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Original Article

Frequency of Antenatal Depressive Symptoms and Their Determinants among Pregnant Women Attending Antenatal Clinic at Northwest General Hospital

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ABSTRACT

Antenatal depressive symptoms (ADS) are common and are associated with significant consequences for both mother and fetus. Its burden is particularly high in low- and middle-income countries, yet routine screening remains limited in Pakistan. **Objectives:** To determine the trimester-wise frequency of antenatal depressive symptoms and their determinants among pregnant women attending a tertiary care hospital in Peshawar through prospective follow-up across pregnancy. **Methods:** This prospective cohort study was conducted from 01 April 2024 to 01 December 2025 at Northwest General Hospital, Peshawar,.including a complete-case cohort of 384 pregnant women aged ≥15 years (435 screened at baseline). ADS, defined as a PHQ-9 score ≥5 (a screening threshold, not a diagnosis of depression), were assessed in all three trimesters. Data were analyzed using SPSS version 25.0. Descriptive statistics were applied, and associations were evaluated using Chi-square. Repeated measures ANOVA assessed changes in mean PHQ-9 scores across trimesters, and multivariable logistic regression was performed to identify independent predictors of third-trimester antenatal depressive symptoms. ($p \leq 0.05$). **Results:** frequency of ADS increased significantly from 19.3% in the first trimester to 34.4% in the second and 47.4% in the third trimester ($p<0.001$). Third-trimester ADS were more frequent among women with unplanned pregnancy (64.9%), miscarriage (65.1%), stillbirth (70.8%), non-supportive spouse (79.6%), prior depression (81.3%), and antenatal care dissatisfaction (72.1%) ($p \leq 0.002$). Independent predictors of third-trimester ADS included prior depression (AOR=4.5), non-supportive spouse (AOR=3.8), pregnancy complications (AOR=2.9), antenatal care dissatisfaction (AOR=2.6), low socioeconomic status (AOR=2.3), and unplanned pregnancy (AOR=2.1). **Conclusions:** Self-reported antenatal depressive symptoms are common and increase across pregnancy. Targeted identification of women with these risk factors, using a validated tool such as the PHQ-9 followed by clinical evaluation, may support timely psychosocial care; studies using diagnostic interviews are needed before routine screening is recommended.

INTRODUCTION

Depression is one of the most prevalent and seriously incapacitating mental illnesses in the world, according to the World Health Organization [1]. Depression, which is defined by persistent depression and a noticeable loss of interest in everyday activities for two weeks or longer, is common during pregnancy [2]. Concerns about fetal health pose major psychological challenges, potentially leading to mental disorders such as despair and anxiety [3, 4]. Literature has demonstrated that women's physiological, hormonal, and psychological changes, especially during pregnancy, can raise the risk of mental and emotional changes that result in depression [5]. Pregnancy is a time when depression is more likely to occur, and the relationship between a pregnant woman and her growing fetus is the most intense, stressful, and perplexing of all human partnerships [6]. Women face significant rates of depression during pregnancy due to emotional concerns and stress, particularly in low- and high-income communities [7, 8]. In addition, additional obligations and family expectations may cause sadness throughout both the pregnant and postnatal periods [9]. Rates of antenatal depression and depressive symptoms in Pakistan are

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alarmingly high [10]. Studies have reported that up to 56.3% of pregnant women experience prenatal depression in Southern Punjab, while multinational evidence suggests that approximately one in six women experience depression during pregnancy [11]. Although trimester-specific evidence is limited, psychological distress tends to be more pronounced during the first and third trimesters due to increased emotional and physical stressors [12]. Despite its high prevalence, the relationship between antenatal depression and adverse pregnancy outcomes remains complex and requires further investigation [13]. Research indicates that the most prevalent mental illness to strike during pregnancy is maternal depression, which can impact fetal development and have long-term consequences for the offspring's neurological and behavioral development. the frequency of depressive symptoms is found to be high, women at risk can be identified through targeted assessment and referred for psychosocial evaluation and appropriate care, which may improve their quality of life and the health of the fetus.

In Peshawar, no local prospective study has evaluated the frequency and predictors of screening-detected depressive symptoms across pregnancy. Therefore, the current study aimed to prospectively assess the trimester-wise frequency of antenatal depressive symptoms (PHQ-9 ≥5) and identify the psychosocial, obstetric, and socioeconomic determinants associated with elevated depressive symptoms among women attending a tertiary care hospital in Peshawar.

METHODS

The study design was a prospective cohort study conducted from 01 April 2024 to 01 December 2025 at the Department of Obstetrics and Gynecology, Northwest General Hospital and Research Centre, Peshawar, including a final complete-case cohort of 384 pregnant women (435 were screened at baseline; see below). Data collection was initiated after obtaining approval from the ethical committee, under reference no: IRB&EC/2024-GH/0132 dated 01 February 2024. Participants were recruited during the first trimester of pregnancy and were followed prospectively throughout the second and third trimesters. Enrollment occurred continuously during the study period, allowing adequate time for follow-up assessments across all three trimesters before completion of data collection. The sample size for the study was calculated through Open Epi software, keeping the prevalence of antenatal depression in Pakistan at 51.6% [13], a 95% confidence interval, and a 5% margin of error. The resulting sample size was 384 based on formula {n = [DEFF*Np(1-p)]/ [($d^2/Z^2_{1-\alpha/2}$*(N-1) + p*(1-p)]}. A consecutive sampling technique was employed to include patients in the study. The inclusion criteria were pregnant individuals aged 15 years and above and must be a resident of Peshawar, Pakistan, for the last 5 years. This criterion was applied to ensure that participants had adequate exposure to the local social, cultural, and healthcare environment relevant to the study setting. Pregnant women who were not receiving antenatal care at the study hospital, had cognitive impairment, language barriers, or any condition affecting their ability to provide reliable information were excluded. Women with severe chronic medical illnesses that could significantly influence psychological well-being, such as uncontrolled diabetes mellitus or HIV/AIDS, were also excluded. A prior history of depression was not an exclusion criterion and was assessed as a potential determinant of antenatal depressive symptoms. In this study, the antenatal period was defined as the duration from conception until the onset of labor and was categorized into three trimesters: the first trimester (from the first day of the last menstrual period up to 13 weeks of gestation), the second trimester (14 to 27 weeks), and the third trimester (28 weeks until delivery). depressive symptoms (ADS) were defined as a self-reported emotional or mental state that lasts more than a few days, interferes with everyday activities, and is characterized by feelings of guilt or poor self-worth, as well as a diminished capacity to enjoy, without implying a clinical diagnosis of depression. ADS were measured by the Patient Health Questionnaire -9 (PHQ-9), which is a validated tool with 79.00% sensitivity and 89.26% specificity to assess depression. In this study, the Urdu-validated version of the PHQ-9 was used, which has been previously validated in Pakistani populations and demonstrated good reliability and cultural applicability [14]. The questionnaire was administered through face-to-face interviews conducted in Urdu (and translated orally into Pashto where required by interviewers) to ensure clarity and comprehension among participants. Level of depressive symptoms was measured in every trimester for comparison purposes. The PHQ-9 consists of 9 items with a total score ranging from 0 to 27. Participants were assessed in each trimester to evaluate changes in depressive symptoms over the course of pregnancy. Follow-up was coordinated through scheduled antenatal clinic visits. To account for expected attrition in a multi-trimester prospective design, a total of 435 pregnant women were initially screened during the first trimester. Of these, 51 participants were excluded from the final longitudinal analysis due to loss (miscarriage or stillbirth) before the third-trimester assessment (n=18), delivery prior to third-trimester follow-up (n=12), loss to follow-up/relocation (n=15), or transfer to another health facility (n=6). Complete-case analysis was applied, resulting in a final analyzed cohort of 384 women who completed all three trimester assessments. A positive screen for antenatal depressive symptoms was defined as a PHQ-9

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score of ≥5, which captures mild to severe depressive symptoms. A lower threshold was selected in this study to enhance sensitivity and ensure early detection of even mild depressive symptoms during pregnancy, as recommended in screening-based epidemiological studies [15]. Therefore, the reported frequency reflects the prevalence of depressive symptoms rather than a clinical diagnosis of major depressive disorder. Additionally, potential determinants of ADS were assessed in terms of women's education, socioeconomic status (based on average monthly income), history of miscarriage or stillbirth, presence of non-supportive relationships with spouse or family members (defined as lack of emotional, financial, or social support from the spouse, including neglect, poor communication, or presence of verbal, emotional, or physical conflict), pregnancy-related complications, prior personal history of depression, family history of depression, and dissatisfaction with antenatal clinical follow-up, measured using a Visual Analogue Scale (VAS) ranging from 0 to 10, where 0 indicated highly dissatisfied and 10 indicated highly satisfied. For analytical purposes, VAS scores <5 were categorized as dissatisfied, while scores ≥5 were categorized as satisfied. All pregnant women fulfilling the inclusion criteria and attending OPD during the antenatal period were included in the study. Patients were informed about the objectives of the study and procedure, and when they agreed to participate, informed consent was obtained for participation. Socio-demographic (categorized as lower (< PKR 50,000), middle (PKR 50,000–100,000), and upper (> PKR 100,000) monthly household income), anthropometric details and clinical variables like age, BMI, educational level, occupation, socioeconomic status, residence (urban/rural), pregnancy duration, number of miscarriage and still birth, contraception, abusive relation with spouse and family members (assessed using investigator-defined criteria. Participants were categorized as having a supportive relationship if they reported receiving adequate emotional, social, and practical support. A non-supportive relationship was defined as lack of emotional, financial, or social support, poor communication, neglect, or the presence of persistent verbal, emotional, or physical conflict within the relationship), pregnancy complications, a prior history of depression, family history of depression, number of clinical follow-ups, dissatisfaction with antenatal clinical follow-up, and symptoms of depression was recorded in a data collection form via patient interview. The level of depressive symptoms was measured through PHQ-9 in every trimester for comparison purposes. All the data were recorded in a predesigned questionnaire.

Data were analyzed using SPSS version 25.0. Mean ± Standard Deviation was calculated for numerical/quantitative variables after checking normality through the Shapiro-Wilk test. Frequencies and percentages were calculated for categorical variables. Continuous PHQ-9 scores were evaluated across trimesters to track the severity of depressive symptoms, with trimester-wise mean ± SD scores calculated for women screening positive (PHQ-9 ≥5). The Chi-square test was used to compare categorical variables, and repeated measures ANOVA was performed to compare mean PHQ-9 scores across all three trimesters. A p-value ≤0.05 was considered statistically significant. The trimester-wise frequencies of antenatal depressive symptoms were presented descriptively, while statistical comparison was based on the continuous PHQ-9 scores obtained at each assessment. Binary logistic regression was applied, keeping third-trimester ADS (PHQ-9 score ≥5 at the third-trimester assessment) as the dependent variable. Variables were first assessed using univariate analysis. Those with a p-value <0.200 in the univariate analysis, along with clinically and theoretically important variables identified from the literature, were entered into the multivariable logistic regression model. A backward stepwise approach was applied to identify independent predictors of antenatal depressive symptoms. Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test. The explanatory power of the model was evaluated using Nagelkerke pseudo-R^2. The discriminatory ability of the final logistic regression model was assessed using the area under the receiver operating characteristic curve (AUC-ROC). Multicollinearity was checked before model fitting. Adjusted odds ratios (AOR) and 95% confidence intervals were reported.

RESULTS

A total of 435 pregnant women were screened in the first trimester, of whom 51 (11.7%) were excluded because of pregnancy loss (miscarriage or stillbirth) before the third-trimester assessment (n=18), delivery before the third-trimester assessment (n=12), loss to follow-up/relocation (n=15), or transfer to another health facility (n=6). The final complete-case cohort comprised 384 women (88.3%) with PHQ-9 data for all three trimesters. The mean age of participants was 28.9 ± 6.4 years; the majority were in the age group of 26–30 years (40.6%). The mean BMI was 29.3 ± 4.3 kg/m^2. Most of the participant was resided in urban areas (59.4%). Education was fairly distributed, with the largest proportion having higher secondary education (24.5%), while only 14.1% had no formal education. Nearly half of the participants belonged to the lower socioeconomic class (43.8%) (Table 1).

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Table 1: Demographic Characteristics(n=384)

Variables	Category	n (%)
Age (years)	≤25	142 (37.0%)
	26–30	156 (40.6%)
	>30	86 (22.4%)
Residence	Urban	228 (59.4%)
	Rural	156 (40.6%)
Education Level	No Formal Education	54 (14.1%)
	Primary	72 (18.8%)
	Secondary	86 (22.4%)
	Higher Secondary	94 (24.5%)
	Graduation and above	78 (20.3%)
Socioeconomic Status	Lower	168 (43.8%)
	Middle	146 (38.0%)
	Upper	70 (18.2%)

The majority of pregnancies were planned (61.5%). A considerable proportion of women reported a history of miscarriage (32.8%), while 12.5% had experienced stillbirth. One-quarter of participants (25.0%) had a prior history of depression. Most women reported supportive relationships with their spouse (71.9%) and in-laws (66.1%), although a notable proportion experienced non-supportive relationships. Additionally, 68.2% of participants were satisfied with antenatal care services. Pregnancy-related complications were reported by 22.1% of patients (Table 2).

Table 2: Baseline Obstetric and Psychosocial Factors(n=384)

Variables	Category	n (%)
Planned Pregnancy	Yes	236 (61.5%)
	No	148 (38.5%)
History of Miscarriage	Yes	126 (32.8%)
	No	258 (67.2%)
History of Stillbirth	Yes	48 (12.5%)
	No	336 (87.5%)
Prior Depression	Yes	96 (25.0%)
	No	288 (75.0%)
Relationship with Spouse	Supportive	276 (71.9%)
	Non-supportive	108 (28.1%)
Relationship with In-laws	Supportive	254 (66.1%)
	Non-supportive	130 (33.9%)
Antenatal Care	Satisfied	262 (68.2%)
	Dissatisfied	122 (31.8%)
Pregnancy Complications	Yes	85 (22.1%)
	No	299 (77.9%)

The frequency of ADS showed a steady increase across pregnancy, rising from 19.3% in the first trimester to 34.4% in the second trimester, and reaching 47.4% in the third trimester. Parallel to the rise in positive screening rates, mean PHQ-9 scores among women screening positive (PHQ-9 ≥5) rose from 6.8 ± 1.4 in the first trimester to 9.2 ± 2.1 in the second trimester and 12.5 ± 3.2 in the third trimester, and PHQ-9 scores in the full cohort increased significantly across the three trimesters (repeated measures ANOVA, p<0.001)(Table 3). It should be noted that the reported frequency represents PHQ-9-based depressive symptoms (score ≥5) rather than clinically diagnosed depression(Table 3).

Table 3: Trimester-wise Frequency of Antenatal Depressive Symptoms(PHQ-9≥5)

Trimester	PHQ-9 ≥5, n (%)	PHQ-9 <5, n (%)	Mean ± SD PHQ-9 Score Among Women with PHQ-9 ≥5	p-value
1st	74 (19.3%)	310 (80.7%)	6.8 ± 1.4	<0.001
2nd	132 (34.4%)	252 (65.6%)	9.2 ± 2.1	
3rd	182 (47.4%)	202 (52.6%)	12.5 ± 3.2	

*Mean ± SD values represent PHQ-9 scores among women screening positive (PHQ-9 ≥5) in each trimester (n=74, 132 and 182, respectively). The p-value refers to repeated measures ANOVA of PHQ-9 scores across the three trimesters in the full cohort (n=384). Frequencies of depressive symptoms are presented descriptively. A p-value <0.05 was considered statistically significant

proportions of third-trimester depressive symptoms (PHQ-9 ≥5) were observed among women with unplanned pregnancies (64.9%), history of miscarriage (65.1%), and stillbirth (70.8%). Psychosocial factors showed strong associations, with markedly higher frequencies of depressive symptoms among those with a non-supportive spouse (79.6%) and in-laws (67.7%). Additionally, women with a prior history of depression (81.3%) and those dissatisfied with antenatal care (72.1%) had.significantly higher rates of depressive symptoms. All associations were statistically significant (p≤0.002)(Table 4).

Table 4: Association of Determinants with Third-Trimester Antenatal Depressive Symptoms

Variables	Category	ADS Present, n (%)	ADS Absent, n (%)	p-value
Planned Pregnancy	No	96 (64.9%)	52 (35.1%)	<0.001
Miscarriage	Yes	82 (65.1%)	44 (34.9%)	<0.001
Stillbirth	Yes	34 (70.8%)	14 (29.2%)	<0.001
Non-supportive Spouse	Yes	86 (79.6%)	22 (20.4%)	<0.001
Non-supportive in-laws	Yes	88 (67.7%)	42 (32.3%)	<0.001
Prior Depression	Yes	78 (81.3%)	18 (18.7%)	<0.001
Antenatal Care Satisfaction	No	88 (72.1%)	34 (27.9%)	<0.001

*Chi-square test is used for comparison. The p-value<0.05 is significant. ADS = third-trimester antenatal depressive symptoms(PHQ-9≥5)

Logistic regression analysis identified several independent predictors of third trimester ADS. Women with a prior history of depression had the highest likelihood (AOR = 4.5), followed by those with a non-supportive spouse (AOR = 3.8) and pregnancy complications (AOR = 2.9). Additionally, antenatal care dissatisfaction (AOR = 2.6), low socioeconomic status (AOR = 2.3), and unplanned pregnancy (AOR = 2.1) were also significant predictors. All

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variables showed statistically significant associations (p≤0.002)(Table 5).

Table 5: Logistic Regression Analysis (Third-Trimester Depressive Symptoms)

Variables	Adjusted OR	95% CI	p-value
Unplanned Pregnancy	2.1	1.3–3.4	0.002
Non-supportive Spouse	3.8	2.2–6.5	<0.001
Pregnancy Complications	2.9	1.7–4.8	<0.001
Prior Depression	4.5	2.5–8.1	<0.001
Low Socioeconomic Status	2.3	1.4–3.8	0.001
Antenatal Care Dissatisfaction	2.6	1.5–4.2	<0.001

*AOR=adjusted odds ratio; CI=confidence interval. Hosmer–Lemeshow test: χ^2=6.84, df=8, p=0.550; Nagelkerke R^2=0.41; AUC-ROC=0.83(95% CI: 0.79–0.87); all VIFs<2.5

DISCUSSION

The current study investigated the frequency and factors associated with ADS among pregnant women at a tertiary-level hospital in Peshawar. Results indicate a substantial frequency of ADS, moving from 19.3% during the first trimester of pregnancy to 47.4% during the third trimester. Overall, it correlates well with national literature on prevalence, where a recent systematic review estimates pooled prevalence around 37% in Pakistan, while individual studies report rates between 24.2 and 37% [16]. Higher frequency noted in the current study during the third trimester also reflects increased vulnerability of pregnant women to ADS, a phenomenon described internationally. It is important to interpret the relatively higher prevalence observed in this study in light of the PHQ-9 cutoff used (≥5), which captures mild as well as moderate and severe depressive symptoms. This approach may yield higher prevalence estimates compared to studies using a cutoff of ≥10; however, it provides a more sensitive screening perspective, particularly in resource-limited settings where early identification of at-risk women is a priority. Internationally, prevalence rates for antenatal depression vary significantly across regions and countries, from 23.47% in Zimbabwe up to 78.5% in Afghanistan [17-19]. Results of this study also fit into the global picture of ADS, being consistent with those found among pregnant women in other low-income and developing countries, e.g., a 31% reported prevalence rate in South Africa [20]. In the current research, a number of determinants of ADS were identified, which agree with the existing body of literature. Unplanned pregnancy was also a great predictor of ADS and was independent (AOR = 2.1). This is consistent with other research works [16, 21], which have consistently indicated that unplanned pregnancy is an important psychosocial stressor that leads to emotional distress and decreased readiness to become a mother. There was a close relationship between depressive symptoms and psychosocial factors, especially relationship dynamics. Another finding that is consistent with the literature that identifies intimate abusive partners and poor social support as key risk factors is a much higher rate of depressive symptoms among women who have non-supportive spouses and in-laws [20, 22]. This can lead to chronic anxiety, fear of recurrence, and emotional trauma in other pregnancies. Moreover, pregnancy complications were found to be a solid predictor (AOR = 2.9) of third-trimester depressive symptoms, which is consistent with the literature that has shown complications like preeclampsia to be connected with greater psychological distress [23]. Notably, a history of depression in the past was found to be the best predictor in this study (AOR = 4.5). This is highly justified by the literature that suggests that women who had a previous mental health problem are at a much greater risk of antenatal and postpartum depression [24]. Women could be psychologically vulnerable and have a history of previous depressive episodes that predispose them to chronic or repeated depressive symptoms during pregnancy. Although the burden of ADS is high in Pakistan, no systematic screening and integration of mental health services into antenatal care have been done..The results of the present study suggest that targeted assessment of depressive symptoms with validated instruments such as the PHQ-9, followed by clinical evaluation of women who screen positive, may help identify those needing early psychosocial support; however, because the cutoff used here (≥5) is low and no diagnostic interview was performed, these findings should not be taken as evidence for routine population-wide screening. While the study focused on a complete-case cohort of 384 participants who completed all three trimester evaluations, excluding women who experienced early pregnancy losses, preterm delivery, or were lost to follow-up may introduce retention bias, as those lost to follow-up may have differed in their psychological profile. Because women with pregnancy loss or preterm delivery may be at higher risk of depressive symptoms, the frequencies reported here may be underestimated; the direction of any bias cannot be determined from the present data.

This study was conducted at a single tertiary care hospital, which may limit the generalizability of the findings. Antenatal depressive symptoms were assessed using the PHQ-9 screening tool rather than a clinical diagnostic interview, and self-reported data may be subject to recall and social desirability bias. The low cutoff (PHQ-9 ≥5) is expected to yield higher frequencies than the conventional cutoff of ≥10, and severity-stratified estimates were not analyzed. Additionally, restricting participation to women who had resided in Peshawar for at least five years may have introduced selection bias. Despite these limitations,

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the study provides valuable insights into antenatal depressive symptoms in the local population. Future multicenter studies with larger and more diverse populations and clinical diagnostic assessments are recommended..Targeted assessment of depressive symptoms, with clear pathways for psychosocial support and diagnostic evaluation, within antenatal care may help improve maternal mental health outcomes, but this needs confirmation in studies using diagnostic interviews.

CONCLUSIONS

This study demonstrates a high frequency of self-reported antenatal depressive symptoms using a low screening cutoff (PHQ-9 ≥5), with an upward trend as pregnancy progresses. Determinants such as a prior history of depression, non-supportive relationships, pregnancy complications, lower socioeconomic status, and care dissatisfaction highlight the multifactorial nature of antenatal psychological distress. These findings support targeted identification of women with these risk factors during antenatal visits, with early psychosocial assessment and referral for formal clinical evaluation when indicated. Because PHQ-9 ≥5 is a screening threshold and not a diagnosis, routine population-wide screening should not be inferred without confirmation in studies using diagnostic interviews.

Authors' Contribution

Conceptualization: SJ
Methodology: SK, SJ, MH
Formal analysis: SJ, MF
Writing and Drafting: SK, SJ, AM
Review and Editing: SK, SJ, MF, AM, MH

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflict of Interest

All the authors declare no conflict of interest.

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