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Prevalence and risk factors of antenatal depression among pregnant women attending primary healthcare centers in Baghdad, Iraq: A cross-sectional study

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Abstract

Background: Pregnancy, while often celebrated, can also be marked by significant psychological challenges, including antenatal depression (AND). This study aimed to determine the prevalence and risk factors of AND among pregnant women attending primary healthcare centers (PHCs) in Baghdad, Iraq.

Methods: A cross-sectional design with 697 participants was employed. Pregnant women in their second or third trimester attending selected PHCs were recruited. Data collection utilized a researcher-developed questionnaire and the validated Arabic Edinburgh Postnatal Depression Scale (EPDS). Socio-demographic characteristics, obstetric history, psychological history, and behavioral history were assessed. Descriptive statistics and Chi-square tests were used for analysis.

Results: The prevalence of AND was 33.3%, highlighting a substantial public health concern. Younger mothers (under 30) and those with lower educational attainment were at higher risk. Housewives, compared to employed women, exhibited a significantly higher AND rate. Interestingly, socioeconomic status and the husband's age were not significantly associated with AND. Past smoking, exposure to domestic violence, and personal or family history of mental disorders emerged as significant risk factors. The study found no significant difference in AND prevalence across trimesters. However, a history of cesarean section, carrying a female fetus, and irregular prenatal care were associated with a higher risk of AND. Additionally, multiple pregnancy complications, subfertility, and unplanned pregnancies were linked to increased AND prevalence.

Conclusions: This study establishes AND as a prevalent issue in Baghdad, Iraq. It identifies various risk factors, including socio-demographic characteristics, lifestyle behaviors, mental health history, pregnancy experiences, and access to prenatal care. A multi-faceted approach addressing these factors is necessary. The study recommends implementing evidence-based interventions, tailoring them to the cultural context of Baghdad. Further research with broader demographics and longitudinal designs is warranted to refine understanding and develop effective strategies for maternal mental well-being.

Keywords: Prevalence, risk factors, antenatal depression, pregnant mother, and Iraq

Introduction

Pregnancy is a transformative experience for women, encompassing a multitude of physical, emotional, and social changes^[1]. While often heralded as a joyous and anticipatory period, it can also be marked by significant psychological challenges^[1]. Among these challenges is AND, a mental health condition characterized by depressive symptoms such as sadness, anhedonia (loss of interest or pleasure), and sleep and appetite disturbances, that manifest during pregnancy^[1, 2].

Pregnant women exhibit a heightened vulnerability to depression due to a complex interplay of biological, psychological, and social factors. Biologically, hormonal fluctuations throughout pregnancy, particularly changes in neurotransmitters and hormone levels, can contribute to mood swings and emotional instability^[1, 3]. Psychologically, pregnancy can be accompanied by life stressors such as financial anxieties, adjustments to social roles, and anxieties surrounding childbirth and parenthood^[4]. Furthermore, the absence of robust social support networks can leave mothers feeling isolated and lonely, potentially exacerbating the development of depression^[5].

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A personal history of mental health issues, such as previous depression, further increases the risk of experiencing AND [3, 4]. These factors, along with domestic violence and unplanned pregnancies, can create a complex interplay that contributes to the development of AND [3, 4, 6].

Despite its prevalence, AND remains frequently undiagnosed and untreated due to the stigma surrounding mental illness. This is particularly concerning given the potential consequences of untreated AND, which can negatively impact both the mother and the developing child [7]. Untreated AND poses significant risks to both the mother and the developing child. A well-established consequence is an increased risk of developing postpartum depression after delivery [8]. Additionally, depression during pregnancy can negatively affect the mother-infant bond, potentially hindering the formation of a secure attachment with the newborn. Research suggests that children exposed to AND may be at increased risk for developmental delays and behavioral problems [7]. Furthermore, children born to mothers with AND may experience more frequent hospitalizations, potentially increasing healthcare utilization [7, 8]. These consequences underscore the critical importance of early detection and intervention for AND.

Existing research in Iraq suggests a concerning high prevalence of AND, with studies indicating a range of 21.6% to nearly 50% depending on the methodology and population studied [9, 10]. Socioeconomic factors, such as education and income level, may also be associated with an increased risk of AND [11]. This high prevalence, coupled with the potential consequences for mothers and children, necessitates further research in the Iraqi context.

Objectives

1. To determine the prevalence of AND among pregnant women attending primary healthcare centers (PHCs) in Baghdad, Iraq.
2. To identify the potential risk factors associated with AND for this population of pregnant women.

Methods

Study Design: This study employed a cross-sectional design with an analytic component to investigate the prevalence and risk factors associated with AND among pregnant women attending primary healthcare centers (PHCs) in Baghdad, Iraq. This design allows for a snapshot of the prevalence and associated factors within this specific population at a given point in time.

Study Setting: The study was conducted in Baghdad, Iraq, across ten randomly selected PHCs utilizing a family medicine approach. These centers provide comprehensive antenatal care services, including documentation of sociodemographic characteristics, physical examinations, vaccination status, dental care, laboratory investigations, risk assessments, and prescriptions for supplements and medications. Pregnant mothers receive appointment cards with details on their next visit.

Study Participants: Pregnant women in their second or third trimester attending the selected PHCs during the study period and meeting the eligibility criteria were included. Inclusion criteria comprised all pregnant women in their second or third trimester as determined by last menstrual period, and actively seeking antenatal care at the selected

PHCs. Exclusion criteria encompassed pregnant women with a history of chronic illnesses, recent psychological trauma, multiple gestations, or diagnosed physical or learning disabilities.

Sample Size: A previous Iraqi study on depression during pregnancy reported an estimated prevalence of 48% [9, 10]. The recruited sample size of 697 pregnant women surpassed the minimum required sample size ($n = 384$) calculated using the standard cross-sectional study formula ($n = (Z^2 * P * (1 - P)) / d^2$). Here, Z represents the confidence level (typically 1.96 for a 95% confidence interval), P signifies the expected prevalence (established at the estimated prevalence of 0.48), and d denotes the desired precision (established as a margin of error of 0.05). This deliberate oversampling aimed to enhance the study's statistical power, leading to more robust and generalizable findings.

Sampling Technique: A two-stage cluster sampling design was employed to select a representative sample of health centers in Baghdad. The first stage involved identifying ten sectors from each of the two Baghdad health directorates (Al-Karkh and Al-Rusafa) as the initial sampling frame. A simple random sample of five sectors was then selected from each directorate, resulting in a total of ten sampled sectors. In the second stage, a single PHC utilizing a family medicine approach was chosen from each sampled sector using simple random sampling. This method ensured PHCs were selected from diverse geographical locations within Baghdad, fostering a representative sample and mitigating potential biases associated with selecting centers from a single department or specific sector.

Within each selected PHC, a systematic random sampling approach was used for participant recruitment. A list of all pregnant women attending the center during the study period was created. Every third woman on the list who met the eligibility criteria was invited to participate until a quota of 70 participants per center was reached.

Data Collection Tools: Data collection for this study, conducted between March and July 2022 in Baghdad, Iraq, utilized two primary instruments. A researcher-developed questionnaire, informed by existing tools and refined through expert consultations in community medicine, psychiatry, and gynecology, collected information on sociodemographic characteristics, obstetric history, psychological history, and behavioral history of the participants. Furthermore, the validated Arabic version of the Edinburgh Postnatal Depression Scale (EPDS), a 10-item self-report questionnaire, served as a screening tool for AND. Scores exceeding 12 indicated probable depressions [12]. To ensure participant comprehension and address any concerns, researchers were present at the PHCs during data collection. All information was kept confidential, and participants remained anonymous throughout the process.

Data Management and Analysis: Data was coded and entered into SPSS version 26. Descriptive statistics (frequencies and percentages) were generated to summarize sociodemographic and obstetric characteristics. Chi-square tests were employed to examine associations between independent variables (sociodemographic characteristics, obstetric and psychological history) and the dependent

variable (presence of AND). The level of statistical significance was set at $p < 0.05$.

Official and Ethical Approvals: Official approval was granted by the Arab Board Scientific and Ethical Committee of the Iraqi Ministry of Health. Permission to conduct the study in the selected PHCs was obtained through coordination with both Baghdad health directorates, Al-Karkh and Al-Rusafa. Written informed consent was also obtained from all participants. To ensure confidentiality, data were anonymized using proper procedures.

Results

This study enrolled a total of 697 pregnant women seeking antenatal care at designated primary healthcare centers in Baghdad, Iraq. Age distribution revealed a preponderance of younger mothers, with 57% falling under 30 years old, followed by 33% aged 30-39 years, and a smaller group (10%) between 40-49 years. The average age within the sample was 27.6 years ($SD \pm 4.9$). The husbands' age range

primarily concentrated between 30-50 years (59.7%), with younger (28.4%) and older spouses (11.9%) constituting smaller proportions.

Socioeconomic status varied amongst participants, with 32.3% classified as low, 44.0% as medium, and 23.7% as high. Educational attainment spanned from literacy (10.5%) to postgraduate degrees (12.2%). The highest proportions had completed primary (22.7%) or secondary education (25.8%). The majority of participants were housewives (52.8%), while 47.2% were employed. Urban residency predominated (87.8%), with a minority residing in rural areas (12.2%). (Table 1)

The current study employed the Edinburgh Postnatal Depression Scale (EPDS) to assess AND among pregnant mothers attending primary healthcare centers in Baghdad, Iraq. A total of 232 participants were recruited, and based on the EPDS criteria, 33.3% ($n = 77$) were identified as experiencing AND (Figure 1). This finding highlights a significant prevalence of AND within the study population.

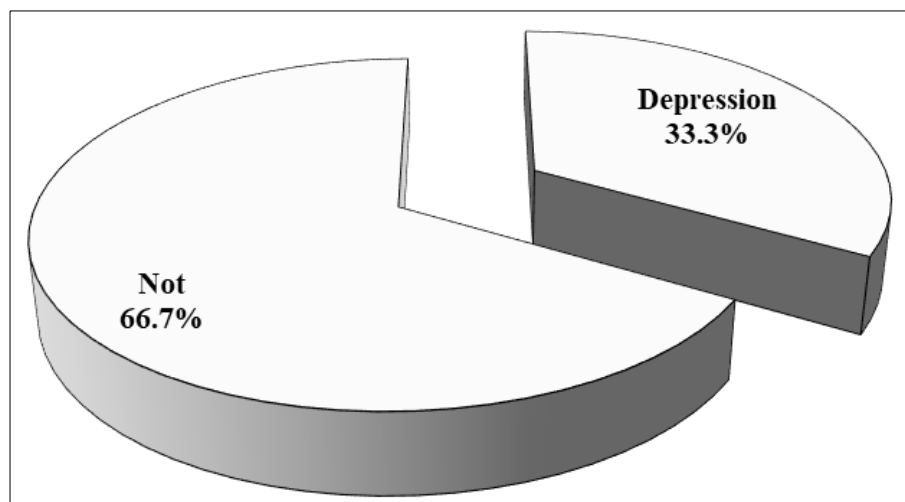


Fig 1: Prevalence of antenatal depression in the study sample

Analysis of the sociodemographic characteristics presented in Table 1 unveiled a clear association between specific factors and AND among study participants. Notably, younger pregnant women (under 30 years) exhibited a statistically significant increase in the risk of experiencing AND compared to older age groups ($p = 0.001$). Educational attainment emerged as another significant factor, with pregnant women possessing lower literacy levels demonstrating a considerably higher prevalence of AND in comparison to those with graduate or postgraduate education ($p = 0.000$). Furthermore, the analysis revealed a significant link between occupation and AND. Housewives displayed a statistically higher rate of AND (40%) compared to employed mothers (25.8%), with a p -value of 0.000 indicating strong statistical significance. Interestingly, neither the age group of the husband nor the socioeconomic status of the participants demonstrated a statistically significant association with AND in this study. Finally, the data suggest that residence during pregnancy, whether rural or urban, did not appear to be a contributing factor for developing AND.

Investigating the health behaviors revealed a high prevalence of non-smoking mothers (89.7%) with a small contingent of former smokers (10.3%). Notably, no participants reported current smoking during pregnancy.

Domestic violence exposure was present in a concerning 10.9% of the sample. The personal and family history of psychological disorders were also evaluated, with 3.9% and 6.2% of participants reporting a personal and family history, respectively (Table 2).

The study identified a significant association between AND and several risk factors in pregnant women. Past smoking behavior emerged as a potential risk factor, with a significantly higher prevalence of AND observed among former smokers (48.6%) compared to non-smokers (31.5%) ($p = 0.004$). Furthermore, exposure to domestic violence during pregnancy was a statistically significant risk factor for AND (59.2%) ($p = 0.000$).

Strikingly, a personal history of mental health disorders emerged as a strong predictor of AND. Pregnant women with a pre-existing mental health diagnosis had a considerably higher prevalence of AND (63%) compared to those without a history (32.1%) ($p = 0.001$). Similarly, a family history of mental illness in pregnant mothers was also associated with an increased risk of AND (81.4%) ($p = 0.000$). These findings underscore the critical importance of considering these factors during pregnancy screenings to proactively identify mothers at heightened risk for AND (Table 2).

Table 1: Distribution of the study sample according to sociodemographic factors and antenatal depression

Variable	Antenatal depression		Total (N=697) (No) (%)	χ^2 P value
	Yes (n=232) (No) (%)	No (n=465) (No) (%)		
Age group of participants (years)				
< 30	(176) (44.3)	(221) (55.7)	(397) (57.0)	11.3 0.001
30- 39	(75) (32.6)	(155) (67.4)	(230) (33.0)	
40- 49	(11) (15.8)	(59) (84.2)	(70) (10.0)	
Age group of husbands (years)				
< 30	(76) (38.4)	(122) (61.6)	(198) (28.4)	4.9 0.086
30-50	(125) (30.1)	(291) (69.9)	(416) (59.7)	
> 50	(31) (37.4)	(52) (62.6)	(83) (11.9)	
Socioeconomic status				
Low	(89) (39.6)	(136) (60.4)	(225) (32.3)	6.6 0.038
Medium	(97) (31.6)	(210) (68.4)	(307) (44.0)	
High	(46) (27.9)	(119) (72.1)	(165) (23.7)	
Level of education				
Read & write	(35) (47.9)	(38) (52.1)	(73) (10.5)	30.4 0.000
Primary education	(72) (45.6)	(86) (54.4)	(158) (22.7)	
Secondary education	(57) (31.7)	(123) (68.3)	(180) (25.8)	
Institute & university	(51) (25.4)	(150) (74.6)	(201) (28.8)	
Postgraduate	(17) (20.0)	(68) (80.0)	(85) (12.2)	
Occupation				
Housewife	(147) (40.0)	(221) (60.0)	(368) (52.8)	15.6 0.000
Employee	(85) (25.8)	(244) (74.2)	(329) (47.2)	
Residence				
Rural	(29) (34.1)	(56) (65.9)	(85) (12.2)	0.03 0.862
Urban	(203) (33.2)	(409) (66.8)	(612) (87.8)	

Table 2: Distribution of the study sample according to psychological, behavioral disorders history and antenatal depression

Variable	Antenatal depression		Total (N=697) No (%)	χ^2 P value
	Yes (n=232) No (%)	No (n=465) No (%)		
Smoking history				
Ex-smoker	(35) (48.6)	(37) (51.4)	(72) (10.3)	8.5 0.004
Non -smoker	(197) (31.5)	(428) (68.5)	(625) (89.7)	
Domestic violence				
Yes	(45) (59.2)	(31) (40.8)	(76) (10.9)	25.8 0.000
No	(187) (30.1)	(434) (69.9)	(621) (89.1)	
Personal history of psychological disorder				
Yes	(17) (63.0)	(10) (37.0)	(27) (3.9)	11.1 0.001
No	(215) (32.1)	(455) (67.9)	(670) (96.1)	
Family history of psychological disorder				
Yes	(35) (81.4)	(8) (18.6)	(43) (6.2)	47.8 0.000
No	(197) (30.1)	(457) (69.9)	(654) (93.8)	

Baseline characteristics of the pregnant cohort revealed a predominance of women in the second trimester (62.5%) compared to the third (37.5%). The majority (72.0%) were multiparous (having given birth previously), while 28.0% were primiparous (first-time mothers). Delivery history indicated a higher prevalence of vaginal deliveries (52.8%) compared to cesarean sections (25.3%). Regarding fetal sex, 36.2% of the mothers were carrying females, with 75.2% aware of the sex and 24.8% unaware. Attendance to antenatal care services was satisfactory, with 66.9% having regular visits. One or more pregnancy complications were experienced by 33.5% of the participants (18.6% with one complication and 14.9% with multiple complications). Subfertility (difficulty conceiving) was present in 18.2% and absent in 59.3%, with a high rate of planned pregnancies (73.7%). (Table 3)

A detailed analysis of risk factors for AND is presented in Table 3. AND prevalence varied slightly between trimesters (34.4% and 31.4% in the second and third trimesters, respectively), with no statistically significant differences observed based on gestational age. Although primiparous

women exhibited a higher prevalence (37.4%) compared to multiparous women (31.7%), this difference was not statistically significant. However, a history of cesarean section (50.4%) emerged as a significant risk factor for AND compared to normal delivery (21.9%) ($p=0.000$). Interestingly, fetal sex played a role, with mothers carrying females experiencing a considerably higher prevalence (46.0%) compared to those carrying males (25.0%) or those with unknown sex (27.8%) ($p=0.000$). Furthermore, irregular prenatal care significantly increased the risk of AND (43.3%) compared to regular care (28.3%) ($p=0.000$). Mothers with multiple pregnancy complications (41.1%) or a history of subfertility also showed a significantly higher prevalence of AND compared to those with one complication (27.7%) or without complications ($p=0.016$ and $p=0.000$, respectively). Finally, unplanned pregnancies (44.3%) were associated with a significantly higher prevalence of AND compared to planned pregnancies (29.4%) ($p=0.000$). These findings highlight the complex interplay of factors influencing antenatal depression, extending beyond traditional demographic variables.

Table 3: Distribution of the study sample according to obstetric history and antenatal depression

Variable	Antenatal depression		Total (N=697) (No) (%)	χ^2 P value
	Yes (n=232) (No) (%)	No (n=465) (No) (%)		
Gestational age				
2nd trimester	(150) (34.4)	(286) (65.6)	(436) (62.5)	0.7 0.418
3rd trimester	(82) (31.4)	(179) (68.6)	(261) (37.5)	
parity				
Primi	(73) (37.4)	(122) (62.6)	(195) (28.0)	2.1 0.147
Multi para	(159) (31.7)	(343) (68.3)	(502) (72.0)	
Type of previous delivery*				
Normal delivery	(58) (21.9)	(207) (78.1)	(265) (52.8)	32.5 0.000
Cesarean section	(64) (50.4)	(63) (49.6)	(127) (25.3)	
Both (normal & cesarean)	(37) (33.6)	(73) (66.4)	(110) (21.9)	
Sex of fetus				
Male	(68) (25.0)	(204) (75.0)	(272) (39.0)	29.2 0.000
Female	(116) (46.0)	(136) (54.0)	(252) (36.2)	
Unknown sex	(48) (27.8)	(125) (72.2)	(173) (24.8)	
Antenatal care				
Irregular care	(100) (43.3)	(131) (56.7)	(231) (33.1)	15.6 0.000
Regular care	(132) (28.3)	(334) (71.7)	(466) (66.9)	
Complication during pregnancy				
One complication	(36) (27.7)	(94) (72.3)	(130) (18.6)	8.3 0.016
More than one complication	(83) (41.1)	(119) (58.9)	(202) (29.0)	
No complication	(113) (31.0)	(252) (69.0)	(365) (52.4)	
History of subfertility				
Primary subfertility	(56) (44.1)	(71) (55.9)	(127) (18.2)	17.7 0.000
Secondary subfertility	(64) (40.8)	(93) (59.2)	(157) (22.5)	
No subfertility	(112) (27.1)	(301) (72.9)	(413) (59.3)	
Planned pregnancy				
Unplanned	(81) (44.3)	(102) (55.7)	(183) (26.3)	13.5 0.000
planned	(151) (29.4)	(363) (70.6)	(514) (73.7)	

Type of previous delivery*: A total number of 502 were excluded due to no previous delivery

Discussion

This study investigated the prevalence and risk factors of AND among pregnant women attending primary healthcare centers (PHCs) in Baghdad, Iraq. The findings contribute valuable data to the understanding of maternal mental health in the region.

The reported prevalence of AND (33.3%) aligns with global estimates ranging from 10% to 40% [13]. This underscores the significance of AND as a public health concern. The study also identified a higher prevalence among younger mothers (under 30 years), mirroring global trends [13]. Several sociodemographic factors emerged as significant risk factors for AND. Lower educational attainment, consistent with previous research [11, 14], may limit access to mental health knowledge and coping mechanisms. Unemployment, particularly among housewives, could lead to social isolation, financial strain, and a lack of purpose, all contributing to depression.

The study identified a potential association between smoking and AND, corroborating existing literature suggesting a link between the two [15]. Furthermore, exposure to domestic violence during pregnancy emerged as a major risk factor, aligning with research on the detrimental impact of domestic violence on mental health [6, 16]. This finding underscores the need for interventions to address domestic violence within the context of maternal healthcare. The significant association between personal and family history of mental disorders with AND reinforces the importance of incorporating these factors into mental health screening protocols for pregnant women. Pregnant mothers with a past diagnosis or family history of mental illness may require closer monitoring and targeted interventions, as suggested by previous research [17].

Interestingly, the study did not find a significant association between AND and socioeconomic status (SES). This may differ from findings in high-income countries where lower SES is a well-established risk factor [17, 18]. Possible explanations include sample-specific characteristics or limitations in measuring SES within the Iraqi context. Similarly, the lack of association with the husband's age could be population-specific.

The non-significant difference in depression prevalence across trimesters is noteworthy. While some studies suggest a higher risk in the second trimester due to hormonal fluctuations [19], this trend may not have been captured in the present study. Additionally, although a higher prevalence among first-time mothers aligns with some research [20], the lack of statistical significance warrants further investigation. A history of cesarean delivery emerged as a significant risk factor, aligning with research suggesting a possible connection between cesarean sections and postpartum depression, although the causal direction remains unclear [21]. Furthermore, the study found that mothers carrying female fetuses were more likely to experience AND. This finding necessitates further exploration, as existing research on fetal sex and maternal depression is inconclusive [22]. The significant association between irregular prenatal care and AND highlights the importance of promoting consistent access to antenatal services. The study also identified multiple pregnancy complications and subfertility as risk factors for AND, consistent with research on the psychological impact of these experiences [23, 24]. Finally, unplanned pregnancies were associated with a higher prevalence of AND, mirroring findings from other studies [25].

Conclusion

This study establishes AND as a prevalent concern affecting pregnant mothers in Baghdad, Iraq. It identifies key risk factors, including sociodemographic factors, lifestyle behaviors, mental health history, pregnancy experiences, and access to prenatal care. These findings emphasize the need for a multi-faceted approach that considers various social, psychological, and reproductive factors in addressing AND. The study recommends implementing evidence-based programs such as mental health education workshops, support groups to address isolation, and integrating depression screening into prenatal care with clear referral pathways. Additionally, social support services, particularly for unemployed mothers, could be beneficial. Tailoring interventions to the cultural context of Baghdad is crucial. Implementing these programs can enable healthcare providers to proactively identify and treat AND, leading to improved mental health outcomes for both mothers and children. Further research with broader demographics and longitudinal designs is recommended to refine the understanding of these factors and develop effective strategies to promote maternal mental well-being.

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