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ORIGINAL ARTICLE

Prevalence and Associated Factors of Depression in Women in the Last Trimester of Pregnancy: A Cross-Sectional Study in a Southern Province of Vietnam

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Abstract

Background/Aim: Depression during pregnancy is a significant public health issue, particularly in the third trimester when women experience various physical and emotional changes. This study aimed to investigate the prevalence of depression in women in the final trimester of pregnancy, as well as the associated factors.

Methods: A cross-sectional descriptive study was conducted involving pregnant women in their last three months of pregnancy who attended regular prenatal check-ups at the prenatal clinic of Phuong Chau International Hospital in Can Tho, Vietnam. The Edinburgh Postnatal Depression Scale (EPDS) was used to screen for depressive symptoms.

Results: The present study found a prevalence of depression of 14.3 %. Symptoms of depression were significantly associated with a history of previous miscarriage ($p = 0.004$), a history of abortion ($p < 0.001$), treatment for vulvovaginitis ($p = 0.002$) and satisfaction with the marital relationship ($p = 0.003$).

Conclusion: This study identified factors associated with depressive symptoms in pregnant women during their third trimester. Absence of previous miscarriage, absence of abortion history, no treatment for vulvovaginitis and marital satisfaction were associated with lower odds of depressive symptoms.

Key words: Pregnancy; Psychiatric status rating scales; EPDS; Vietnam.

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Introduction

Depression is classified as a mood disorder in the International Classification of Diseases, 10th Edition (ICD-10). It is characterised by a persistently low mood, a loss of interest or pleasure in activities and decreased energy. These symptoms can result in increased fatigue and reduced activity levels. To meet the diagnostic criteria, these symptoms must last for at least two consecutive weeks.[1]

Numerous epidemiological studies have been conducted to evaluate the prevalence of depressive disorders in the population. According to the latest statistics from the World Health Organization (WHO) in 2017, the global rate of depression was 4.4 % in 2015. This rate was lowest in the Western Pacific region and highest in the African region.[2] Depression affects up to 20 % of pregnant women and is proposed to trigger the release of vasoactive mediators and vascular changes.[3]

Pregnancy involves substantial physical and emotional changes, along with an elevated risk of mental health issues.[4] Pregnant women frequently experience increased anxiety and depressive symptoms, which challenges the notion that hormonal changes during pregnancy provide protective effects.[5] During pregnancy, women often encounter negative situations stemming from life events that can lead to depressive symptoms. Previous studies in the American Academy of Obstetrics and Gynecology suggest that 14 %–23 % of women experience depressive symptoms during pregnancy or postpartum.[6]

The rates of depression during pregnancy appear to vary according to a country's level of development. Developed countries, such as the United States, the United Kingdom, Canada and Sweden, report lower rates of depression, generally between 10 % and 15 %. In contrast, developing countries like Brazil, Bangladesh, Pakistan and South Africa have higher average rates of around 25 %.[7-9]

Pregnant women who are experiencing depression may find it difficult to take care of themselves. This can result in poor nutrition, substance abuse and a decreased interest in caring for their unborn child. These issues can have negative effects on both the mother's health and the development of the foetus. Furthermore, evidence shows a link between prenatal maternal stress and cognitive, behavioural and emotional problems in children.[10] Effective management of pregnant individuals is crucial for improving their quality of life and reducing the burden of illness. Women who experience worsening depressive symptoms as their pregnancy progresses face an increased risk of preterm birth, low Apgar scores and admissions to the neonatal intensive care unit (NICU).[6, 11]

The Edinburgh Postnatal Depression Scale (EPDS) was developed by Cox et al in 1987 to assess postpartum depression.[12] Cox et al (1996) demonstrated that the EPDS is an effective tool for measuring symptoms of prenatal depression. Since its introduction, the EPDS has been validated against clinical diagnoses and is recognised as the most widely used and thoroughly validated screening tool for depression in pregnant and postpartum women.[13]

Previous studies on prenatal and postpartum depression in pregnant women have primarily utilised the EPDS and have mostly been conducted in public hospitals. In contrast, there are few studies that have been conducted in private clinics or private hospitals in Vietnam.[14, 15] In Vietnam, the issue of prenatal depression has not received significant attention, as most existing research focuses primarily on postpartum depression.[16] Prenatal depression is recognised as a significant risk factor for postpartum depression, potentially leading to various negative consequences for both the mother and the foetus.[17, 18] Only a limited number of studies have examined depression in pregnant women during the third trimester in the Can Tho area. Presented study aimed to explore the prevalence of depression, as well as the associated factors in women in the last trimester of pregnancy in Vietnam.

Methods

Study setting

A cross-sectional descriptive study was conducted involving pregnant women in the last three months of pregnancy who attended regular prenatal check-ups at the prenatal clinic of Phuong Chau International Hospital in Can Tho, Vietnam. The selection criteria included women who were at least 29 weeks pregnant, aged 18 years or older and carrying a single foetus. The exclusion criteria included women with mental health issues, those with a history of pregnancy-related medical conditions and those who had morphological abnormalities identified during a second-trimester ultrasound. The study period ran from January 2024 to November 2024.

The sample size was calculated using a formula for estimating the necessary sample size for a proportion. A confidence level of 95 % was used and an acceptable margin of error of 5 %. Based on an estimated prevalence of depression over the last three months of 25.4 %, it was determined that a minimum sample size of 291 participants was required. Therefore, goal was to recruit a total of 300 participants.

Convenience sampling was used. From January to November 2024, data were collected from 300 pregnant women in their third trimester (29 weeks or more) visiting Phuong Chau International Hospital. The Hospital's statistics indicate that it receives approximately 70 patient visits daily, with around 20 to 30 of those being preg-

nant women at 29 weeks or further along in their pregnancies. Sampling was employed by selecting one individual from every three consecutive patients. To avoid duplication, each participant's administrative details were verified (full name, date of birth, case number) and ensured that each subject participated in the survey only once during the data collection period.

Study measures

The Vietnamese questionnaire used in this study was structured into two sections. The first section gathered demographic information, which included participants' year of birth, ethnicity, current gestational age, education level, current occupation, obstetric and gynaecological history and details about their marital and family relationships.

The second part focuses on a depression scale consisting of 10 items, based on the EPDS. This scale included 10 questions that ask about a woman's feelings over the past 7 days, addressing aspects such as depressed mood, guilt, anxiety and suicidal thoughts. Each question offered four response options, scored from 0 to 3 points. For questions 1, 2 and 4, the scoring increased from 0 to 3 based on the responses. In contrast, questions 3 and 5 to 10 were scored in reverse, with points decreasing from 3 to 0 for the last answer. Consequently, the total score on the questionnaire ranged from 0 to 30 points, with higher scores indicating a greater level of depression.[8] For question 10, which addresses participants' suicidal intentions over the past seven days, responses of "yes, quite often," "occasionally," or "rarely" indicated suicidal intentions. In contrast, responding "never" signified the absence of suicidal intentions.[19] A meta-analysis of 36 studies involving more than 9,000 women who participated in pregnancy screening using the EPDS found a sensitivity of 0.66 (95 % CI: 0.58-0.74) and a specificity of 0.95 (95 % CI: 0.92-0.96). The analysis determined that a cut-off point of 13 or higher was most effective for classifying depression in pregnant women. According to this cut-off, a total EPDS score of less than 13 indicates no depression, while a score of 13 or higher suggests the presence of depression.[20] The EPDS scale, which has a cutoff threshold of 13, was regarded as an effective tool for assessing the likelihood of depressive disorders in pregnant women in Vietnam. This scale is advantageous because it excludes confounding factors and more clearly identifies the risk of clinical depression compared to conventional cutoff thresholds of ≥ 10 or ≥ 12.[11]

Data analysis

The collected data were processed using SPSS version 22.0 software. The results were presented using descriptive statistics, which included frequency, percentage, mean and standard deviation. To assess differences in depression based on demographic characteristics, gynaecological history and support from husbands and families, the Chi-square test was utilised. Initially, univariable models were evaluated and variables with a p-value of less than 0.2 were included in the multivariable model. The final multivariable model for the EPDS was assessed by comparing the Akaike information criterion (AIC), selecting variables that contributed to a lower AIC for inclusion in the optimised model. Statistical significance was defined as a p-value of less than 0.05.

Results

A total of 300 pregnant women participated in this study. The average age of the participants was 31.01 years, with a standard deviation of 4.623 years (Table 1). The youngest participant was 25 years old, while the oldest was 40 years old. The majority of the subjects fell within the age group of 25-30 years. In terms of occupation, most participants were civil servants, representing 31.7 % of the group. This was followed by those in trading, who accounted for 26.3 % and housewives, who made up 17.7 %. Additionally, 43 participants screened positive for depression, which corresponds to 14.3 % of the total sample size (43 out of 300 cases). Regarding obstetric history, 63.7 % had no previous miscarriage, 44.7 % had a previous abortion, 53.7 % had received treatment for vulvovaginitis and 56 % had never been treated for infertility. In a survey regarding support from husbands and family, it was observed that 50.3 % of respondents reported a lack of family support. Satisfaction with the relationship between husband and wife was noted to be at 53 %. Additionally, 54.7 % of participants indicated that their husbands did not scold them during pregnancy. Support from family, both financially and emotionally during difficult times, was reported by over 60 % of respondents.

Table 1: Factors associated with prevalence of depression in women in the last trimester of pregnancy - univariate logistic regression analysis

Factors	Depression in women		Univariate regression	
	Yes	No	Adjusted OR (95 % CI)	p-value
Age				
25-30	27 (14.9)	154 (85.1)	0.886 (0.455 – 1.726)	0.722
> 31	16 (13.4)	103 (86.6)		
Education				
≤ High school	10 (13.5)	64 (86.5)	1.094 (0.511 – 2.344)	0.817
> High school	33 (14.6)	193 (85.4)		
Employment				
Worker and civil servant	18 (12.9)	121 (87.1)	1.236 (0.643 – 2.375)	0.525
Others	25 (15.5)	136 (84.5)		
Previous miscarriage				
No	8 (7.3)	101 (92.7)	0.353 (0.157 – 0.792)	0.009
Yes	35 (18.3)	156 (81.7		
History of previous abortions				
No	6 (4.5)	128 (95.5)	0.163 (0.067 – 0.401)	< 0.001
Yes	37 (22.3)	129 (77.7)		
Treatment of vulvovaginitis				
No	14 (8.7)	147 (91.3)	0.361 (0.182 -0.716)	0.003
Yes	29 (20.9)	110 (79.1)		
Infertility treatment				
No	28 (16.7)	140 (83.3)	0.641 (0.327 – 1.257)	0.193
Yes	15 (11.4)	117 (88.6)		
Husband's care during pregnancy				
No	17 (11.3)	134 (88.7)	1.666 (0.862 – 3.219)	0.126
Yes	26 (17.4)	123 (82.6)		
Satisfaction with the marital relationship				
No	14 (8.8)	145 (91.2)	0.373 (0.188 – 0.739)	0.004
Yes	29 (20.6)	112 (79.4)		
The husband yells at his wife during her pregnancy				
No	13 (9.6)	123 (90.4)	0.472 (0.236 – 0.946)	0.032
Yes	30 (18.3)	134 (81.7)		
Share difficulties				
No	14 (12.3)	100 (87.7)	1.319 (0.665 – 2.618)	0.427
Yes	29 (15.6)	157 (84.4)		
Financial support from family				
No	9 (13.0)	60 (87.0)	1.151 (0.522 – 2.534)	0.728
Yes	34 (14.7)	197 (85.3)		

OR: odds ratio CI: confidence interval;

Univariate logistic regression analysis revealed that several factors associated with lower odds for depression (Table 1). These factors included no previous miscarriage (OR = 0.353, 95 % CI: 0.157–0.792, p = 0.009); no previous abortion (OR = 0.163, 95 % CI: 0.067–0.401, p < 0.001); no diagnosis of vulvovaginitis (OR = 0.361, 95 % CI: 0.182–0.716, p = 0.003), no satisfaction with marital relationship (OR = 0.373, 95 % CI: 0.188–0.739, p = 0.004); and experience of being scolded by the husband during pregnancy (OR = 0.472, 95 % CI: 0.236–0.946, p = 0.032).

Table 2: Factors associated with prevalence of depression among women in the last trimester of pregnancy - multivariate logistic regression analysis

Factors		Univariate regression	
		Adjusted OR (95 % CI)	p-value
Previous miscarriage			
	No	0.265 (0.106 – 0.661)	0.004
	Yes		
History of previous abortions			
	No	0.175 (0.068 – 0.450)	< 0.001
	Yes		
Treatment of vulvovaginitis			
	No	0.291 (0.136-0.624)	0.002
	Yes		
Infertility treatment			
	No	0.740 (0.343 – 1.598)	0.444
	Yes		
A husband cares about his wife's health during pregnancy			
	No	1.921 (0.905 – 4.079)	0.089
	Yes		
Satisfaction with the marital relationship			
	No	0.316 (0.147 – 0.679)	0.003
	Yes		
The husband yells at his wife during her pregnancy			
	No	0.46 (0.211 – 1.004)	0.051
	Yes		

OR: odds ratio CI: confidence interval;

Multivariate logistic regression analysis, the findings indicated several significant factors (Table 2). Specifically, women without a history of miscarriage had lower odds of depression (OR = 0.265, 95 % CI: 0.106–0.661, $p < 0.05$). Similarly, not receiving treatment for vulvovaginitis was associated with an odds ratio of 0.291 (95 % CI: 0.136–0.624) compared with those who received treatment, while dissatisfaction with the marital relationship showed an odds ratio of 0.316 (95 % CI: 0.147–0.679) compared with those who were satisfied with their marital relationship. Both associations were statistically significant at $p < 0.05$. In addition, having no prior history of abortion was associated with an odds ratio of 0.175 (95 % CI: 0.068–0.450) compared with those who had a history of abortion and this association was statistically significant at $p < 0.001$. However, factors such as infertility treatment, husband's care during pregnancy and experiences of scolding during pregnancy did not show statistical significance ($p > 0.05$).

Discussion

Multiple studies have found a link between depression and age. Specifically, being 30 years old or younger has been recognised as a predictor of severe depression during the second and third trimesters of pregnancy.[21] Individuals aged 15 to 25 are at a higher risk of experiencing prenatal depression. This younger age group often faces challenges such as lower socioeconomic status, limited educational opportunities and inadequate social support.

The present study found that the prevalence of depression was 14.3 %, which was lower than that reported in Turkey (32.6 %) and Brazil (27.9 %).[22, 23] A review on the prevalence and correlates of postpartum depression indicated

average rates of perinatal depression, antenatal depression and postpartum depression as 26.3 %, 28.5 % and 27.6 %, respectively.[24] Prenatal depression is notably more prevalent during various stages of pregnancy. Unexpected changes in circumstances can trigger psychological and emotional issues and the hormonal changes associated with pregnancy can intensify the occurrence of prenatal depression.

In the study by Zhu et al, the prevalence of prenatal depression was 25.57 % (124 out of 485 participants), whereas the prevalence of postpartum depression was 33.81 % (164 out of 485 participants).[25] Depression rates can vary during pregnancy and after childbirth. Several studies from Turkey, Canada, India and Nepal have reported significant levels of depressive symptoms among new mothers.[26] Previous studies suggest that the prevalence of prenatal depression varied between 14.1 % and 34.1 %.[27] All studies utilised the EPDS scale but chose various cutoff points or different trimesters for their analysis.

A study conducted by Míguez and Vázquez found that the first trimester is when women are most likely to experience depression, with a rate of 23.4 %, including 5.1 % for major depression. In the second trimester, the rate of major depression was at its lowest, at 4.0 %, while the overall depression rate was highest at 17.0 %. In the third trimester, the major depression rate increased to 21.4 %, which was higher than in the second trimester but still did not reach the levels observed in the first trimester.[21] This indicates that depressive symptoms vary during pregnancy, highlighting the need for screening throughout the entire pregnancy.

Presented results from the univariate logistic regression analysis indicated that respondents who had no previous miscarriages were less likely to experience depression in the third trimester. Similarly, those with no history of abortions also showed a lower likelihood of depression. In the multivariate model, the absence of depression remained associated with a history of no miscarriages and no abortions. These findings are consistent with the research of Roy and Swain, who identified unintended pregnancy, a history of abortion and previous pregnancy complications as potential risk factors for prenatal depression. Furthermore, these findings suggest that demographic and personal factors—such as lack of family support, a history of domestic violence, marital dissatisfaction and low partner education—may also increase the risk of prenatal depression ($p < 0.05$).[28] Presented study did not find a significant relationship between the absence of depression and factors such as age group or education level ($p > 0.05$). This results contrast with those of Zhu et al, who reported a significant relationship between prenatal depression and factors like age, education level and the number of children ($p < 0.05$).[25] The differences observed can be explained by the varying research methodologies used. In particular, the average age of the participants in Zhu et al study was younger and their education levels were higher compared to those in this study. Additionally, Zhu et al research covered a longer period of over three years. Notably, they did not find a significant correlation between unwanted pregnancies and prenatal depression ($p > 0.05$).[25]

Míguez and Vázquez observed a significant difference in depression rates linked to the education levels of mothers during the third trimester of pregnancy. Specifically, 50.3 % of the participants had only completed primary or secondary education, while 49.7 % had attained a university education. This difference was found to be statistically significant, with a p-value of less than 0.05.[21] The study revealed no association between the number of previous children and depression or any connection with previous abortion status. In the third trimester, several factors were identified as predictors of depression: severe depression in the first trimester (OR = 5.43), potential depression in the second trimester (OR = 6.19), increased anxiety (OR = 4.88) and higher levels of perceived stress in the third trimester (OR = 1.16). The author highlights the importance of screening in the first trimester with the EPDS tool as a baseline for identifying depression during the third trimester.

The findings of this study closely match those of Dhillon and Duko. Duko's research reveals that unintended pregnancies increase the risk of antenatal depression by a factor of seven, with an OR = 7.12 (95 % CI: 3.12-9.63).[19, 29]

A study by Umuziga found that 37.6 % of women in their third trimester of pregnancy showed suggestive depressive symptoms, as indicated by the EPDS score of 10 or higher. Furthermore, logistic regression analysis indicated that postpartum depressive symptoms were more prevalent among participants with four or more living chil-

dren compared to those who were having their first child (OR = 0.07, 95 % CI: 0.01–0.42). The study also revealed that postpartum depression in women was strongly influenced by various social and interpersonal factors. Within the study population, 36.6 % of women experienced mild to moderate depressive symptoms (EPDS scores of 8–12), while 28 % reported high levels of depressive symptoms (EPDS scores of 13 or higher).[30] Women at 42 days of postpartum showed no significant difference in depression levels based on privileged birth status compared to multiparous birth status.[31]

The present study did not find a relationship between economic support from family and signs of depression. This contrasts with the findings of Hanach et al, who reported that in individuals receiving financial support from family, 38.4 % had EPDS scores greater than 12, compared to 19.2 % of those who did not receive such support ($p < 0.001$). Furthermore, the study indicated that women with a low education level had a higher rate of EPDS scores greater than 12 ($p < 0.001$). Additionally, the support of husbands was statistically significantly associated with lower EPDS scores. Specifically, 55.6 % of women who did not receive support from their husbands immediately after giving birth had EPDS scores greater than 12, compared to only 24.3 % of those who did receive support from their husbands ($p = 0.02$).[20] Differences in study design, assessment timing (prenatal or postnatal) and the availability of economic and psychological support require a multifaceted approach to assess the risk of depression in pregnant and postpartum women. Clinically, this indicates that prenatal counselling should consider not only biological factors but also the assessment of family relationships and social support levels.

This study has shown that depression in pregnant women is associated with preterm birth and low birth weight. Additionally, the rate of antenatal depression is significantly higher in low-income countries compared to middle-income countries and it has been identified as a risk factor for both low birth weight and preterm birth.[32, 33]

Study limitations

Presented study employed a cross-sectional method, which presents challenges in establishing a causal relationship between risk factors and depression. Additionally, presented sample was collected exclusively from a single hospital, which may limit the representativeness of the sample in reflecting the diverse characteristics of pregnant women across different regions and socioeconomic backgrounds.

Conclusion

Findings in this study indicate that the absence of previous miscarriage, absence of abortion history, no treatment for vulvovaginitis and satisfaction with the marital relationship were associated with lower odds of depressive symptoms in women in the third trimester of pregnancy. These results underscore the importance of both obstetric history and relational factors in maternal mental health. Additionally, further research, including a meta-analysis that focuses on depression during the third trimester and the postpartum period using the EPDS, could help clarify the consistency of these associations across various settings. Such studies could contribute to a more comprehensive understanding of perinatal depression and support the development of targeted screening and intervention strategies.

Ethics

The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study. The study was approved by the Ethics Committee in Biomedical Research of Phuong Chau International Hospital (Decision No 59/QD.KHTH.PC.2024), dated 1 February 2024. Participants were informed that taking part in the study was voluntary.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The datasets generated and analysed during the current study are not publicly available due to institutional regulations and confidentiality agreements with the participating patients. All data were anonymized prior to analysis to ensure participant privacy and compliance with ethical standards.

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