Original article

# Prevalence and associated factors of depressive symptoms among high-risk pregnant women at the Department of Obstetrics and Gynecology, Hue University of Medicine and Pharmacy Hospital

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**Abstract**

**Background:** Depressive symptoms during pregnancy are an important concern, particularly among women with high-risk pregnancies.

**Objectives:** To determine the prevalence of depressive symptoms and identify associated factors among high-risk pregnant women at Hue University of Medicine and Pharmacy Hospital.

**Methods:** A cross-sectional study was conducted among 257 high-risk pregnant women at Hue University of Medicine and Pharmacy Hospital. Data were collected using a structured questionnaire and the Beck Depression Inventory-II (BDI-II). Depressive symptoms were defined as a BDI-II score of ≥ 14. Univariable and multivariable logistic regression analyses were performed to identify associated factors.

**Results:** Among the 257 participants, 65 participants (25.3%; 95% CI: 20.4 – 30.9%) had BDI-II scores of ≥ 14. Regarding symptom severity, 39 participants (15.2%) had mild symptoms, 17 (6.6%) had moderate symptoms, and 9 (3.5%) had severe symptoms. Occasional or frequent disagreements with a husband/ partner were associated with higher odds of depressive symptoms (aOR = 4.70; 95% CI: 2.27 – 9.86; p < 0.001). A history of psychological problems before pregnancy was also associated with higher odds (aOR = 5.52; 95% CI: 1.23 – 26.13; p = 0.025). Conversely, a monthly household income of ≥ 5 million VND was associated with lower odds (aOR = 0.40; 95% CI: 0.16 – 0.99; p = 0.045).

**Conclusion:** Depressive symptoms were prevalent among high-risk pregnant women. Marital disagreements, a history of psychological problems, and household income were independently associated with depressive symptoms. Integrating mental health screening and appropriate psychosocial support into antenatal care may help address the needs of this population.

**Keywords:** *depressive symptoms; high-risk pregnancy; beck depression inventory-ii; associated factors; pregnant women.*

## 1. INTRODUCTION

Depression during pregnancy is a common mental health concern with important implications for maternal and child health. According to the World Health Organization (WHO), approximately 10% of pregnant women and 13% of postpartum women experience a mental disorder, with depression being one of the most common conditions [1]. Antenatal depression affects not only maternal mental health, quality of life, and ability to adapt to pregnancy but may also be associated with adverse maternal and child outcomes [1,2]. Evidence from previous studies suggests that antenatal depression is associated with an increased risk of adverse birth outcomes, including preterm birth and low birth weight [3]. These concerns are particularly relevant for women with high-risk pregnancies, who already face increased medical and obstetric challenges. The coexistence of obstetric risks and depressive symptoms may compound maternal distress and complicate the provision of comprehensive antenatal care. Therefore, early identification of depressive symptoms and appropriate psychosocial support are important components of care for high-risk pregnant women.

Women with high-risk pregnancies may be particularly vulnerable to mental health problems because they must cope simultaneously with underlying medical conditions, obstetric risks, and psychological stressors throughout pregnancy. In Vietnam, a multisite cross-sectional study involving 1,260 pregnant women reported that 24.5% screened positive for antenatal depressive symptoms using the Edinburgh Postnatal Depression Scale (EPDS), with fetal abnormalities identified as an associated factor [4]. Previous studies have also identified

several factors associated with antenatal depression, including a history of psychological problems, inadequate support from partners or family members, stress, unplanned pregnancy, and certain obstetric factors [2,5]. Collectively, these findings suggest that depressive symptoms among women with high-risk pregnancies may be influenced by multiple factors, including health-related, obstetric, and psychosocial characteristics. Screening for and early identification of depressive symptoms during pregnancy are essential for timely assessment and intervention. The American College of Obstetricians and Gynecologists (ACOG, 2023) recommends using standardized, validated instruments to screen for depression and anxiety during pregnancy and the postpartum period [5]. The Edinburgh Postnatal Depression Scale (EPDS) was developed specifically for assessing depressive symptoms during the perinatal and postpartum periods. In this study, the Beck Depression Inventory-II (BDI-II) was selected to assess depressive symptoms among high-risk pregnant women; however, the screening efficacy and optimal threshold scores for these tools vary depending on the specific population [6].

In Vietnam, previous studies have highlighted the importance of antenatal depressive symptoms as a public health concern. A study by Duong et al. (2023) involving 312 women with high-risk pregnancies at Da Nang Hospital for Women and Children reported a depression prevalence of 36.5%, assessed using the Edinburgh Postnatal Depression Scale (EPDS) [7]. These findings underscore the need for continued attention to the identification of depressive symptoms during pregnancy, particularly among women with high-risk pregnancies. However, evidence regarding the prevalence of depressive symptoms and associated factors among high-risk pregnant women in Vietnam remains limited. Investigating this issue at Hue University of Medicine and Pharmacy Hospital may provide locally relevant data on the prevalence of depressive symptoms defined by a BDI-II cutoff score of ≥14 and help identify associated factors in the local obstetric care setting. The findings may inform efforts to identify pregnant women who require further mental health assessment and appropriate support. Therefore, this study was conducted to investigate the prevalence and associated factors of depressive symptoms among high-risk pregnant women at the department of Obstetrics and Gynecology, Hue University of Medicine and Pharmacy Hospital, with the following objectives:

*1. To determine the prevalence of depressive symptoms among high-risk pregnant women.*

*2. To identify factors associated with depressive symptoms among high-risk pregnant women.*

## 2. METHODS

### 2.1. Study design and setting

A descriptive cross-sectional study was conducted from March 2026 to September 2026 at the Department of Obstetrics and Gynecology, Hue University of Medicine and Pharmacy Hospital, Hue University, Vietnam. The study aimed to estimate the prevalence of depressive symptoms and identify factors associated with depressive symptoms among pregnant women with high-risk pregnancies.

### 2.2. Participants and sampling

The study included pregnant women diagnosed with high-risk pregnancies by an obstetrician and receiving inpatient care at the Department of Obstetrics and Gynecology during the study period. Women at all stages of pregnancy (first, second, and third trimesters) were eligible, with gestational age recorded in completed weeks. Participants were required to communicate fluently in Vietnamese, complete the questionnaire independently, and provide informed consent. Women with severe obstetric emergencies, clinically unstable conditions requiring immediate management, respiratory failure, impaired consciousness, conditions preventing questionnaire completion, or acute psychiatric inpatient treatment that substantially impaired participation were excluded, as were those who declined participation or did not complete the questionnaire.

The required sample size was calculated using the formula for estimating a single population proportion:

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

where n represents the required sample size; $Z^2_{1-\alpha/2}$ =1.96 for a 95% confidence level; p = 0.365, based on the study by Duong et al. [7] among high-risk pregnant women in Vietnam and d = 0.06, representing the allowable absolute margin of error.

The minimum required sample size was 248 participants. Convenience sampling was employed, and eligible pregnant women were recruited during the study period until the required sample size was achieved. A total of 257 pregnant women were enrolled in the study.

**2.3. Data collection and measures**

Data were collected using a structured self-administered questionnaire developed for this study. The questionnaire consisted of two parts: general characteristics and factors associated with high-risk pregnancy, and the assessment of depressive symptoms using the BDI-II.

The first part collected information on participants' characteristics and factors potentially associated with depressive symptoms. These variables were organized into three groups: Group A, sociodemographic characteristics (9 items, A1–A9); Group B, pregnancy-related factors (7 items, B1–B7); and Group C, family and psychosocial factors (15 items, C1–C15). The second part assessed depressive symptoms using the BDI-II, a 21-item self-report instrument widely used to assess the severity of depressive symptoms in adolescents and adults. The original Beck Depression Inventory was introduced in 1961 and revised in 1996 to better align with the diagnostic criteria for depression in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) [8]. The BDI-II assesses symptoms experienced during the preceding two weeks, including the day of assessment. Each item is scored from 0 to 3, yielding a total score ranging from 0 to 63, with higher scores indicating greater severity of depressive symptoms. According to the BDI-II scoring guidelines, scores of 0 – 13 indicate minimal symptoms, 14 – 19 indicate mild symptoms, 20 – 28 indicate moderate symptoms, and 29 – 63 indicate severe symptoms [8, 9]. The Vietnamese-language version adapted by Tran Nhu Minh Hang [9]. A BDI-II score threshold of ≥ 14 was applied to identify pregnant women with depressive symptoms, based on the study by Tandon et al., with a sensitivity of 81.3% and a specificity of 95.2% [10]. The internal consistency of the BDI-II in the present study was good, with a Cronbach's alpha coefficient of 0.90.

**2.4. Data analysis**

Data were processed and analyzed using R and RStudio. Descriptive statistics were used to summarize participant characteristics as frequencies and percentages. The prevalence of depressive symptoms, defined as a BDI-II total score of ≥ 14, was calculated with a 95% confidence interval (CI) using the Wilson method.

For regression analyses, depressive symptoms were treated as a binary outcome: participants with BDI-II scores below 14 were coded as 0, while those with scores of 14 or higher were coded as 1. Univariable and multivariable logistic regression analyses were performed to identify factors associated with depressive symptoms. Results were reported as crude odds ratios (ORs) and adjusted odds ratios (aORs), with corresponding 95% CIs and p-values.

Candidate variables for the multivariable model were selected based on clinical and subject-matter knowledge, previous research, and findings from univariable analyses. Variables with low observation frequencies in some categories were combined into broader categories where appropriate to reduce sparse data and improve the stability of parameter estimates. Multicollinearity was assessed using the variance inflation factor (VIF). A two-sided p-value of $< 0.05$ was considered statistically significant.

**2.5. Ethical considerations**

The study was approved by the Biomedical Research Ethics Committee of Hue University of Medicine and Pharmacy, Hue University (Approval No. H2026/105, dated March 31, 2026). Participants were informed about the study objectives and procedures before enrollment. Participation was voluntary, and participants had the right to decline participation. Information provided by participants was kept confidential and used exclusively for scientific research purposes.

## 3. RESULTS

### 3.1. General characteristics of the study participants and related factors

**Table 1.** General characteristics of the study participants (n = 257)

| Characteristics | | Frequency (n = 257) | Percentage (%) |
|---|---|---|---|
| Age | Mean ± SD (Min–Max) | 31.4 ± 6.2 (14 – 58) | |
| Religion | Yes | 61 | 23.7 |
| | No | 196 | 76.3 |
| Occupation | Manual labor | 68 | 26.5 |
| | Non-manual labor | 189 | 73.5 |

| | | | |
|---|---|---|---|
| Educational level | Lower secondary school or below | 73 | 28.4 |
| | High school | 77 | 30.0 |
| | College education or higher | 107 | 41.6 |
| Living area | Rural area | 138 | 53.7 |
| | Urban area | 119 | 46.3 |
| BMI | < 18.5 | 22 | 8.6 |
| | 18.5 – 22.9 | 157 | 61.1 |
| | ≥ 2 3.0 | 78 | 30.4 |
| Alcohol use during pregnancy | Yes | 6 | 2.3 |
| | No | 251 | 97.7 |
| Exposure to tobacco smoke | Yes | 53 | 20.6 |
| | No | 204 | 79.4 |
| History of premen-strual syndrome (PMS) | Yes | 33 | 12.8 |
| | No | 224 | 87.2 |

The mean age was 31.4 ± 6.2 years (range: 14 – 58 years). Most participants reported no religious affiliation (76.3%), were engaged in non-manual occupations (73.5%), lived in rural areas (53.7%), and had a normal BMI (61.1%). Most did not consume alcohol (97.7%), were not exposed to tobacco smoke (79.4%), and had no history of premenstrual syndrome (87.2%).

**Table 2.** Pregnancy characteristics and factors associated with high-risk pregnancy

| Characteristics | | | Frequency (n = 257) | Percentage (%) |
|---|---|---|---|---|
| Method of conception | | Spontaneous conception | 238 | 92.6 |
| | | IVF | 19 | 7.4 |
| Number of pregnancies | | 1 | 58 | 22.6 |
| | | ≥ 2 | 199 | 77.4 |
| History of adverse obstetric outcomes | | Yes | 148 | 57.6 |
| | | No | 109 | 42.4 |
| Current high-risk pregnancy factors | Maternal factors | Yes | 144 | 56.0 |
| | | No | 113 | 44.0 |
| | Fetal factors | Yes | 79 | 30.7 |
| | | No | 178 | 69.3 |
| | Adnexal factors | Yes | 11 | 4.3 |
| | | No | 246 | 95.7 |
| Pregnancy intention | | Planned | 153 | 59.5 |
| | | Unplanned | 104 | 40.5 |

Most participants conceived naturally (92.6%), had experienced two or more pregnancies (77.4%), and had a history of adverse obstetric outcomes (57.6%). The current high-risk pregnancy was primarily associated with maternal factors (56%), while 30.7% were associated with fetal factors and 4.3% with adnexal factors. In addition, 59.5% of participants reported that their pregnancies were planned.

**Table 3.** Family characteristics and psychosocial factors among high-risk pregnant women

| Characteristics | | Frequency (n = 257) | Percentage (%) |
|---|---|---|---|
| Age at marriage | < 18 years | 24 | 9.3 |
| | ≥ 18 years | 233 | 90.7 |
| Marital status | Married | 236 | 91.8 |
| | Cohabiting (not legally married) | 17 | 6.6 |
| | Divorced | 1 | 0.4 |
| | Single | 3 | 1.2 |
| Spousal participation in household activities | Rarely | 105 | 40.9 |
| | Sometimes | 121 | 47.1 |
| | Often | 31 | 12.1 |
| Disagreements with husband/partner | Rarely | 204 | 79.4 |
| | Sometimes | 50 | 19.5 |
| | Often | 3 | 1.2 |
| Domestic violence | Rarely | 252 | 98.1 |
| | Sometimes | 3 | 1.2 |
| | Often | 2 | 0.8 |
| Help with household chores from husband/ partner | Yes | 239 | 93.0 |
| | No | 18 | 7.0 |
| Marital satisfaction | Satisfied | 154 | 59.9 |
| | Neutral | 98 | 38.1 |
| | Dissatisfied | 5 | 1.9 |
| Relationship with husband's family | Rarely | 241 | 93.8 |
| | Sometimes | 15 | 5.8 |
| | Often | 1 | 0.4 |
| Average monthly household income | < VND 5 million | 31 | 12.1 |
| | ≥ VND 5 million | 226 | 87.9 |
| Number of living children | None | 70 | 27.2 |
| | 1 child | 89 | 34.6 |
| | ≥ 2 children | 98 | 38.1 |
| Pressure to give birth to a boy | No pressure | 243 | 94.6 |
| | Mild pressure | 1 | 0.4 |
| | Substantial pressure | 13 | 5.1 |
| History of psychological problems diagnosed or treated | Yes | 10 | 3.9 |
| | No | 247 | 96.1 |

Most participants were aged 18 years or older at marriage (90.7%) and were currently married (91.8%). Regarding family characteristics and psychosocial factors, 47.1% reported occasional disagreements with their husband/partner, while 93.8% rarely experienced problems in their relationships with their husband's family. Most participants received help with household chores from their husband/partner (93.0%), were satisfied with their marriage (59.9%), and had a monthly household income of ≥ 5 million VND (87.9%). In

addition, 38.1% had two or more children, 5.1% experienced substantial pressure to give birth to a boy, and 3.9% had previously been diagnosed with or treated for psychological problems.

**3.2. Prevalence of depressive symptoms among high-risk pregnant women assessed using the BDI-II**

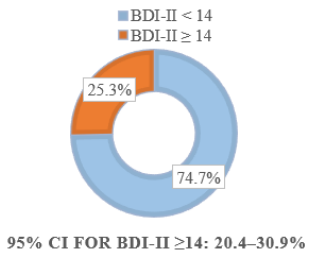



**Figure 1.** Prevalence of depressive symptoms among high-risk pregnant women assessed using the BDI-II

Among the 257 high-risk pregnant women screened using the BDI-II, 65 had a BDI-II score of ≥ 14, corresponding to a prevalence of depressive symptoms of 25.3% (95% CI: 20.4 – 30.9%). The remaining 192 women (74.7%) had BDI-II scores of < 14.

**Table 4.** Distribution of depressive symptom severity according to Beck Depression Inventory-II scores (n = 257)

| BDI-II score | Severity level | Frequency (n = 257) | Percentage (%) |
|---|---|---|---|
| 0 - 13 | Minimal | 192 | 74.7 |
| 14 - 19 | Mild | 39 | 15.2 |
| 20 - 28 | Moderate | 17 | 6.6 |
| 29 - 63 | Severe | 9 | 3.5 |
| Total | | 257 | 100 |

Regarding the severity of depressive symptoms, 192 participants (74.7%) had minimal symptoms (BDI-II scores of 0 – 13), while 39 (15.2%) had mild symptoms (14 – 19), 17 (6.6%) had moderate symptoms (20 – 28), and 9 (3.5%) had severe symptoms (29 – 63).

**3.3. Factors associated with depressive symptoms among high-risk pregnant women**

**Table 5.** Factors associated with depressive symptoms among high-risk pregnant women

| Factors | Univariable analysis | | Multivariable analysis | |
|---|---|---|---|---|
| | OR (95% CI) | p-value | aOR (95% CI) | p-value |
| Age at marriage | 0.36 (0.15 – 0.86) | 0.019 | 0.47 (0.17 – 1.35) | 0.150 |
| Disagreements with husband/partner | 5.64 (2.96 – 10.90) | p < 0.001 | 4.70 (2.27 – 9.86) | p < 0.001 |
| Help with household chores from husband/ partner | 3.27 (1.22 – 8.76) | 0.017 | 1.99 (0.54 – 7.18) | 0.291 |
| Marital satisfaction | 0.40 (0.22 – 0.71) | 0.002 | 0.81 (0.41 – 1.65) | 0.554 |
| Frequent/occasional conflict with husband's family | 4.25 (1.52 – 12.38) | 0.006 | 1.81 (0.46 – 7.01) | 0.388 |
| Average monthly household income | 0.41 (0.19 – 0.92) | 0.026 | 0.40 (0.16 – 0.99) | 0.045 |

| | | | | |
|---|---|---|---|---|
| Pressure to give birth to a boy | 3.19 (1.05 – 9.68) | 0.037 | 1.99 (0.52 – 7.53) | 0.306 |
| History of psychological problems diagnosed or treated | 4.78 (1.32 – 19.23) | 0.018 | 5.52 (1.23 – 26.13) | 0.025 |
| Pregnancy intention | 1.76 (1.00 – 3.11) | 0.052 | 1.73 (0.90 – 3.33) | 0.098 |

OR: crude odds ratio; aOR: adjusted odds ratio; 95% CI: 95% confidence interval. Reference categories are indicated in parentheses for each variable. The outcome was depressive symptoms, defined as a BDI-II score of ≥ 14.

Multivariable logistic regression analysis identified three factors significantly associated with depressive symptoms (BDI-II ≥ 14). Women who reported occasional or frequent disagreements with their husband/partner had higher odds of depressive symptoms than those who rarely experienced disagreements (aOR = 4.70; 95% CI: 2.27 – 9.86; p < 0.001). A monthly household income of ≥ 5 million VND was associated with lower odds of depressive symptoms than an income of < 5 million VND per month (aOR = 0.40; 95% CI: 0.16 – 0.99; p = 0.045). Women with a history of psychological problems diagnosed or treated before pregnancy had higher odds of depressive symptoms than those without such a history (aOR = 5.52; 95% CI: 1.23 – 26.13; p = 0.025). The remaining factors were not significantly associated with depressive symptoms after adjustment (p > 0.05).

## 4. DISCUSSION

### 4.1. Prevalence of depressive symptoms among high-risk pregnant women

In this study of 257 pregnant women at Hue University of Medicine and Pharmacy Hospital, 25.3% of high-risk pregnant women had a BDI-II score of ≥ 14, indicating depressive symptoms (95% CI: 20.4 – 30.9%). This finding underscores the importance of addressing mental health as part of antenatal care for women with high-risk pregnancies. Pregnancy involves substantial endocrine, anatomical, physiological, and psychological changes, which may be accompanied by additional stressors in women experiencing high-risk pregnancies. Concerns about maternal health, potential adverse fetal outcomes, obstetric complications, and the uncertainty surrounding pregnancy progression may further contribute to psychological distress during ongoing medical monitoring and care. Previous studies in Vietnam have also reported depressive symptoms among pregnant women, with reported proportions of 36.5% in the study by Duong et al. and 28.2% in the study by Ho et al. in central Vietnam [7, 11]. These findings provide context for understanding the mental health needs of pregnant women across different settings. In Thailand, Tuksanawes et al. reported a prevalence of 18.9% among pregnant women [12]. However, these differences may reflect variations in study population characteristics, pregnancy status, healthcare settings, and assessment instruments. In particular, the use of different screening scales and cutoff scores may contribute to differences in the proportions of women screening positive for depressive symptoms.

Beyond the overall prevalence, the distribution of symptom severity provides additional information relevant to antenatal care. In this study, 39 participants (15.2%) had mild symptoms, 17 (6.6%) had moderate symptoms, and 9 (3.5%) had severe symptoms, while 192 (74.7%) were classified in the minimal-symptom category. Notably, 26 women (10.1% of the total sample) had moderate to severe symptoms. A community-based study in Hue reported that 12.7% of pregnant women had moderate to severe depressive symptoms according to the PHQ-9, although differences in study populations and assessment instruments limit direct comparison [13]. These findings highlight the importance of considering symptom severity when planning perinatal mental health care. Consistent with ACOG guidance, a positive screening result should be followed by appropriate clinical assessment and management, with monitoring and follow-up tailored to the woman's needs [5]. Therefore, women with mild symptoms may benefit from psychological support and follow-up, whereas those with moderate to severe symptoms may require more comprehensive assessment and referral for specialist care when indicated. These decisions should not be based on BDI-II scores alone but should also consider clinical presentation, functional impairment, safety concerns, and the woman's preferences.

### 4.2. Factors associated with depressive symptoms among high-risk pregnant women

The multivariable logistic regression analysis

identified three factors significantly associated with depressive symptoms among high-risk pregnant women: disagreements with a husband/partner, household income, and a history of psychological problems before pregnancy. These findings suggest that interpersonal relationships, economic circumstances, and pre-existing psychological vulnerability may be important considerations when addressing maternal mental health in women with high-risk pregnancies. These findings are consistent with the review by Insan et al. (2022) and the study by Ho et al. (2026), which highlighted the roles of family relationships and pressure related to the child's sex in maternal mental health [11, 14].

**Disagreements with a husband/partner:** Women who reported occasional or frequent disagreements with their husband/partner had 4.70 times higher odds of depressive symptoms than those who rarely experienced disagreements (aOR = 4.70; 95% CI: 2.27 – 9.86; p < 0.001). This finding is consistent with research from Thailand [12] and Murray et al. (2015), who linked discordant intimate and family relationships, poverty, and food insecurity to postpartum depressive symptoms in Thua Thien Hue Province [15]. Relationship conflict may increase stress and reduce perceived support, particularly during high-risk pregnancy. Although these mechanisms were not directly assessed, the findings highlight the importance of evaluating relationship difficulties and partner support in antenatal psychosocial care.

**Household income:** A monthly household income of ≥ 5 million VND was associated with 60% lower odds of depressive symptoms than an income of < 5 million VND per month (aOR = 0.40; 95% CI: 0.16 – 0.99; p = 0.045). This finding is consistent with the meta-analysis by Yang et al. (2022), which indicated an association between economic hardship and perinatal depression [16]. Financial difficulties may contribute to psychological distress through concerns about daily living expenses, transportation, healthcare costs, and preparations for childbirth and childcare. However, household income alone does not capture broader financial circumstances, and the observed association does not establish a causal relationship.

**History of psychological problems before pregnancy:** Women who had previously been diagnosed with or treated for psychological problems had 5.52 times higher odds of depressive symptoms than those without such a history (aOR = 5.52; 95% CI: 1.23 – 26.13; p = 0.025). This finding is consistent with Biaggi et al. (2016), who identified previous mental illness as an important factor associated with antenatal depression and anxiety [2]. Previous psychological problems may indicate underlying emotional vulnerability, which can be exacerbated by concerns about complications and fetal outcomes in high-risk pregnancies. However, this finding requires particular caution because only 10 participants reported a history of psychological problems before pregnancy. The wide 95% confidence interval (1.23 – 26.13) indicates substantial uncertainty regarding the magnitude of the association. Although the association was statistically significant, the aOR of 5.52 should not be interpreted as a precise estimate of the increase in odds. The small number of participants in this subgroup may have limited the precision and stability of the regression estimate. Larger studies with more participants reporting previous psychological problems are needed to establish a more reliable estimate. Clinically, however, obtaining a psychological history remains relevant because it may help identify women who require closer monitoring and timely mental health assessment.

Several factors associated with depressive symptoms before adjustment were no longer significant in the multivariable model, possibly due to overlapping psychosocial and socioeconomic influences, limited statistical power, or imprecise estimates. Adjustment for potential mediators may also attenuate associations; however, mediation and temporal relationships could not be established given the cross-sectional design. Therefore, non-significance does not necessarily indicate clinical irrelevance. Sociocultural expectations regarding childbirth may also affect psychological well-being. Nguyen et al. (2023) found an association between pressure to have a son and son preference among 732 pregnant women in Vietnam [17]. Although such expectations may cause emotional strain, this pressure was not independently associated with depressive symptoms in our study. The small number of women reporting substantial pressure may have limited estimate precision; therefore, effects in specific family or social contexts cannot be excluded.

These findings support integrating psychosocial assessment into antenatal care for women with high-risk pregnancies. Nurses should sensitively assess relationship difficulties, partner and family support, financial concerns, and previous psychological problems. Depression screening should be followed by clinical assessment and referral when indicated,

as screening alone does not establish a diagnosis. With the woman's consent and when appropriate and safe, involving supportive family members may strengthen emotional and practical support. Women with previous psychological problems may benefit from closer monitoring and timely referral. These approaches align with American College of Obstetricians and Gynecologists recommendations for mental health screening during pregnancy and postpartum [5]. Further prospective studies involving larger samples and multiple healthcare settings are needed to clarify these associations and guide culturally responsive nursing interventions.

## 5. CONCLUSION

The prevalence of depressive symptoms, defined as a Beck Depression Inventory-II (BDI-II) score of ≥ 14, among high-risk pregnant women was 25.3%, including 15.2% with mild symptoms, 6.6% with moderate symptoms, and 3.5% with severe symptoms. Multivariable logistic regression analysis including nine selected factors identified three factors significantly associated with depressive symptoms. Specifically, occasional or frequent disagreements with a husband/partner were associated with 4.70 times higher odds of depressive symptoms compared with rare disagreements (aOR = 4.70; 95% CI: 2.27 – 9.86; p < 0.001). A history of psychological problems before pregnancy was associated with 5.52 times higher odds of depressive symptoms (aOR = 5.52; 95% CI: 1.23 – 26.13; p = 0.025). Conversely, a monthly household income of ≥VND 5 million was associated with lower odds of depressive symptoms than an income of < 5 million VND per month (aOR = 0.40; 95% CI: 0.16 – 0.99; p = 0.045). The remaining factors in the model were not significantly associated with depressive symptoms after adjustment (p > 0.05).

## STUDY LIMITATIONS

This study has several limitations. First, it was conducted at a single healthcare facility using convenience sampling, which may limit the generalizability of the findings. Second, the Beck Depression Inventory-II (BDI-II) is a self-report instrument, and a cutoff score of ≥ 14 does not replace a clinical diagnosis. Third, the relatively small number of participants with depressive symptoms may have affected the precision and stability of the regression estimates. In addition, the cross-sectional design precludes the establishment of causal relationships. Future studies should include multiple healthcare facilities, recruit larger samples, and combine screening with clinical assessments to validate the use of the BDI-II cutoff score in high-risk pregnant women.

## Conflict of interest

The authors declare no conflicts of interest.

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