-nhon-trong-tiem-truyen-cua-sinh-vien-khoa-y-duoc-truong-dai-hoc-tra-vinh-11700.html

7. Wang P, Cai M, Lv Y, Xiang Q. A competency–based framework for preventing blood–borne pathogen occupational exposures in medical students: literature review and Delphi study [Internet]. BMC Med Educ. 2025;25(1):1023. DOI: https://doi.org/10.1186/s12909-025-05257-4

8. Chelly S, Omri N, Saadallah Z, Ammar A, Ezzi O, Njah M, et al. Knowledge, attitudes, and practices regarding blood exposure accidents and eHealth literacy among Tunisian medical students: a cross–sectional study [Internet]. BMC Med Educ. 2025;25(1):366. DOI: https://doi.org/10.1186/s12909-025-05063-y

9. Almuslami OK, Fadul SS, Munshi SS, Sangoof FM, Mersal NA. Awareness and prevalence of needle stick injury among nursing students at King Abdulaziz University [Internet]. Evid Based Nurs Res. 2024;5(1):14-23. DOI: https://doi.org/10.47104/ebnrojs3.v5i1.266

10. Ministry of Health (Viet Nam). Decision No. 3671/QD-BYT on Safe Injection Guidelines in Medical Facilities [Internet]. Hanoi: Ministry of Health; 2012. [access: 14/05/2026]. Available from: https://thuvienphapluat.vn/van-ban/The-thao-Y-te/Quyet-dinh-3671-QD-BYT-huong-dan-tiem-an-toan-co-so-kham-benh-chua-benh-2012-169210.aspx

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11. Ministry of Health (Viet Nam). Continuing Education Materials on Infection Control for Grassroots Healthcare Workers (Document No. 5771/BYT-K2ĐT) [Internet]. Hanoi: Ministry of Health; 2013. [access: 14/05/2026]. Available from: https://kcb.vn/wp-content/uploads/2015/07/Tai-lieu-Kiem-soat-nhiem-khuan.pdf

12. Ministry of Health (Viet Nam). Circular No. 20/2021/TT-BYT on Medical Waste Management in Healthcare Facilities [Internet]. Hanoi: Ministry of Health; 2021. [access: 14/05/2026]. Available from: https://thuvienphapluat.vn/van-ban/The-thao-Y-te/Thong-tu-20-2021-TT-BYT-quan-ly-chat-thai-y-te-trong-pham-vi-khuon-vien-co-so-y-te-492936.aspx

13. Thuy VTT. Current status and associated factors related to knowledge and attitudes toward standard precautions among nursing students at Vinh University of Medicine in 2018 [Internet]. J Nurs Sci. 2018 [access: 14/05/2026];1(2):84-9. Available from: https://jns.vn/index.php/journal/article/view/98

14. Phu TG, Hung TG. The socioeconomic characteristics influencing knowledge, attitudes, and practices in toxocariasis prevention among the adult Khmer population in Tra Vinh province, Vietnam [Internet]. Asian Pacific Journal of Tropical Medicine. 2025;18(12):541-50. DOI: https://doi.org/10.4103/apjtm.apjtm_254_25

15. Phu TG, Hung TG, Tram TV, Hien NT. Effectiveness of communication interventions for toxocariasis prevention among the Khmer population in Tra Cu District, Tra Vinh Province [Internet]. J Prev Med. 2025;34(8):105-15. DOI: https://doi.org/10.51403/0868-2836/2024/2149

16. Thu NM. Knowledge and practices regarding occupational exposure prevention to HIV/AIDS among medical students [Internet]. Can Tho J Med Pharm. 2022;49:140-7. DOI: https://doi.org/10.58490/ctump.2022i49.227

17. Datar UV, Kamat M, Khairnar M, Wadgave U, Desai KM. Needlestick and sharps injury in healthcare students: prevalence, knowledge, attitude and practice [Internet]. J Family Med Prim Care. 2022;11(10):6327-33. DOI: https://doi.org/10.4103/jfmpc.jfmpc_1460_21

18. Phu TG, Hung TG, Tram TV, Hien NT. Association between knowledge, attitudes and practices and human toxocariasis among Khmer adults in Tra Vinh province in 2023 [Internet]. J Prev Med. 2024;34(Suppl 5):61-71. DOI: https://doi.org/10.51403/0868-2836/2024/1859

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19. Di Gennaro F, Segala FV, Papagni R, De Vita E, Guido G, Frallonardo L, et al. Knowledge, practices, educational needs and hospital engagement in infection prevention and control among Italian healthcare workers and students: results from a national multicentre survey [Internet]. JAC Antimicrob Resist. 2025;7(3):dlad034. DOI: https://doi.org/10.1093/jacamr/dlad034

20. Park SY, Kim J, Lee E, Park S, Park JW, Yu SN, et al. Gender differences in psychosocial determinants of hand hygiene among physicians [Internet]. Infect Control Hosp Epidemiol. 2024;45(2):215-20. DOI: https://doi.org/10.1017/ice.2023.274

21. Al–Anazi S, Al–Dhefeery N, Al–Hijaili R, Al–Duwaihees A, Al–Mutairi A, Al–Saeedi R, et al. Compliance with hand hygiene practices among nursing staff in secondary healthcare hospitals in Kuwait [Internet]. BMC Health Serv Res. 2022;22:1325. DOI: https://doi.org/10.1186/s12913-022-08774-5

22. Al–Mugheed K, Farghaly SM, Baghdadi NA, Oweidat I, Alzoubi MM. Incidence, knowledge, attitude and practice toward needle stick injury among nursing students in Saudi Arabia [Internet]. Front Public Health. 2023;11:1160680. DOI: https://doi.org/10.3389/fpubh.2023.1160680

23. Huang J, Li N, Xu H, Liu Y, An N, Cai Z. Global prevalence, risk factors, and reporting practice of needlestick and sharps injuries among dental students: a systematic review and meta–analysis [Internet]. J Hosp Infect. 2022;129:89-101. DOI: https://doi.org/10.1016/j.jhin.2022.09.006

Conflict of interest

The authors declare that they have no potential conflicts of interest relevant to this article.

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Data Availability Statement

The database is available upon request to the corresponding author at the following email address: tgphu@tvu.edu.vn

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