

KNOWLEDGE OF GESTATIONAL DIABETES MELLITUS AND ASSOCIATED FACTORS AMONG NURSING AND MIDWIFERY STUDENTS

AT CAN THO UNIVERSITY OF MEDICINE AND PHARMACY

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) is becoming an escalating public health concern in Vietnam, significantly increasing the risk of adverse maternal and neonatal outcomes, including preeclampsia, macrosomia, and long-term metabolic disorders. Despite the continuous evolution of medical curricula, the GDM-related knowledge among nursing and midwifery students—who are the primary frontline caregivers—often remains inconsistent and may not fully align with professional competency standards. Systematic evaluations of these educational gaps are currently limited in the Vietnamese context. **Objectives:** To assess the current level of GDM knowledge among nursing and midwifery students at Can Tho University of Medicine and Pharmacy and to identify the socio-demographic and academic factors influencing their understanding. **Materials and methods:** A cross-sectional descriptive study was conducted among 167 third- and fourth-year nursing and midwifery students from April to May 2025. Data were gathered through a structured, validated questionnaire adapted from the Bashir scale, consisting of 12 items addressing four critical domains: risk factors, diagnostic criteria, management protocols, and potential complications. Knowledge levels were categorized as poor (score ≤ 4), average (5-8), or good (9-12). **Results:** The findings revealed that while 33.53% of students demonstrated good knowledge, the majority (61.08%) fell into the average category, and 5.39% still exhibited poor knowledge. Significant statistical associations were identified between knowledge levels and several key variables, including age, academic major, and year of study ($p < 0.05$). Specifically, midwifery students and seniors (4th-year) consistently outperformed their counterparts. Notably, students with higher exposure to clinical GDM cases and specialized information sources showed a lower prevalence of poor knowledge. **Conclusion:** Knowledge of GDM among the surveyed students remains suboptimal, particularly regarding complex management and long-term complications. There is a critical need for targeted educational interventions, such as specialized workshops and enhanced clinical integration, to bridge these gaps. Strengthening the curriculum and providing more hands-on clinical exposure are essential to equip future healthcare professionals with the necessary competencies for high-quality maternal care.

Keywords: Gestational diabetes mellitus, knowledge, nursing and midwifery students.

I. INTRODUCTION

Gestational diabetes mellitus (GDM) is a condition of glucose intolerance and/or hyperglycemia first detected during pregnancy, which increases the risk of adverse obstetric outcomes for both the mother and fetus [1]. Normally, GDM is diagnosed in the 2nd and 3rd trimester without any prior signs before pregnancy [1]. In Vietnam, the prevalence of GDM

has significantly increased with rates exceeding 20% among pregnant women examined at specialized hospitals [1]. GDM can lead to obstetric complications for both mother and fetal, such as miscarriage, stillbirth, preeclampsia, macrosomia leading to an increased risk of difficult labor and cesarean section, neonatal asphyxia, perinatal mortality, and postpartum diabetes [1], [2]. A study by Klaudia Illenberger et al. also showed that pregnant women had a positive change and adhere to nutritional and treatment regimens when advised and educated by students [3]. Therefore, assessing the knowledge of GDM among health science students, especially nursing and midwifery students who are the primary caregivers for pregnant women, is essential for implementing prevention strategies, improving the quality of training, and meeting professional needs [3], [4]. A study by Maryam M. Bashir et al. (2022) revealed that most students had an average level of knowledge about GDM [4]. This study also pointed out a correlation between GDM knowledge and demographic factors such as age and marital status, while emphasizing that the main source of information for students was from family/friends [4].

In the context of the increasing prevalence of GDM in Vietnam, studies assessing GDM knowledge have so far focused mainly on pregnant women, with limited data recorded on healthcare students. To improve the quality of training and meet professional competency standards, and also contribute to enhancing the quality of care, we conducted this study with the objective: 1) To describe the knowledge of GDM among nursing and midwifery students at Can Tho University of Medicine and Pharmacy, 2) To identify some related factors to the knowledge towards GDM.

II. MATERIALS AND METHODS

2.1. Participants

Nursing and Midwifery students who were studying at the Faculty of Nursing and Medical Technology, Can Tho University of Medicine and Pharmacy from April 2025 – May 2025.

- **Inclusion criteria:** 3rd and 4th year nursing and midwifery students who agreed to participate in the study.

- **Exclusion criteria:** Students absent during the research period, students who didn't respond or complete the survey link.

2.2. Research methods

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

- **Sample size and sampling:** Our study used a total sampling method on 196 students who met the selection criteria. The responses's rates in our study was reached at 167/196 (85.20% response rate).

- **Data collection tool:** Our study utilized a standardized 12-item scale developed by Bashir et al. (2022) which assess key GDM aspects: 5 items on risk factors, 2 items on diagnosis, 2 items on management, and 3 items on complications [4]. Before using this research, the research questionnaire in English version was both translated and measured for reliability which follow the Beaton's guideline [5]. The scale demonstrated satisfactory reliability with Cronbach's alpha coefficient ($\alpha=0.7$), confirming internal consistency. Based on the total score, knowledge levels were categorized as follows: poor (≤ 4 scores), average (5 - 8 scores), and good (9 - 12 scores). Additionally, we collected variables including age,

gender, had experience with/cared for pregnant women with GDM, family history of GDM, major, academic year, academic performance.

- **Data collection procedures:** We sent a Google Form link along with an invitation letter to participate. On this link, the first section provided information on the study's purpose and content, ensuring data confidentiality and adherence to medical ethics principles. If the student agreed to participate, the Google Form link lead to a questionnaire assessing knowledge of gestational diabetes. The survey took 10–15 minutes to complete.

- **Data analysis:** Descriptive statistics, including frequencies (n) and percentages (%), were used to describe the general characteristics of the students and their level of knowledge GDM. Analytical statistics using the Chi-square test or Fisher's exact test were employed to determine the association between students' knowledge of GDM and their general characteristics. A p-value of <0.05 was considered statistically significant. Data were entered and analyzed using STATA 15.0 software.

- **Ethical approval:** The study strictly adheres to all regulations governing biomedical research ethics. The research proposal was approved by the Ethics Committee of Can Tho University of Medicine and Pharmacy under decision no. 24.070.SV/PCT-HDDD, dated November 9, 2024. The student population was entirely voluntary, and participants retained the right to withdraw from the study at any time if they no longer wished to participate. Their involvement did not affect their academic performance at the University. Personal information was kept confidential and used solely for research purposes.

III. RESULTS

3.1. Characteristics of study population

Table 1. General characteristics of study population

| Characteristics | | Frequency (n) | Percentage (%) |
|----------------------|-----------------------|---------------|----------------|
| Age | <21 | 84 | 50.30 |
| | ≥21 | 83 | 49.70 |
| Gender | Male | 15 | 8.98 |
| | Female | 152 | 91.02 |
| Major | Nursing | 105 | 62.87 |
| | Midwifery | 62 | 37.13 |
| Academic year | 3 rd year | 99 | 59.28 |
| | 4 th year | 68 | 40.72 |
| Academic performance | Excellent – Very good | 35 | 20.96 |
| | Good | 93 | 55.69 |
| | Average or below | 39 | 23.35 |

The study included 167 students with the following characteristics: being under 21 years old (50.30%), the overwhelming majority were female (91.02%), nearly two-thirds were nursing students (62.87%) and more than half were third-year students (59.28%). Regarding academic performance, the majority of students reported an evaluation of good (55.69%). A substantial proportion, however, achieved a ranking of excellent or very good (20.96%), while 39 participants (23.35%) were rated as average or below.

Table 2. Characteristics related to access to knowledge about GDM

| Characteristics | | Frequency (n) | Percentage (%) |
|---|-----|---------------|----------------|
| Family history of GDM | Yes | 19 | 11.38 |
| | No | 148 | 88.62 |
| Had experience with/cared for pregnant women with GDM | Yes | 68 | 40.72 |
| | No | 99 | 59.28 |

The vast majority of participants reported no family history of GDM was 88.62%. Only a small fraction, 11.38% study participants who indicated having a family member with GDM. In terms of practical experience, less than half of the sample reported having experience with/cared for pregnant women with GDM 40.72%. A larger proportion, 59.28% presented no such prior experience.

3.2. Knowledge about GDM of study population

Table 3. Knowledge about Gestational Diabetes Mellitus

| Classification of knowledge | Frequency (n) | Percentage (%) |
|-----------------------------|---------------|----------------|
| Good (9 - 12 scores) | 56 | 33.53 |
| Average (5 - 8 scores) | 102 | 61.08 |
| Poor (0 - 4 scores) | 9 | 5.39 |

The majority demonstrated average knowledge (61.08%), while good knowledge was observed in 33.53% of students, and only 5.39% presented poor knowledge.

3.3. Related factors to knowledge GDM among study population

Table 4. Association between knowledge GDM and student characteristics

| Characteristics | | GDM Knowledge | | | p |
|----------------------|-----------------------|---------------|---------------|-------------|------------|
| | | Poor n (%) | Average n (%) | Good n (%) | |
| Age | <21 | 6 (7.14%) | 60 (71.43%) | 18 (21.43%) | 0.003 |
| | >21 | 3 (3.61%) | 42 (50.60%) | 38 (45.78%) | |
| Gender | Male | 2 (13.33%) | 10 (66.67%) | 3 (20.00%) | 0.233 |
| | Female | 7 (4.61%) | 92 (60.53%) | 53 (34.87%) | |
| Major | Nursing | 7 (6.67%) | 72 (68.57%) | 26 (24.76%) | 0.007 (*) |
| | Midwifery | 2 (3.23%) | 30 (48.39%) | 30 (48.39%) | |
| Academic years | 3 rd year | 7 (7.07%) | 72 (72.73%) | 20 (20.20%) | <0.001 (*) |
| | 4 th year | 2 (2.94%) | 30 (44.12%) | 36 (52.94%) | |
| Academic performance | Excellent – Very good | 1 (2.86%) | 19 (54.29%) | 15 (42.86%) | 0.575 |
| | Good | 5 (5.38%) | 57 (61.29%) | 31 (33.33%) | |
| | Average or below | 3 (7.69%) | 26 (66.67%) | 10 (25.64%) | |

* Fisher's exact test

Analysis of 167 students revealed statistically significant associations between GDM knowledge and age group, majors, and academic year ($p < 0.05$). However, no statistically significant relationships were found between GDM knowledge and either gender or academic performance ($p > 0.05$).

Table 5. Association between knowledge and access-related factors GDM

| Characteristics | | GDM Knowledge | | | p |
|---|-----|---------------|---------------|-------------|-----------|
| | | Poor n (%) | Average n (%) | Good n (%) | |
| Family history of GDM | Yes | 2 (10.53%) | 11 (57.89%) | 6 (31.58%) | 0.574 (*) |
| | No | 7 (4.73%) | 91 (61.08%) | 50 (33.78%) | |
| Had experience with/cared for pregnant women with GDM | Yes | 4 (5.88%) | 41 (60.29%) | 23 (33.82%) | 0.967 |
| | No | 5 (5.05%) | 61 (61.62%) | 33 (33.33%) | |

* Fisher's exact test

Analysis of 167 nursing and midwifery students, no significant relationships were found between GDM knowledge family history of GDM and familiarity with someone who experienced GDM ($p > 0.05$).

IV. DISCUSSION

Our study's findings reveal that a majority of students (61.08%) demonstrated the average knowledge of GDM. Our results were notably higher than those reported by Maryam M. Bashir, specifically, in their research, only 17.5% of students had good knowledge, with 58.5% having average knowledge and 24.0% having poor knowledge [4]. This significant difference can be attributed to the different populations surveyed. Our study was conducted with nursing and midwifery students, who receive specialized education on maternal and prenatal health, including GDM, as a core component of their curriculum. This foundational knowledge likely contributes to their higher performance. In contrast, Bashir's study surveyed students from non-medical fields, who would not have received this targeted education. Their limited exposure to such topics would logically lead to a lower overall knowledge level. This highlights the critical role of specialized medical training in shaping students' understanding of GDM and underscores the need for targeted health education programs for the general population.

This result is consistent with the work of Mary Downes Gastrich and aligns with the core principles of Social Cognitive Theory. This theory highlights that learning is not merely a passive process of absorbing information but an active one, shaped by a combination of internal and external factors [6], [7]. The curriculum, which becomes increasingly specialized with each academic year, likely serves as a foundational component for this enhanced knowledge. As students progress, their exposure to medical topics deepens, providing a more robust framework for understanding complex conditions like GDM. Crucially, the clinical experiences that are a standard part of the fourth-year curriculum play a vital role. Direct patient interaction, observing diagnostic procedures, and participating in treatment plans provide practical, real-world context that complements theoretical knowledge. This hands-on experience, combined with a more mature understanding of the

material, contributes to the observed improvement in GDM knowledge among these students. This synergy between academic learning and practical application is a key factor in the development of clinical competence.

Additionally, we noted a relationship between major and GDM knowledge, with midwifery students having a higher proportion of good knowledge ($p < 0.05$). This is likely because the midwifery curriculum is more intensely focused on all aspects of pregnancy and childbirth, including the prevention, diagnosis, and management of complications like GDM. Their training is specifically tailored to provide comprehensive maternal care, which requires a deep and practical understanding of gestational conditions. In contrast, nursing students have a broader-based curriculum that covers a wide range of medical fields. While they do study maternal health, the depth of focus on specific conditions like GDM may be less than what is required for a midwifery specialization.

However, the lack of a significant relationship between prior experience caring for pregnant women with GDM and overall knowledge in our study. It suggests that hands-on clinical experience alone does not automatically translate to a deeper theoretical understanding. This finding highlights the crucial role of formal education and curriculum design in complementing clinical training. Clinical experience is valuable for skill development, but it must be supported by a robust theoretical foundation to ensure a truly knowledgeable healthcare professional.

V. CONCLUSION

Our study found that 5.39% of students had poor knowledge of GDM, 61.08% had average knowledge, and 33.53% had good knowledge. Our results also showed a significant association between students' GDM knowledge and age, major, year of study, and exposure to GDM-related information ($p < 0.05$). To enhance students' knowledge of GDM, Can Tho University of Medicine and Pharmacy should increase GDM-related training and periodically review the curriculum and integrate GDM cases into students' clinical practice. The authors gratefully acknowledge the financial support provided by Can Tho University of Medicine and Pharmacy (Official Decision No. 4618/QD-DHYDCT, December 17, 2024). We extend our sincere appreciation to the nursing and midwifery students from the Faculty of Nursing and Medical Technology for their valuable contributions to this research.

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