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**KNOWLEDGE OF POSTPARTUM HEMORRHAGE PREVENTION
AND MANAGEMENT AND ASSOCIATED FACTORS AMONG
MIDWIFERY AND NURSING STUDENTS
AT CAN THO UNIVERSITY OF MEDICINE AND PHARMACY**

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ABSTRACT

Background: Postpartum hemorrhage is one of the five major obstetric emergencies and can result from multiple causes. Therefore, equipping healthcare students with comprehensive knowledge of postpartum hemorrhage prevention and management is essential. **Objectives:** To assess midwifery and nursing students' knowledge regarding the prevention and management of postpartum hemorrhage and to identify associated factors. **Materials and methods:** A descriptive cross-sectional study was conducted among 140 midwifery and nursing students at Can Tho University of Medicine and Pharmacy in 2025. Students' knowledge was collected and evaluated using a structured questionnaire which was created by Rose Faustine et al. in 2025. **Results:** The findings indicated that 90% of students demonstrated good knowledge of postpartum hemorrhage, while 10% had a moderate level of knowledge. Factors associated with knowledge of postpartum hemorrhage included prior formal instruction or training in postpartum hemorrhage prevention and management, as well as previous participation in the care of or exposure to postpartum hemorrhage cases during clinical practice. **Conclusions:** These students demonstrated a high level of knowledge regarding the prevention and management of postpartum hemorrhage. However, educational institutions should strengthen training programs on postpartum hemorrhage and provide increased opportunities for students to engage in clinical cases, from simulation-based learning to real-world practice, in order to sustain and further enhance students' knowledge in the prevention and management of postpartum hemorrhage.

Keywords: Knowledge, nursing, midwifery, postpartum hemorrhage.

I. INTRODUCTION

Postpartum hemorrhage (PPH) remains one of the most severe obstetric complications and a leading cause of maternal mortality globally. According to the World Health Organization (WHO), PPH accounts for more than 20% of maternal deaths, with a particularly high prevalence in low- and middle-income countries [1], [2]. Although numerous preventive and management strategies have been recommended including the active management of the third stage of labor, which has been proven to significantly reduce PPH incidence and mortality their correct and complete application in clinical practice remains limited. Because nurses and midwives are the direct caregivers for women in labor, equipping nursing and midwifery students with sufficient knowledge of PPH prevention and management is crucial to ensure the safety of both mothers and newborns, as well as to

foster their future professional development. Conversely, a lack of knowledge directly impairs their ability to assess, manage, and provide high-quality care.

A student's knowledge base regarding PPH is influenced by various personal characteristics and training factors, including their year of study, major, level of exposure to PPH-related content, and clinical practice opportunities. Globally, numerous studies indicate that students' knowledge of postpartum hemorrhage is not yet at an optimal level. For instance, a study by Fungai Muzeya *et al.* (2020) involving 99 midwifery students recorded an average knowledge score of only 73.8% [3]. Similarly, research by Bhutia, Shadap, and Pangambam (2018) among 40 nursing students revealed that 82.5% possessed moderate knowledge, 15% had poor knowledge, and a mere 2.5% demonstrated good knowledge [4].

In Vietnam, existing research on PPH has primarily focused on healthcare professionals, while studies targeting the student population have noted significant limitations. Tran Thi Bich Thao *et al.* (2014) showed that only 20% of midwifery students knew how to perform uterine fundus massage after placental delivery, and no students fully executed the active management of the third stage of labor according to National Guidelines [5]. More recently, Ha *et al.* (2023) recorded that 16% of cases still failed to meet the required standards for proper uterine fundus massage [6]. Furthermore, Luong *et al.* (2024) demonstrated that while the knowledge rate regarding essential maternal and newborn care reached over 78.5%, actual practice remained highly limited [7]. Given the scarcity of comprehensive research on the baseline knowledge of nursing and midwifery students in Vietnam, surveying their understanding of PPH prevention and management during their training is essential to upgrade educational quality and fulfill professional competency standards. Therefore, this study was conducted to assess the current knowledge of nursing and midwifery students regarding the prevention and management of postpartum hemorrhage, thereby providing an empirical basis for adjusting and improving the quality of the training curriculum.

II. MATERIALS AND METHODS

2.1. Participants

Midwifery and nursing students studying at Can Tho University of Medicine and Pharmacy in 2025-2026.

- Inclusion criteria:

Nursing and midwifery students, third and fourth-year students were studying at Can Tho University of Medicine and Pharmacy during the research period.

The student agreed to participate in the research.

- Exclusion criteria: Absence during the data collection period.

2.2. Research methods

- **Study design:** A descriptive cross-sectional study was conducted.

- **Sample size and sampling:** All nursing and midwifery students in the Third and fourth-year students were included (n = 140).

Sample size: Calculated using the sample size-by-proportion formula:

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

In which: Select $Z_{(1-\frac{\alpha}{2})} = 1.96$ with 95% confidence ($\alpha = 0.05$). $p = 0.66$ (Rose Faustine *et al*, 2025). d : The error term of the study is chosen as $d = 0.08$. Therefore, the minimum sample size for the study was $n = 134$.

- **Data collection tool:** The knowledge of nursing students regarding the prevention and management of postpartum hemorrhage (PPH) was assessed using a scale developed by Rose Faustine *et al.* in 2025 [8]. The scale consists of 22 questions evaluating the definition, causes, risk factors, classification of PPH, active management of the third stage of labor, and PPH management. Each question is worth 1 point if answered correctly. Knowledge scores on PPH prevention and management ranged from 0 to 22. Knowledge was categorized as: good knowledge: $\geq 80\%$ of the total score, average knowledge: 40 to $<80\%$ of the total score, and poor knowledge: $<40\%$ [8]. The scale was translated into Vietnamese by the research team with a Cronbach's alpha coefficient of 0.8130. General information of the study subjects was collected to investigate the relationship with PPH knowledge.

- **Data collection procedures:** A self-administered questionnaire was used. The questionnaire was distributed during breaks in morning or afternoon classes at the lecture hall. The research subjects were informed about the research objectives and how to complete the survey.

- **Data analysis:** Data were processed using STATA version 17 software. Descriptive statistics (rates, percentages, means, standard deviations) were used to describe the general characteristics of the study subjects and the knowledge of nursing students. Analytical statistics, including the Chi-square test and Fisher's test, were used to investigate several factors related to knowledge about preventing and managing postpartum hemorrhage. $p < 0.05$ was considered statistically significant.

- **Ethical Approval:** This research has been approved by the Biomedical Research Ethics Committee under decision number 25.006.SV/PCT-HDDD dated May 12, 2025.

III. RESULTS

3.1. Characteristics of the study participants

Table 1. Characteristics of the research subjects

Characteristic		Frequency (n)	Percentage (%)	
Age	<21	83	59.29	
	≥ 21	57	40.71	
Gender	Male	12	8.57	
	Female	128	91.43	
Major	Nursing	71	50.71	
	Midwifery	69	49.29	
Academic year	3 rd year	99	70.71	
	4 th year	41	29.29	
Academic achievements	Excellent	02	1.43	
	Good	10	7.14	
	Fair	86	61.43	
	Average	42	30.00	
Have received training/education on the prevention and management of postpartum hemorrhage		Yes	97	69.29

Characteristic		Frequency (n)	Percentage (%)
	No	43	30.71
Have experience caring for/dealing with cases of postpartum hemorrhage	Yes	78	55.71
	No	62	44.29

Mean $\pm$ SD: mean and standard deviation.

59.29% of the students participating in the study were under the age of 21. The proportion of students aged under 21 years was higher (59.29%) than those aged 21 years and above (40.71%). Females accounted for the majority (91.43%). Nursing and midwifery students had nearly equal proportions (50.71% and 49.29%, respectively), with most participants being in the 3rd year (70.71%). The majority had a fair academic performance (61.43%). Most students had received training/education on the prevention and management of postpartum hemorrhage (PPH) (69.29%). However, the proportion who had previously cared for a PPH case was relatively low (55.71%).

3.2. Knowledge of study population on the prevention and management of postpartum hemorrhage

Table 2. Knowledge of postpartum hemorrhage among study participants.

Knowledge of PPH	Frequency (n)	Percent (%)
Average	14	10
Good	126	90
Total score	20.54 $\pm$ 2.38 (min = 10, max=22)	

The results showed that the majority of students had good knowledge of postpartum hemorrhage (PPH), accounting for 90.00%, while 10.00% demonstrated a moderate level of knowledge. The mean total knowledge score was 20.54 $\pm$ 2.38 (range: 10-22), indicating that the overall level of knowledge among students was relatively high and fairly consistent.

3.3. Factors Associated with Students' Knowledge

Table 3. Factors associated with knowledge of PPH prevention and management

Characteristic	Frequency (n)	Knowledge of PPH		χ^2 /Fisher	P
		Average (n,%)	Good (n,%)		
Age	<21	11 (13.25)	72 (86.75)	2.39	0.12
	$\geq$ 21	3 (5.26)	54 (94.74)		
Gender	Male	3 (25.00)	9 (75.00)	3.28	0.07 (*)
	Female	11 (8.59)	117 (91.41)		
Major	Nursing	10 (14.08)	61 (85.92)	2.67	0.10
	Midwifery	4 (5.80)	65 (94.20)		
Academic year	3 rd year	13 (13.13)	86 (86.87)	3.68	0.05 (*)
	4 th year	1 (2.44)	40 (97.5)		
Academic achievements	Excellent	0 (0.00)	2 (100.0)	1.59	0.66 (*)
	Good	0 (0.00)	10 (100.0)		
	Fair	10 (11.63)	76 (88.37)		
	Average	4 (9.52)	38 (90.48)		
Have received training/education	Yes	5 (5.15)	92 (94.85)	8.24	0.004

Characteristic	Frequency (n)	Knowledge of PPH		χ^2 /Fisher	P
		Average (n,%)	Good (n,%)		
on the prevention and management of postpartum hemorrhage	No	9 (20.93)	34 (79.07)	4.65	0.03
Have experience caring for/dealing with cases of postpartum hemorrhage	Yes	4 (5.13)	74 (94.87)		
	No	10 (16.13)	52 (83.87)		

(*) Fisher's exact test

No statistically significant association was found between knowledge of PPH and age, gender, major, academic year, and academic performance ($p > 0.05$). In contrast, students who had received education/training on the prevention and management of PPH demonstrated a significantly higher proportion of good knowledge compared with those who had not received such training, and this difference was statistically significant ($p < 0.05$). Similarly, students who had previously cared for or been exposed to a PPH case showed a higher proportion of good knowledge than those without prior exposure ($p < 0.05$).

IV. DISCUSSION

4.1. Knowledge of study population on the prevention and management of postpartum hemorrhage

The current research results show that the total knowledge assessment score among surveyed nursing and midwifery students was 20.54 ± 2.38 correct answers out of 22 questions. The classification of knowledge levels shows that 90% of students achieved a good level and 10% achieved an average level, with no cases recorded at a poor level. This reflects the generally high level of knowledge regarding postpartum hemorrhage among the students.

This result is higher than that reported by Fungai Muzeya and Julie (2020), in which the average total score for knowledge of PPH was 73.8%, although the self-assessment rate of competence was 95.2%, but this difference may be related to the fact that the two studies used different assessment methods, in which Muzeya and Julie's study used a structured questionnaire to collect data on self-reported knowledge and competence, then compared clinical assessment results with self-reported results [3]. The study by Rose Faustine *et al.* in 2025 showed that 60-67.3% of nursing students had knowledge of PPH prevention and management, a significantly lower result than the current study's results [8].

The high level of knowledge recorded through research may reflect the suitability of the curriculum being implemented at the school for nursing students. Learning content on postpartum hemorrhage (PPH) is taught in theoretical classes with visual images and content, including clinical situations that have occurred in practice. An important content on PPH is the active management of the third stage of labor, with the aim of preventing and managing dangerous obstetric complications - PPH. The content is delivered in an integrated and continuous manner throughout the curriculum so that students can systematize the

learning content, thereby helping to consolidate their knowledge base. According to Yawn *et al.* (2025), the implementation of repeated learning content helps improve the level of knowledge retention by up to 34% ($p < 0.001$), regardless of the content duration [9]. This is consistent with explaining why integrating and emphasizing content on PPH throughout the training program can lead to the high knowledge rates recorded in the current study.

4.2. Factors Associated with Students' Knowledge

The study noted a statistically significant association between knowledge and the factor of "having received training/education" on the prevention and management of PPH. The finding of a statistically significant association between having received training/education and knowledge level in the current study is also consistent with the results of Bidiru *et al.* (2025). The authors showed that participants who had received training in obstetrics were 3,386 times more likely to achieve a good level of knowledge than the untrained group [10]. Students who had received training/education on PPH had a higher rate of correct answers compared to the group who had never been exposed to PPH. This result shows consistency with previous studies, that training/education plays an important role in improving students' professional ability. The reason for this relevance is that, in addition to theoretical knowledge, students also learn about clinical scenarios integrated into the lectures, which helps them visualize the necessary actions when preventing postpartum hemorrhage (PPH). Furthermore, the PPH content is integrated across various lectures, so the knowledge sections are linked coherently and tightly, creating a comprehensive picture of PPH.

In addition, the study also showed that students who had been exposed to clinical situations related to PPH had a higher level of knowledge than the group who had not been exposed, and this difference was statistically significant. Clinical experiences help transform theoretical content into clinical thinking through recall and application. When directly learning from real situations, students will understand the urgency of preventing and managing PPH, the tasks of team members and the steps of intervention. This finding is indirectly reinforced by the study of Rose Faustine *et al.* (2025), in which simulation-based training - a form of situational approach close to clinical reality - was noted to help students enhance practical preparation, teamwork spirit and professional development through constructive feedback[8]. This shows that access to and experience with real-world scenarios for managing PPH, whether in a simulation or a real clinical setting, contributes to consolidating and maintaining knowledge more sustainably than simply learning theory.

However, the study only assessed knowledge through a questionnaire and did not fully reflect the clinical skills and ability to handle real-life situations of the students. Assessing practical competence requires direct observation and a comprehensive checklist. The fact that students had already studied the theory of PPH also somewhat influenced the level of knowledge recorded, as the questions were relevant to the learned content. Nevertheless, preventing and managing PPH also requires accurate and timely professional procedures, teamwork skills, and the ability to manage under high pressure.

Based on the research findings, it is necessary to strengthen training programs through models, creating opportunities for students to access real-world clinical environments, learn and study case studies to consolidate and maintain knowledge of preventing and managing obstetric emergencies, particularly PPH. Lecturers should coordinate the organization of specialized sessions, create simulated obstetric emergency scenarios, and update new professional knowledge to equip students with a solid foundation,

contributing to improved practice in preventing and managing obstetric and gynecological emergencies in clinical settings. These results not only reflect the effectiveness of the training program but also serve as a basis for developing strategies to enhance the obstetric emergency management capabilities of nursing students in the future.

This study has several limitations that should be considered. Firstly, its descriptive cross-sectional design prevents the establishment of causal relationships between the identified factors and students' knowledge. Second, the small sample size from a single institution restricts the generalizability of the findings to nursing and midwifery students across Vietnam. Third, the assessment relied entirely on a self-administered questionnaire, which measures theoretical knowledge rather than practical competence. Finally, because the survey was administered after the completion of theoretical coursework, preparation bias may have contributed to the inflated scores. Future multicenter studies using objective structured clinical examinations are recommended to better evaluate practical competency.

V. CONCLUSION

The study shows that the knowledge of postpartum hemorrhage prevention and management among nursing and midwifery students was significantly associated between those who have participated in training and have clinical experience and those who have not. Students with clinical experience have a better level of knowledge, affirming the important role of practical training. The results emphasize the need to strengthen specialized training and create opportunities for students to participate in care. Based on these findings, the school can implement appropriate teaching methods that can contribute to improving knowledge and practical skills in postpartum hemorrhage and ensuring the safety of mothers.

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