Vietnam Journal of Community Medicine, Vol. 66, English version, 235-241

ASSESSING CLINICAL NURSES' KNOWLEDGE ABOUT PERIPHERAL VENOUS THROMBOPHLEBITIS AT 108 MILITARY CENTRAL HOSPITAL IN 2024

Vu Ba Quynh, Phan Duy Nguyen*

108 Military Central Hospital - 1 Tran Hung Dao, Hai Ba Trung Dist, Hanoi City, Vietnam

Received: 20/06/2025
Revised: 27/06/2025; Accepted: 03/07/2025

ABSTRACT

Objective: To evaluate the knowledge of nurses in clinical departments about peripheral venous thrombophlebitis at 108 Military Central Hospital from March to April 2024.

Method: A survey of 217 nurses from 17 clinical departments was conducted using a quantitative research design and cross-sectional descriptive approach. Data were collected using an online questionnaire based on the tool developed by Lanbeck et al.

Result: 81.6% of the surveyed nurses had some knowledge of peripheral venous thrombophlebitis; however, only 18% demonstrated a good understanding. Nurses who had participated in courses or training programs on peripheral venous thrombophlebitis had significantly better knowledge than those who had not.

Conclusion: Peripheral venous thrombophlebitis is a common complication of peripheral venous catheterization. Nurses' knowledge of peripheral venous thrombophlebitis plays a crucial role in clinical practice. Therefore, nursing managers should focus on training to enhance skills in managing peripheral venous catheter care and preventing complications.

Keywords: Clinical nursing, knowledge, peripheral venous catheter, peripheral venous thrombophlebitis.

1. INTRODUCTION

Peripheral Venous Catheter (PVC) therapy is one of the most commonly employed procedures in clinical practice, owing to its significant benefits for patients, including ease of access for fluid administration and diagnostic testing, as well as its cost-effectiveness. Through the use of a peripheral venous catheter, essential treatments such as fluids, medications, blood, or blood products are administered to the patient, facilitating therapeutic interventions and diagnostic procedures [1]. However, despite its widespread use, PVC is considered an invasive procedure that carries potential risks. Improper administration of medications or fluids, as well as inadequate monitoring and management of catheter placement, can lead to severe complications, some of which may even be life-threatening [2]. These complications can include systemic reactions such as anaphylactic shock, pulmonary edema, and air embolism, in addition to localized issues like subcutaneous hematomas, extravasation, infiltration, obstruction, and the increasingly recognized condition of peripheral venous thrombophlebitis [3]. Research has shown that the incidence of thrombophlebitis following PVC insertion can vary significantly, with reported rates ranging from as low as 2.3% to as high as 67%, depending on the population and clinical setting [4].

Nurses play a critical role in minimizing the risks associated with PVC placement. Their responsibilities span from performing the procedure, administering prescribed fluids and medications, to detecting complications and taking preventive actions [5]. The Infusion Nursing Society (INS) emphasizes that nurses' knowledge, as well as their ability to identify risk factors associated with peripheral venous thrombophlebitis, can directly contribute to reducing the frequency and severity of such complications [6]. This study aims to assess the level of knowledge among nurses in clinical

*Corresponding author
Email: nguyentrang.hvqy@gmail.com **Phone**: (+84) 986720620 **Https**://doi.org/10.52163/yhc.v66ienglish.2865

departments at 108 Military Central Hospital regarding peripheral venous thrombophlebitis, utilizing a pre-designed questionnaire developed by Lanbeck et al. to provide insights into potential areas for improvement in nursing practice and training [7].

2. SUBJECT AND METHOD

2.1. Subjects

This study involved 217 nurses from 17 clinical departments at 108 Military Central Hospital, comprising 10 internal medicine departments and seven surgical departments. The participants were selected based on specific inclusion criteria, ensuring that only nurses with a sufficient duration of experience and active roles in the clinical setting were included in the study.

2.2. Method:

- Study Design: Cross-sectional descriptive study.

- *Inclusion Criteria:* Nurses who were employed at 108 Military Central Hospital on a permanent or contractual basis for a minimum of one year were eligible for inclusion in the study.

- *Exclusion Criteria:* Nurses on long-term leave who had returned to work for less than six months and those who did not consent to participate in the study were excluded. This ensured that only nurses with recent work experience and who had given informed consent were included.

- Study Parameters:

Section A: Information about the study subjects, including age, gender, work experience, educational level, and whether the nurse had participated in training or courses on peripheral venous thrombophlebitis.

Section B: Questions assessing knowledge about the practice of care and management of PVC therapy (10 single-choice questions) and awareness of the risk factors for peripheral venous thrombophlebitis (7 multiple-choice questions).

Classification of Nurses' Knowledge Levels:

+ Lack of Knowledge (<50 knowledge points)

+ Basic Knowledge (50 ≤ points < 75)

+ Good Knowledge (≥75 knowledge points)

- Data Analysis and Processing: Data collected from the questionnaires were initially summarized and processed using Microsoft Excel. Statistical analysis was performed using SPSS 21.0 software. Proportions were compared using the one-way ANOVA test, the t-test, and the chi-square test, where appropriate. The difference between two or more median values was considered statistically significant when $p < 0.05$.

2.3. Research Ethics

The study adhered to established ethical standards in biomedical research. Ethical approval was granted by the Management Board of 108 Military Central Hospital. All participating nurses voluntarily agreed to complete the research questionnaire, with all responses kept confidential. The data collected were used exclusively for the purpose of improving patient care and developing ongoing training programs for the hospital's nursing staff, ensuring that participants' anonymity and rights were respected throughout the study.

3. RESULTS

3.1. Demographic Characteristics of Study Participants

Table 1. General information

Characteristic		Frequency (n)	Percentage (%)
Age	25-30 years	71	32.7
	30-40 years	77	35.5
	Over 40 years	69	31.8
Gender	Male	49	22.6
	Female	168	77.4
Experience	Less than 10 years	103	47.5
	More than 10 years	114	52.5
Department	Department	97	44.7
	Department	120	55.3
Education Level	Associate degree or lower	83	38.2
	Bachelor's degree or higher	134	61.8
Training on Peripheral Venous Thrombo-phlebitis	Yes	75	34.6
	No	142	65.4

The nurses who participated in the survey were categorized into three age groups: 25-30 years, 30-40 years, and over 40 years, with 32.7%, 35.5%, and 31.8% of participants in each group, respectively. This distribution reflects a relatively balanced representation of nurses across various stages of their careers, from early-career professionals to more experienced practitioners. In terms of gender, the study sample was predominantly female, with 77.4% of participants being women and 22.6% men. This gender disparity is reflective of the common trend in nursing, where women typically make up the majority of the workforce.

Regarding work experience, the survey revealed a nearly equal division between nurses with less than 10 years of experience (47.5%) and those with more than 10 years of experience (52.5%). This indicates that both novice and experienced nurses were well-represented in the study, offering a diverse perspective on knowledge and practices related to peripheral venous thrombophlebitis.

When examining the departmental distribution, the majority of nurses in the study were from internal medicine departments (55.3%), followed by those from surgical departments (44.7%). This distribution aligns with the typical roles that nurses play in both types of departments, as surgical departments frequently handle more invasive procedures, including peripheral venous catheterization, which may require a greater awareness of complications such as thrombophlebitis.

Educationally, 61.8% of nurses had a bachelor's degree or higher, indicating that a significant portion of the workforce possesses advanced formal education, which may contribute to their understanding of complex medical concepts. In contrast, 38.2% held an associate degree or lower, highlighting the varied educational backgrounds among nurses. Furthermore, only 34.6% of nurses reported having attended a course or training program specifically on peripheral venous thrombophlebitis, which could suggest a gap in targeted educational opportunities in this area. This discrepancy may be critical in understanding the level of knowledge nurses possess regarding this common complication and the need for further training initiatives in the hospital setting.

3.2. Nurses' Knowledge of Peripheral Venous Thrombophlebitis

Table 2. The average knowledge score of Nurses' Knowledge of Peripheral Venous Thrombophlebitis

Characteristic		
Average Score (mean ± SD)		p-value
Age (#)		
25-30 years	65.89 ± 14.06	0.03
30-40 years	60.23 ± 13.13	
Over 40 years	61.38 ± 12.44	
Gender (*)		
Male	61.02 ± 16.35	0.38
Female	62.92 ± 12.38	
Experience (*)		
Less than 10 years	64.24 ± 13.94	0.06
More than 10 years	60.90 ± 12.68	
Department (*)		
Surgery	62.54 ± 11.99	0.95
Internal Medicine	62.42 ± 14.95	
Education Level (*)		
Associate degree or lower	62.61 ± 15.33	0.91
Bachelor's degree or higher	62.41 ± 12.05	
Training on Peripheral Venous Thrombophlebitis (*)		
Yes	66.83 ± 12.03	0.0004
No	60.20 ± 13.51	
Overall Sample (N = 217)	62.48 ± 13.37	

(#): One-way ANOVA test,
(*): t-test, statistically significant with $p < 0.05$

The average knowledge score for the entire sample of nurses was 62.48 ± 13.37. The statistical analysis revealed a significant difference in knowledge scores between the age groups, particularly between those aged 25-30 years and those over 40 years ($p = 0.03$). The younger nurses (25-30 years) demonstrated higher average knowledge scores (65.89 ± 14.06) compared to the older groups. In contrast, the knowledge scores of nurses in the 30-40 years and over 40 years categories were slightly lower, at 60.23 ± 13.13 and 61.38 ± 12.44, respectively. This may suggest that younger nurses, who are more recently trained, tend

to have up-to-date knowledge compared to their older counterparts.

Regarding gender, the average knowledge scores between male and female nurses did not show a statistically significant difference (p = 0.38). Both groups had similar scores, with females averaging 62.92 ± 12.38 and males scoring 61.02 ± 16.35. This suggests that gender did not appear to influence the nurses' knowledge levels regarding peripheral venous thrombophlebitis.

Experience level also did not show a significant impact on knowledge. Nurses with more than 10 years of experience had an average score of 60.90 ± 12.68, while those with less than 10 years of experience scored slightly higher with an average of 64.24 ± 13.94 (p = 0.06). This finding is interesting because it suggests that experience alone does not guarantee a deeper understanding of the topic, possibly indicating that knowledge is not automatically updated over time without specific training.

There were no significant differences in knowledge scores between nurses from internal medicine and surgical departments (p = 0.95), nor between those with an associate degree or lower and those with a bachelor's degree or higher (p = 0.91). These findings suggest that, at least within this sample, department affiliation and educational level may not be strongly correlated with the nurses'understanding of peripheral venous thrombophlebitis.

However, a significant difference was observed between nurses who had received training on peripheral venous thrombophlebitis and those who had not (p = 0.0004). Nurses who had attended relevant training programs had a higher average knowledge score (66.83 ± 12.03) compared to those who had not received any formal training (60.20 ± 13.51). This highlights the critical role of targeted training in enhancing nurses' understanding of complications associated with the use of peripheral venous catheters.

Table 3. Classification of Nurses' Knowledge Levels about Peripheral Venous Thrombophlebitis

Classification of Nurses' Knowledge Levels		Frequency (n)	Percentage (%)
Lack of Knowledge (<50 knowledge points)		40	18.4
Knowledgeable	Basic Knowledge (50 ≤ points < 75)	138	63.6
	Good Knowledge (≥75 knowledge points)	39	18
Total		177	81.6

The results presented in Table 3.3 indicate the distribution of nurses' knowledge levels regarding peripheral venous thrombophlebitis. Out of the 217 nurses surveyed, a significant 81.6% demonstrated some level of knowledge about peripheral venous thrombophlebitis. Specifically, 63.6% of the nurses had basic knowledge, as evidenced by their knowledge scores falling between 50 and 75 points. This group represents the most significant proportion of the sample, indicating that while many nurses are aware of the condition, their understanding may be more foundational rather than comprehensive.

Additionally, 18% of nurses demonstrated good knowledge, scoring 75 points or higher, which suggests a more advanced understanding of peripheral venous thrombophlebitis and its management. This is a positive finding, indicating that a smaller but still significant portion of the nursing staff is well-versed in the subject. However, 18.4% of nurses scored below 50 points, indicating a lack of knowledge, which is concerning given the potential risks associated with this condition.

Table 4. Factors Associated with Nurses' Knowledge of Peripheral Venous Thrombophlebitis in Clinical Departments

Characteristic	Lack of Knowledge (%)	Knowledgeable n (%)	Overall Sample (n = 217) N (%)	p-value
Age				
25-30 years	11 (5.07)	60 (27.65)	71 (32.72)	0.65
30-40 years	14 (6.45)	63 (29.03)	77 (35.48)	
Over 40 years	15 (6.91)	54 (24.98)	69 (31.8)	

Characteristic	Lack of Knowledge (%)	Knowledgeable n (%)	Overall Sample (n = 217) N (%)	p-value
Gender				
Male	12 (5.53)	37 (17.05)	49 (22.58)	0.22
Female	28 (12.90)	140 (64.52)	168 (77.42)	
Experience				
Less than 10 years	18 (8.29)	85 (39.17)	103 (47.46)	0.86
More than 10 years	22 (10.14)	92 (42.40)	114 (52.54)	
Department				
Surgery	21 (9.68)	99 (45.62)	120 (55.3)	0.73
Internal Medicine	19 (8.76)	78 (35.64)	97 (44.7)	
Education Level				
Associate degree or lower	19 (8.76)	64 (29.49)	83 (38.25)	0.21
Bachelor's degree or higher	21 (9.68)	113 (63.84)	134 (61.75)	
Training on Peripheral Venous Thrombophlebitis				
Yes (*)	7 (3.23)	68 (31/34)	75 (34.6)	0.016
No	33 (15.21)	109 (50.23)	142 (65.4)	

(*): statistically significant with $p < 0.05$, Chi-square test

The analysis of factors associated with nurses' knowledge of peripheral venous thrombophlebitis reveals several significant trends. The study categorized nurses into two groups based on their knowledge: those who lacked knowledge and those who were knowledgeable about the condition. A total of 217 nurses participated in the study, with 32.72% of the sample aged 25-30 years, 35.48% aged 30-40 years, and 31.8% over 40 years. The Chi-square test ($p = 0.65$) revealed no significant difference in the level of knowledge between the different age groups, indicating that age did not appear to be a strong determinant of knowledge about peripheral venous thrombophlebitis.

Gender also did not significantly impact knowledge ($p = 0.22$), as 77.42% of female nurses demonstrated knowledge, compared to 22.58% of male nurses. This finding suggests that gender differences were not a significant factor in understanding peripheral venous thrombophlebitis within this sample.

In terms of experience, there was no significant difference between nurses with less than 10 years of experience (47.46%) and those with more than 10 years (52.54%) in terms of their knowledge ($p = 0.86$). This result suggests that experience alone does not lead to a significant improvement in knowledge, indicating the potential importance of specific training programs in enhancing understanding, regardless of the number of years worked.

Regarding department affiliation, the knowledge level was relatively similar between nurses from surgery (55.3%) and internal medicine (44.7%) departments, with a p-value of 0.73, suggesting no departmental variation in knowledge.

When examining the educational level of the nurses, 61.75% held a bachelor's degree or higher, and 38.25% had an associate's degree or lower. However, the Chi-square test ($p = 0.21$) showed no significant difference in knowledge based on educational attainment, suggesting that higher education did not automatically correlate with better knowledge of peripheral venous thrombophlebitis.

A notable factor influencing nurses' knowledge was their participation in specific training programs related to peripheral venous thrombophlebitis. Nurses who had attended training courses demonstrated significantly higher knowledge levels ($p = 0.016$). Specifically, 34.6% of nurses who

received training were knowledgeable about the condition, compared to just 50.23% of those who had not participated in any training. This finding underscores the crucial role of targeted educational interventions in enhancing nurses' knowledge about this common and serious complication of peripheral venous catheterization.

4. DISCUSSION

The present study aimed to assess the level of knowledge of nurses in clinical departments about peripheral venous thrombophlebitis (PVT). Overall, the survey found that 81.6% of the nurses demonstrated a general understanding of the management and care of peripheral venous catheterization (PVC), specifically regarding the prevention of thrombophlebitis complications. This result indicates a relatively high level of awareness among nurses, which is encouraging. However, when evaluating the depth of knowledge, only 18% of the nurses scored as having good knowledge, which is significantly lower than expected, especially when compared to international studies. For example, a survey conducted by Ying et al. (2020) in Northeast Malaysia reported that 56.8% of nurses demonstrated good knowledge of PVT. A similar study, conducted by Nordin et al. (2023) at the University of Selangor Hospital, found that 49.7% of nurses were well-versed in the subject [8,9]. Moreover, the average knowledge score of all nurses in the current study was 62.48 ± 13.37, which falls within the category of fundamental knowledge. This score is considerably lower than the average score of 81.54 ± 12.06 reported by Yilmaz et al. (2021) at the Faculty of Medicine, Izmir Katip Çelebi University, Turkey [10]. These findings indicate that, although the general level of knowledge about PVT at 108 Military Central Hospital is adequate, there is still considerable room for improvement.

The study did not find any strong correlation between the nurses' age or work experience and their level of knowledge regarding PVT. Interestingly, statistical analysis revealed that nurses in the 25-30 age group had significantly higher average knowledge scores compared to those aged 40 and above. Furthermore, notable differences were observed in the basic knowledge category between these two groups, with younger nurses scoring higher on average. Despite having more years of experience, nurses with over 10 years of practice had lower average knowledge scores than those with less than 10 years of experience. These results are consistent with those of Milutinovic et al. (2015) and Nordin et al. (2023), who also observed that younger nurses are more likely to maintain current knowledge [11].

Regarding educational background, 61.8% of the nurses in the study held a bachelor's or postgraduate degree, which typically correlates with a higher level of understanding in clinical subjects. However, no significant correlation was found between the nurses' education level and their knowledge of PVT. This finding contrasts with previous studies, such as Se et al. (2016), which suggested that nurses with higher education levels are more effective in preventing complications related to peripheral venous catheterization [12]. This discrepancy indicates that while higher education is essential, it does not necessarily translate into greater practical knowledge in specialized areas, such as PVT management.

Furthermore, other factors such as gender and departmental affiliation (internal medicine or surgery) did not significantly impact the nurses' understanding of PVT. This finding suggests that factors beyond demographic characteristics or department affiliation may play a more significant role in determining the level of knowledge regarding PVT.

A key finding of the study was the strong relationship between training on PVT and the nurses' level of knowledge. Nurses who had received training on PVT had significantly higher knowledge scores compared to those who had not attended any relevant courses. This is consistent with recommendations from the Infusion Nursing Society (INS), which emphasizes the importance of ongoing education and competency assessments in nursing practice [6]. Continuous training programs, particularly those focused on PVT prevention, are crucial for ensuring that nurses possess the necessary skills to manage peripheral venous catheterization effectively and prevent serious complications, such as thrombophlebitis. This finding highlights the importance of healthcare institutions investing in targeted educational interventions that can enhance nurses' competence and improve patient outcomes.

5. CONCLUSION

Peripheral venous thrombophlebitis (PVT) is a common and significant complication of peripheral venous catheterization that can lead to severe clinical outcomes if not properly managed. Given the increasing use of peripheral venous catheters in healthcare settings, it is essential for nurses, particularly in clinical departments, to be proficient in the proper techniques for catheter placement and management. Nurses' knowledge and understanding of PVT, including its risk factors, prevention, and early detection, are vital to improving patient outcomes and minimizing

complications. This study highlights that while nurses at 108 Military Central Hospital generally demonstrated a basic understanding of PVT, a noticeable gap remains in the level of knowledge, with only a small percentage achieving a good level of knowledge.

The findings suggest that, despite experience and educational background, targeted training on PVT prevention and management significantly improves nurses' knowledge. Therefore, nursing managers should prioritize the implementation of comprehensive, ongoing training programs to enhance nurses' practical skills, ensure proper catheter care, and address the risk factors associated with PVT. These training initiatives should focus not only on the technical aspects of peripheral venous catheter placement but also on the importance of early recognition and intervention to prevent thrombophlebitis. In doing so, healthcare institutions can help improve the competency of nursing staff, enhance patient care, and reduce the incidence of complications, such as PVT. Additionally, integrating such training into routine practice will ensure that nurses are equipped with the necessary knowledge to manage and prevent this common but potentially serious condition.

REFERENCES

[1] Ghazali ANM. Nurses' Knowledge and Practice Towards Care and Maintenance of Peripheral Intravenous Cannulation in Pantai Hospital, Batu Pahat, Johor, Malaysia. Accessed June 17, 2024.

[2] Abadi S, Etemadi S, Abed Saeedi Z. Investigating the Role of Mechanical and Chemical Factors in the Creation of Peripheral Vein in Flammarion Hospitalized Patients in Zahedan, Iran. Life Science Journal. 2013;10.

[3] Doherty L, Bravery K, Gabriel, et al. Standards for Infusion Therapy. Vol. 3rd ed. Royal College of Nursing; 2012.

[4] Webster J, Osborne S, Rickard C, et al. Clinically indicated replacement versus routine replacement of peripheral venous catheters. In: The Cochrane Collaboration, ed. Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2010:CD007798.pub2.

[5] Osti C, Wosti D, Pandey B, et al. Ventilator-Associated Pneumonia and Role of Nurses in Its Prevention. JNMA J Nepal Med Assoc. 2017;56(208):461-468.

[6] Gorski LA, Hadaway L, Hagle ME, et al. Infusion Therapy Standards of Practice. Vol. 8th edition. J Infus Nurs; 2021.

[7] Lanbeck P, Odenholt I, Paulsen O. Perception of Risk Factors for Infusion Phlebitis Among Swedish Nurses: A Questionnaire Study. Journal of Infusion Nursing. 2004;27(1):25-30. doi:10.1097/00129804-200401000-00004

[8] Ying CX, Yusuf A, Keng SL. Perceptions of risk factors for phlebitis among Malaysian nurses. Br J Nurs. 2020;29(2):S18-S23.

[9] Nordin N, Abu Bakar KB, Sharoni SKA, et al. Assessment of Peripheral Intravenous Catheter (PIVC) Knowledge and Perceptions of Phlebitis Risk Factors among Nurses in a University Hospital in Selangor. MJN. 2023;15(supp1):80-92.

[10] Yilmaz DU, Yilmaz D, Karaman D. Clinical nurses' knowledge and practices on routine care related to the prevention of complications of peripheral intravenous therapy: A cross-sectional study. J Vasc Access. 2023;24(2):277-283.

[11] Milutinović D, Simin D, Zec D. Risk factor for phlebitis: a questionnaire study of nurses' perception. Rev Latino-Am Enfermagem. 2015;23(4):677-684. doi:10.1590/0104-1169.0192.2603

[12] Se H, Is L, Wm L. Nurses' Knowledge and Practice in Relation to Peripheral Intravenous Catheter Care. Medicine and Health. Published online 2016:181-188.