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Anxiety and depressive symptom experiences in the perinatal period: samples of two different countries

Funda Gümüş^{1,2*} , Florence Naab³, Samuel Adjorlolo² and Evelyn Asamoah Ampofo³

Abstract

Background Perinatal mental health problems, particularly anxiety and depression, affect approximately 20% of women during pregnancy or within the first year after birth, with rates up to twice as high in developing countries. Accordingly, this study aimed to assess the levels of anxiety and depressive symptoms and their associated factors among perinatal women in Diyarbakır, Türkiye (TR), and Accra, Ghana (GH).

Methods This descriptive and cross-sectional study was conducted with 1,021 (TR: 437; GH: 584) perinatal women between 25.06.2024 and 15.09.2025. Data were collected using a structured questionnaire, the Sociodemographic Form, and the Hospital Anxiety and Depression Scale (HADS), which is now described as a validated and standardized questionnaire used for data collection. Frequency tables and descriptive statistics, Chi-square, Fisher's Exact Test, Independent T-test, One-Way ANOVA, Mann-Whitney U-test, and Multiple linear regression were used to analyse the data.

Results Anxiety levels were 6.46 (3.86) for women living in Turkey and 5.22 (3.73) for women living in Ghana, with a statistically significantly higher score for women living in Diyarbakır, Turkey ($p < 0.001$, effect size = 0.34). 26.6% of women living in Diyarbakır, Turkey, and 15.8% of women living in Accra, Ghana received Borderline Abnormal anxiety scores ($p < 0.001$, effect size = 0.142). When depression scores were examined, they were 6.68 (3.69) for women living in Diyarbakır, Turkey, and 7.25 (3.34) for women living in Accra, Ghana, with statistically significant differences between the two groups ($p = 0.012$, Effect size = 0.16). Pregnancy planning, week of pregnancy, social support, and regular follow-up during pregnancy were found to be predictors of anxiety. The model determined that country of residence, economic status, satisfaction with baby gender, and social support were significant predictors of depression.

Conclusion Women in the perinatal period in Diyarbakır and Accra exhibit symptoms of both anxiety and depression. These findings underscore the importance of early identification and timely intervention, as well as the development of public health strategies to improve maternal well-being and overall quality of life throughout the perinatal period.

Trial registration Not applicable.

Keywords Perinatal period, anxiety, depression, Ghana, Turkey

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Background

The International Statistical Classification of Diseases and Related Health Problems (ICD-10) defines the perinatal period as a process that begins with the 22nd completed week of pregnancy (154 days) and ends seven days after birth. Accurate recording of events in the perinatal period (154 days [or 22 completed weeks, which is written as 22+0 to indicate 22 completed weeks and 0 days] of gestation to 7 completed days after birth) [1]. The perinatal period is one of the most significant periods in a woman's life. The perinatal period, marking the shift to pregnancy and parenting, is positively received by some women; however, for others, it may lead to significant worry, anxiety, and psychological problems during pregnancy and the postpartum period, thereby significantly affecting women's health [2–4].

Depression and anxiety symptoms are common throughout the perinatal period. Perinatal mental health disorders often occur during pregnancy and postpartum [2, 5, 6]. Epidemiological evidence suggests that the burden of mental health problems during the perinatal period has increased in recent years [7]. Approximately 20% of women develop perinatal mental health disorders during pregnancy or during the first year postpartum [8]. Globally, postpartum depression affects 10–20% of women [9]. According to WHO (2015) data, while 1 in 10 women in high-income countries develop perinatal depression, 1 in 5 women in low-middle-income countries experience perinatal depression [10]. Anxiety is the most prevalent psychological problems after depression during the perinatal period. A meta-analysis including 221,974 women across 34 nations indicates that anxiety symptoms during the perinatal period are present in 18.2% of women in the first trimester, 19.1% in the second trimester, and 24.6% in the third trimester. Overall, anxiety symptoms were observed in 15.2% of pregnant women. During the postpartum period, anxiety symptoms were identified in 15.0% of women, while 9.9% met the diagnostic criteria for an anxiety disorder [11]. Some studies have reported that the combined prevalence of depression and anxiety symptoms during the perinatal period may reach up to 40% [12].

Studies conducted in Turkey and Ghana indicate that prenatal anxiety and depression rates remain elevated [13–15]. In Turkey, the prevalence of depression during pregnancy varies between 12% and 36%, depending on the stage of pregnancy and working conditions, while the prevalence of postpartum depression ranges between 15% and 35% [16]. The prevalence of depressive symptoms during pregnancy has been reported as 53.1% for moderate symptoms and 17.7% for severe symptoms [17]. Other studies have reported rates of 31% during the prenatal period and 29% during the postpartum period [18]. Additionally, 13.5% of women in the first trimester

have been diagnosed with an anxiety disorder, and 21.6% have exhibited comorbid anxiety and depressive disorders [19]. Dikmen-Yıldız et al. (2017) identified anxiety as the most prevalent mental health problem during pregnancy (29.6%), whereas depression was more prevalent in the postpartum period (32.6%) [14]. In Ghana, prenatal depression has been reported to range between 10% and 38%, postnatal depression between 4% and 9%, and prenatal anxiety at approximately 33% [20]. Another study revealed that 37.7% of pregnant women experienced moderate to severe depressive symptoms, while 16.4% reported moderate to severe anxiety symptoms [5].

Mental health issues arising during the perinatal period can lead to behaviours that may negatively affect women's health. These behaviours include irregular eating, weight loss, reduced self-care, smoking, and alcohol and substance use [21, 22]. In addition, women experiencing intense stress during pregnancy have been associated with an increased risk of anxiety and depression, high blood pressure, and gestational diabetes during pregnancy, spontaneous abortion, premature birth, operative vaginal birth, difficult birth, low birth weight of newborn, increased use of analgesics, and unplanned cesarean section. In addition to the adverse effects of maternal stress on birth outcomes, it causes negative consequences for the postpartum period, such as postpartum depression, a decrease in the quality of attachment between mother and baby, coping with the maternal role, and inadequate coping [22]. Moreover, during the perinatal period, psychological problems that existed before pregnancy recur in approximately 10% of women [7].

Understanding perinatal mental health problems among women in Turkey and Ghana is important for equipping health professionals with the knowledge and competencies necessary to address maternal mental health effectively. Identifying modifiable lifestyle factors and contextual determinants may contribute to the development of targeted interventions for at-risk populations and support systematic improvements in healthcare delivery [20, 23]. This study aimed to assess anxiety and depressive symptom levels and to identify associated factors among perinatal women in Diyarbakır, Turkey, and Accra, Ghana. The study sought to determine which variables are associated with anxiety and depression symptom levels in women living in these two countries.

Methods

Design

This study was designed as a cross-sectional, descriptive, and correlational investigation based on self-reported data in Diyarbakır, Turkey, and Accra, Ghana, to assess levels of anxiety and depressive symptoms and to identify associated factors among perinatal women in both cities.

Sample and recruitment

The study population consisted of individuals who were followed as outpatients in the obstetric outpatient polyclinics between June 25, 2024, and September 15, 2025, at the Education and Research Hospital, and University Hospitals in Diyarbakir, Turkey, and participants were recruited from the Municipal Health Services Directorates, Medical Directorates in Accra, Ghana. A purposive sampling method was used to recruit eligible participants who attended these healthcare institutions during the study period. The criteria for participant inclusion in the study were as follows: being between the 22nd completed gestational week (154 days) and the 7th day after delivery, agreeing to participate, having no hearing, vision, or comprehension difficulties, and being literate. Women who were diagnosed with any mental and/or physical illness, using regular medication, having a high-risk pregnancy, and having given birth prematurely were excluded from the study. Participant recruitment, eligibility assessment, and exclusion procedures are summarized in Fig. 1.

Sample size and power analysis

The sample size was calculated using the formula $n = p \times q \times t^2 / d^2$ for an unspecified population, with p and $q = 0.50$, $t = 1.96$, and $d = 0.05$ [24]. At least 384 participants were required per country. Due to participant cooperation, a total of 437 women from Turkey and 584 from Ghana (total $n = 1,021$) were included. Post hoc power analysis using G*Power 3.1.9.7 indicated a statistical power of 99% for detecting differences in HADS scores between groups (effect size = 0.34, $\alpha = 0.05$), confirming the adequacy of the sample [25].

Data collection

Data were collected through face-to-face interviews conducted in Diyarbakir, Turkey, and in Accra, Ghana, after obtaining written institutional permissions. Interviews were carried out by the researchers (FG, SA) in private outpatient polyclinic rooms to ensure confidentiality and lasted approximately 20–25 min. Some participants completed the study forms independently, whereas others requested assistance from the researchers, who read the questions aloud and recorded responses when necessary.

Measurements

Sociodemographic and obstetric outcomes form

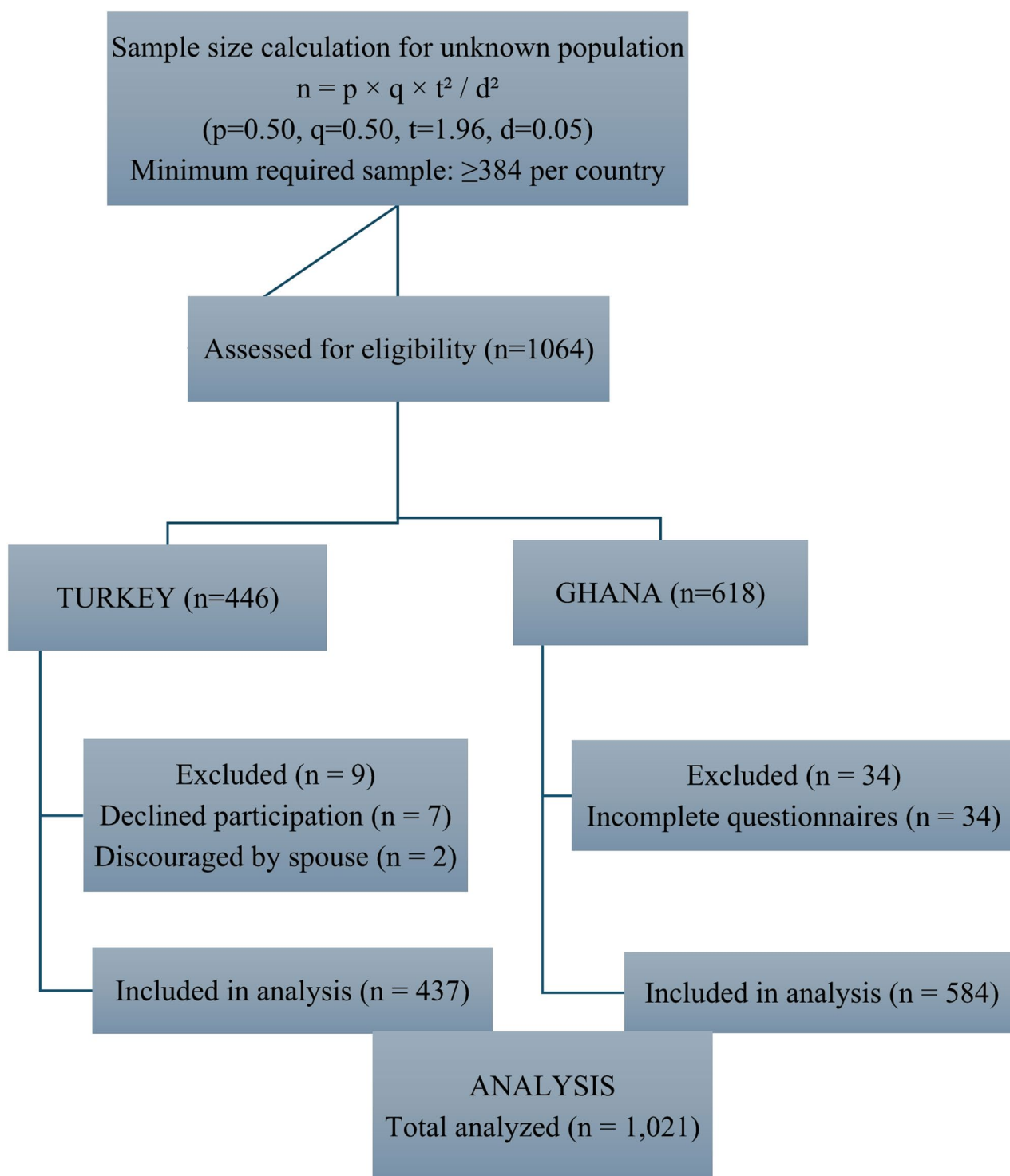
A structured questionnaire, developed based on relevant literature [26, 27], was used to collect socio-demographic information (age, marital status, economic status, employment, place of residence, height, pre-pregnancy weight) and obstetric variables (parity, gravidity, gestational age, miscarriage history, delivery week, mode of delivery, maternal and neonatal weight, infant sex).

Hospital Anxiety and Depression Scale (HADS)

Anxiety and depressive symptoms among recruited women at both study locations were assessed using the HADS questionnaire. The HADS is a validated screening instrument, with prior applications in Turkey [28] and Ghana [4]. HADS was used to screen for symptoms of anxiety and depression in the study population. The scale is not intended for diagnostic purposes; rather, it aims to identify individuals at risk for anxiety and depression and to determine risk level and symptom severity. HADS is a self-report questionnaire consisting of 14 items: 7 assessing anxiety (items 1, 3, 5, 7, 9, 11, and 13) and 7 assessing depression (items 2, 4, 6, 8, 10, 12, and 14). Each item is rated on a 4-point Likert scale ranging from 0 (“not at all”) to 3 (“very often indeed”). Scores for each subscale range from 0 to 21, with higher scores indicating greater levels of anxiety or depression. Scores of 0–7 are considered normal, 8–10 indicate borderline or mild symptoms, and 11–21 indicate abnormal levels corresponding to moderate to severe anxiety or depression. In the present study, Cronbach’s alpha coefficients were 0.73 for the anxiety subscale and 0.64 for the depression subscale. The internal consistency of the total scale was acceptable, with a Cronbach’s alpha coefficient of 0.75.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 27.0. Descriptive data were analyzed using numbers, percentages, means, standard deviations, minimums, and maximums. The chi-square test was used to compare the sociodemographic and obstetric outcomes of women in both countries. The Fisher’s Exact test was used when the expected value was less than 5. Normality of numerical data was assessed using the Shapiro-Wilk test. The independent T-test was used to compare the anxiety and depression subscales of the Hospital Anxiety Depression Scale. Because age, duration of marriage, pregnancy, miscarriage, and abortion, living children, number of living girls and boys, number of weeks of gestation, height, pre-pregnancy and current weight, and BMI were not normally distributed, the Mann-Whitney U test was used for intergroup comparisons. The reliability of the anxiety and depression subscales was assessed using Cronbach’s alpha coefficient. Multiple linear regression was performed. Effect sizes were interpreted using conventional thresholds. Cohen’s d was calculated to assess mean differences between two independent groups, with values of 0.20–0.49 indicating a small effect, 0.50–0.79 a medium effect, and ≥ 0.80 a large effect. Cramer’s V was used to evaluate the strength of association between categorical variables, with values of 0.10–0.29 indicating a small effect, 0.30–0.49 a medium effect, and ≥ 0.50 a large effect. Partial r was calculated to quantify the magnitude of relationships

**Fig. 1** Flow Diagram

in effect analyses, with values of 0.10–0.29 representing a small effect, 0.30–0.49 a medium effect, and ≥ 0.50 a large effect. A post hoc power analysis was conducted using G*Power 3.1.9.7, which determined the required sample size and ensured adequate statistical power. All analyses were statistically significant at the $p < 0.05$ level.

Results

Sociodemographic characteristics of the participants

Table 1 presents the sociodemographic characteristics of the participants. The mean age of women living in Diyarbakir, Turkey, was 28.3 ± 5.90 years, with the vast majority being married (99.5%). Most had completed secondary education (81%), while half of the spouses (50.1%) were high school graduates. The majority of women (91.5%) were not employed, whereas most spouses (79.9%) were employed. Perceived economic status was predominantly moderate-high (68%). Regarding place of residence, 46.2% of women lived in urban areas. The mean duration

of marriage was 6.78 ± 5.04 years. In Accra, Ghana, the mean age of women was 30.1 ± 6.15 years, with the majority being married, having received moderate levels of education, and spouses showing similar educational attainment. A total of 87.7% of the women and 89% of their spouses were employed. The perceived economic status was mostly at the middle–high level (87%). The majority of the participants lived in urban areas (85.4%). The mean duration of marriage was 4.69 ± 4.37 years. When participants living in the two countries were compared in terms of sociodemographic characteristics, significant differences were found between the two groups with respect to women's age, marital status, their own and their spouse's education levels, their employment status, perceived economic situation, place of residence, and duration of marriage (Table 1).

Table 1 Sociodemographic Characteristics of Participants in Turkey and Ghana

Characteristics	Turkiye (n=437)		Ghana (n=584)		Test	Statistics	Effect Size
	Mean (SD)	Min-Max	Mean	Min-Max			
Age	28.3 (5.90)	18–55	30.1 (6.15)	18–52	U: 104.34	$p < 0.001$	0.30
	n	%	N	%			
Marital Status							
Married	435	99.5	380	65.1	$\chi^2: 184.531$	$p < 0.001$	0.43
Single	2	0.5	99	17.0			
Cohabiting	0		105	18			
Education Level							
Tertiary	54	12.3	158	27.1	$\chi^2: 175$	$p < 0.001$	0.41
9–13 years	354	81	237	40.6			
1–8 years	29	6.6	161	27.6			
No formal education	0		28	4.8			
Spouse's Education level							
Tertiary	202	46.5	213	36.5	$\chi^2: 97.5$	$p < 0.001$	0.31
9–13 years	220	50.1	218	37.3			
1–8 years	15	3.4	92	15.8			
No formal education	0		61	10.4			
Occupation							
Unemployment	400	91.5	72	12.3	$\chi^2: 631$	$p < 0.001$	0.79
Employment	32	8.5	512	87.7			
Spouse Occupation							
Unemployment	88	20.1	59	10.1	$\chi^2: 20.4$	$p < 0.001$	0.14
Employment	349	79.9	525	89.0			
Economic Level							
Low	140	32	76	13	$\chi^2: 54.228$	$p < 0.001$	0.25
Middle-high	297	68	508	87			
Place of Residence							
Rural area	150	34.3	14	2.4	$\chi^2: 223$	$p < 0.001$	0.47
Peri Urban Area	85	19.5	71	12.2			
Urban Area	202	46.2	499	85.4			
	Mean (SD)	Min-Max	Mean (SD)	Min-Max			
Marriage Year	6.78 (5.04)	1–24	4.69 (4.37)	(0–32)	U: 95.61	$p < 0.001$	0.45

χ^2 Chi-square test, U Mann-Whitney U test, SD Standard Deviation

Obstetric characteristics of the participants

Table 2 shows the obstetric characteristics of the participants. The number of pregnancies among women living in Diyarbakir, Turkey, was 2.99 (1.85). 20.4% of women had a history of miscarriage, and the average number of miscarriages was 0.32 (0.69). The women were 29.9 (6.3) weeks pregnant, and the average BMI was 28.00 (4.48) kg/m². The number of pregnancies among women living in Accra, Ghana, was 2.59 (1.56). 17.5% of women had a history of miscarriage, and the average number of miscarriages was 0.21 (0.51). The women were of 32 (8.09) weeks pregnant, and the average BMI was 30.01 (6.10) kg/m². Statistically significant differences were found between the groups in each country regarding the number of pregnancies, number of miscarriages and abortions, the number of living children, the number of living girls and boys, BMI, and abortion history. A comparison of the obstetric characteristics of women living in Diyarbakir, Turkey and Accra, Ghana revealed significant differences between the groups in terms of women's satisfaction with the baby's gender, social support, regular pregnancy follow-up, having a double or triple test and its results, having an oral glucose tolerance test and ultrasound and its results, smoking and alcohol use, and having a family history of mental disorders in the postpartum period (Table 2).

Participants' anxiety and depression scores and predictors

Table 3 compares anxiety and depression levels between women living in Diyarbakir, Turkey and Accra, Ghana. Women living in Diyarbakir, Turkey, had significantly higher anxiety scores than women living in Accra, Ghana ($t=5.204$, $p<0.001$). A significant difference was also observed in the distribution of anxiety categories between the two countries ($\chi^2 = 20.540$, $p<0.001$). Regarding depression, women living in Accra, Ghana had significantly higher mean depression scores than women living in Diyarbakir, Turkey ($t = -2.530$, $p=0.012$). However, no significant difference was found between the two countries in terms of categorical depression levels ($\chi^2 = 0.191$, $p=0.909$) (Table 3).

A multiple linear regression analysis was conducted to examine the predictors of anxiety scores. The overall model was statistically significant, $F(16, 1004)=5.124$, $p<0.001$, explaining 7.5% of the variance in anxiety scores ($R^2=0.075$, Adjusted $R^2=0.061$). *Planned pregnancy* was significantly associated with anxiety scores ($B = -0.606$, $p=0.023$), with women who had a planned pregnancy reporting lower anxiety levels compared to those with an unplanned pregnancy. *Social support* was significantly associated with anxiety. Compared to low social support, high social support ($B = -2.434$, $p<0.001$) and medium social support ($B = -1.797$, $p=0.005$) were both associated with lower anxiety scores. *Regular pregnancy follow-up*

was also significantly related to anxiety levels ($B = -1.064$, $p=0.003$), with women who did not have regular follow-up reporting lower anxiety compared to those who did. *Gestational week* was positively associated with anxiety scores ($B=0.030$, $p=0.023$). Country (Turkey vs. Ghana), education level, employment status, economic status, satisfaction with the baby's gender, oral glucose tolerance test, age, and number of living children were not significantly associated with anxiety scores ($p>0.05$) (Table 4).

A multiple linear regression analysis was conducted to examine the predictors of depression scores. The overall model was statistically significant, $F(16,1004)=7.067$, $p<0.001$, explaining 10.1% of the variance in depression scores ($R^2 = 0.101$, Adjusted $R^2 = 0.087$). *The country* was significantly associated with depression scores. Compared to Accra, Ghana, women in Diyarbakir, Turkey reported significantly lower depression scores ($B = -1.251$, $p=0.008$). *Economic status* was significantly related to depression. Women with low economic status reported higher depression scores compared to those with medium–high economic status ($B = 1.349$, $p<0.001$). *Satisfaction with the baby's gender* was significantly associated with depression scores. Women who reported being satisfied with the baby's gender had lower depression scores compared to those who reported that it did not matter ($B = -0.610$, $p=0.043$). *Social support* was significantly associated with depression. Compared to low social support, high social support ($B = -2.564$, $p<0.001$) and medium social support ($B = -1.209$, $p=0.034$) were associated with lower depression scores. Education level, employment status, planned pregnancy, regular pregnancy follow-up, oral glucose tolerance test, age, number of living children, and gestational week were not significantly associated with depression scores ($p>0.05$) (Table 5).

Discussion

Anxiety and depression are the most common mental health problems during the perinatal period and negatively affect both maternal and infant health physically and psychologically [29]. This study aimed to compare anxiety and depressive symptom levels among women living in Diyarbakir, Turkey, and Accra, Ghana, and to evaluate associated factors within a cross-cultural context.

In this study, the mean age of women living in Turkey was 28.3 years, and almost all participants were married, with an average marriage duration of 6.78 years. Most of women were not employed, whereas most spouses were working. Most participants perceived their economic status as moderate and lived in urban areas. Similarly, women living in Ghana had comparable sociodemographic characteristics; however, employment rates among both women and their spouses were higher, and

Table 2 Obstetrics Characteristics of Participants in Turkey and Ghana

Characteristics	Türkiye (n = 437)		Ghana (n = 584)		Test	Statistics	Effect Size
	Mean(SD)	Min-Max	Mean (SD)	Min-Max			
Number of Pregnancies	2.99 (1.85)	1–10	2.59(1.56)	0–10	U: 113.72	p:0.002	0.24
Number of miscarriages	0.32 (0.69)	0–4	0.21(0.51)	0–3	U: 119.67	p:0.01	0.19
Number of abortions	0.14 (0.51)	0–4	0.22(0.56)	0–3	U: 119.24	p: 0.002	0.15
Number of alive children	2.38 (1.62)	0–7	1.40(1.34)	0–9	U: 82.22	<i>p</i> < 0.001	0.67
Number of girls	1.22 (1.20)	0–5	0.75(0.91)	0–5	U: 100.11	<i>p</i> < 0.001	0.45
Number of boys	1.18 (1.15)	0–6	0.68(0.91)	0–9	U: 93.49	<i>p</i> < 0.001	0.49
Week of Pregnancy	29.9 (6.3)	1–41	32 (8.09)	1–42	U:114.14	<i>p</i> < 0.001	0.23
Weight before pregnancy (kg)	63.6 (11.00)	40–116	69.5(15.6)	42–131	U: 99.47	<i>p</i> < 0.001	0.43
Weight (kg)	73.2 (11.8)	39–125	77.9(15.9)	47–150	U: 107.22	<i>p</i> < 0.001	0.33
Height (cm)	161.70(5.21)	145–177	160.95(7.56)	120–189	U: 117.36	p: 0.02	0.11
BMI (kg/m ²) (now)	28.00 (4.48)	15.2–49.4	30.1 (6.10)	17–62.2	U: 102.65	<i>p</i> < 0.001	0.38
	n	%	N	%			
History of miscarriage							
Yes	89	20.4	102	17.5	χ^2 :1.38	<i>p</i> : 0.24	0.04
No	348	79.5	482	82.5			
History of abortion							
Yes	40	9.2	91	15.6	χ^2:9.24	p: 0.002	0.10
No	397	90.8	493	84.4			
Planned pregnancy							
Yes	294	67.3	373	63.9	χ^2 :1.28	<i>p</i> : 0.25	0.04
No	143	32.7	211	36.1			
Gender of the baby							
Unknown	24	5.5	50	8.6	χ^2 : 3.56	<i>p</i> : 0.16	0.06
Girl	214	49	281	48.1			
Boy	199	45.5	253	43.3			
Satisfied with the baby's gender							
Yes	256	58.6	499	85.4	χ^2:93.7	<i>p</i> < 0.001	0.30
No	62	14.2	31	5.3			
Does not matter	119	27.2	54	9.2			
Social Support							
High	234	53.7	352	60.3	χ^2:9.12	p: 0.01*	0.09
Medium	179	41	217	37.2			
Low	23	5.3	15	2.6			
Regular Pregnancy follow-up							
No	87	19.1	550	92.8	χ^2:562	<i>p</i> < 0.001	0.74
Yes	350	80.1	42	7.2			
Double screening test							
No	338	77.3	584	100	χ^2:147	p < 0.001*	0.38
Yes	98	22.6	0	0			
Result of the double screening test							
No test	338	77.1	584	100	χ^2:148	p < 0.001*	0.38
Normal	96	22.2	0	0			
Abnormal	3	0.7					
Triple screening test							
No	378	86.2	584	100	χ^2:86.7	p < 0.001*	0.29
Yes	60	13.7	0	0			
Result of triple screening test							
No test	378	86.2	584	100	χ^2:83.7	p < 0.001*	0.29
Normal	59	13.5	0	0			
Abnormal	1	0.2					
Oral Glucose Tolerance Test							

Table 2 (continued)

	n	%	N	%			
No	352	80.5	158	27.1	X²:286	<i>p</i> < 0.001	0.53
Yes	85	18.5	426	72.9			
Results of the oral glucose tolerance test							
No test	352	80.5	158	27.1	X²:318	<i>p</i> < 0.001	0.56
Normal	66	15.1	417	71.4			
Abnormal	15	3.4	9	1.5			
Ultrasound examination							
Yes	252	57.7	8	1.4	X²:417	<i>p</i> < 0.001	0.64
No	185	42.3	576	98.6			
Results of Ultrasound Examination							
NA	252	57.7	8	1.4	X²:430	<i>p</i> < 0.001	0.65
Normal	176	40.3	573	98.1			
Abnormal	9	2.1	3	0.5			
Smoking							
Yes	77	17.6	6	1.0	X²:92.1	<i>p</i> < 0.001	0.30
No	360	82.4	586	99			
Use Alcohol							
No	437	100	534	91.4	X²:39.3	<i>p</i> < 0.00	0.20
Rarely	0		43	7.4			
Often	0		7	1.2			
Mental Disorders Family History							
Yes	12	2.7	15	2.6	X ² :1.37	<i>p</i> : 0.60*	0.04
No	424	97.2	569	97.4			
Mental Disorders during pregnancy in family history							
Yes	2	0.5	6	1.0	X ² :1.04	<i>p</i> : 0.47*	0.03
No	435	99.5	578	99			
Postpartum Mental Disorders in family history							
Yes	3	0.7	16	2.7	X²:5.77	<i>p</i>:0.01	0.08
No	434	99.3	568	97.3			

Bold values in the tables indicate statistically significant differences (*p* < 0.05)

*Fisher Exact test, X² Chi-square test, *U* Mann-Whitney U test, *t* Independent test

marriage duration was shorter. Studies conducted with similar populations in Turkey and Ghana report comparable findings, indicating consistency with previous literature [30–34]. Significant differences between the two countries were observed in women's age, marital status, educational level, employment status, perceived economic situation, residence, and duration of marriage. Women in Turkey were generally younger, had longer marriages, and had higher educational attainment than Ghanaian participants. Differences between countries may be explained by variations in cultural values, family structure, and socioeconomic conditions [35–37]. Effect size analyses further demonstrated that the observed sociodemographic differences between Türkiye and Ghana were predominantly of small to moderate magnitude. Moderate effect sizes were identified for age, marital status, education level, economic status, place of residence, and duration of marriage, indicating meaningful population-level differences between the two countries. The largest effect size was observed for women's occupational status, suggesting substantial structural

disparities in employment conditions that may influence maternal well-being and access to healthcare resources.

When obstetric characteristics were examined, the number of pregnancies was slightly higher among women living in Diyarbakir compared to those in Accra. Miscarriage history and BMI values also differed significantly between groups. Although the majority of pregnancies were planned in both countries, women living in Diyarbakir reported lower satisfaction with the baby's gender compared to women in Accra. Previous studies conducted in Turkey reported similar findings regarding unplanned pregnancies and gender expectations [30]. Family planning remains an important public health indicator affecting maternal and infant health outcomes. According to the Turkey Demographic and Health Survey, unwanted pregnancies have decreased in recent years [38, 39], whereas unplanned pregnancy rates remain higher in Ghana. Cultural perceptions related to infant gender may influence maternal psychological well-being; girls are often positively perceived in Ghana due to familial and social roles, while traditional gender norms

Table 3 Comparing Hospital Anxiety and Depression Scores of Participants in Türkiye and Ghana

Scales	Türkiye (n = 437)		Ghana (n = 584)		t	p value	Effect Size
	Mean (SD)	Min-Max	Mean (SD)	Min-Max			
Anxiety	6.46 (3.86)	0–18	5.22 (3.73)	0–18	5.204	$p < 0.001$	0.33
Depression	6.68 (3.69)	0–17	7.25 (3.34)	0–17	-2.530	$p = 0.012$	0.16
Anxiety	n	%	n	%	X²		
Normal (0–7)	264	60.4	429	73.5	20.540	$p < 0.001$	0.142
Borderline Abnormal (8–10)	112	25.6	92	15.8			
Abnormal (above 11)	61	14.0	63	10.8			
Depression	n	%	n	%	X²		
Normal (0–7)	243	55.6	317	54.3	0.191	$P = 0.909$	0.014
Borderline Abnormal (8–10)	126	28.8	172	29.5			
Abnormal (above 11)	68	15.6	95	16.3			

Bold values in the tables indicate statistically significant differences ($p < 0.05$)

X²: Chi-square test, t: Independent t-test

in Turkey may create psychosocial pressure related to expectations for male children [40, 41].

Significant differences were also observed between countries regarding prenatal screening practices. Regular pregnancy monitoring, ultrasound examinations, and dual- or triple-screening tests appear to be more standardized in Turkey. In contrast, access to such services in Ghana may be limited due to infrastructural and resource-related challenges, particularly in rural regions [42]. These differences in healthcare accessibility may influence maternal experiences during pregnancy.

Psychiatric history during the postpartum period was reported more frequently among Ghanaian women, representing a stronger risk factor for postpartum depression compared to Turkey. Previous meta-analyses indicate that psychiatric history increases postpartum depression risk two- to threefold in Turkey [43], while studies conducted in Ghana report even higher risk levels [44]. Limited access to mental health services, cultural stigma, and socioeconomic challenges may contribute to this difference.

In this study, women in Ghana reported higher levels of social support during the perinatal period than women in Diyarbakir, Turkey. In Accra, Ghana, social support is provided through extended family, kinship, and community-based structures, as well as group antenatal care programs, which strengthen women's psychosocial well-being through information sharing and peer support [45–48]. Community support, especially in rural areas, contributes to women feeling safer during pregnancy and postpartum by providing not only emotional but also practical and economic support [47, 48]. In Turkey, social

support is primarily provided through the nuclear family and spouse/partner, with extended family and community support not as strong as in Ghana. Due to urbanization, migration, and regional inequalities, some women may experience isolation [49, 50]. In this context, the extended family structure and community solidarity in Ghana make the protective effect of social support more pronounced compared to Turkey [47, 48].

In the study, anxiety levels in women in Diyarbakir, Turkey, were found to be significantly higher than in Accra, Ghanaian women [14, 32, 51, 52]; it is suggested that this difference can be explained by strong family ties and community support [42]. Regarding depression, women living in Accra demonstrated significantly higher mean depression scores than those living in Diyarbakir, Turkey; however, categorical depression levels did not significantly differ between countries. These findings suggest that although symptom severity may vary across cultural contexts, perinatal depression remains a common mental health concern affecting women in both countries. Reported prevalence rates in the literature range between 12% and 36% in Turkey and 20% to 35% in Ghana [4, 32, 53, 54]. The factors that increase the risk of depression are similar in both countries, with economic poverty, high fertility, lack of spousal support, domestic violence, and societal expectations being prominent [54]. Regarding psychological outcomes, anxiety scores showed a moderate effect size, indicating clinically relevant cross-cultural variation, whereas depression scores demonstrated only a small effect size, suggesting limited practical variation despite statistical significance. These findings suggest that anxiety-related outcomes appear to

Table 4 Predictors of Anxiety Subscale

Predictor	B	SE	t	p	95% CI
Intercept	7.346	1.276	5.758	<0.001	4.843–9.850
Turkey (vs. Ghana)	0.475	0.521	0.911	0.362	-0.548–1.498
Education					
Tertiary (vs. No formal)	-0.439	0.768	-0.571	0.568	-1.947–1.069
9–13 years	0.164	0.731	0.225	0.822	-1.271–1.600
1–8 years	-0.314	0.749	-0.420	0.675	-1.784–1.155
Unemployed (vs. Employed)	-0.302	0.434	-0.697	0.486	-1.153–0.549
Low economic status (vs. Medium–High)	0.221	0.309	0.716	0.474	-0.385–0.827
Planned pregnancy (vs. Unplanned)	-0.606	0.265	-2.284	0.023	-1.127–-0.085
Satisfied with baby gender					
Yes (vs. Does not matter)	0.004	0.333	0.011	0.991	-0.650–0.658
No (vs. Does not matter)	-0.179	0.484	-0.370	0.712	-1.129–0.771
Social support					
High (vs. Low)	-2.434	0.629	-3.870	<0.001	-3.668–-1.200
Medium (vs. Low)	-1.797	0.632	-2.846	0.005	-3.037–-0.558
No regular follow-up (vs. Yes)	-1.064	0.362	-2.938	0.003	-1.775–-0.353
No OGTT (vs. Yes)	0.227	0.283	0.799	0.424	-0.330–0.783
Age	0.021	0.025	0.871	0.384	-0.027–0.069
Number of living children	-0.086	0.103	-0.838	0.402	-0.288–0.116
Week of pregnancy	0.030	0.013	2.280	0.023	0.004–0.055

Bold values in the tables indicate statistically significant differences ($p < 0.05$)

The values in parentheses in the table represent the reference categories. t Independent t-test, SE Standard Error, GH Ghana, TR Turkey

Model $F(16, 1004) = 5.124$; $p = 0.000$; Adj. $R^2 = 0.061$; $R^2 = 0.075$

be more strongly influenced by contextual and sociodemographic factors than depressive symptoms across the two populations.

In the present study, multiple regression analysis showed that country of residence, economic status, satisfaction with the baby's gender, and social support level were significant predictors of depression scores. The lower depression scores observed among women living in Turkey compared to the reference country may be associated with cultural characteristics, family cohesion, and differences in available social support mechanisms. In collectivist societies, strong family solidarity may facilitate emotional sharing during pregnancy and

Table 5 Predictors of Depression Subscale

Predictor	B	SE	T	P	95% CI
Intercept	8.350	1.151	7.252	<0.001	6.090–10.609
Turkey (vs. Ghana)	-1.251	0.470	-2.658	0.008	-2.174–-0.327
Education					
Tertiary (vs. No formal)	-0.242	0.693	-0.349	0.727	-1.603–1.118
9–13 years	-0.078	0.660	-0.118	0.906	-1.373–1.217
1–8 years	-0.205	0.676	-0.304	0.761	-1.531–1.121
Unemployed (vs. Employed)	0.126	0.391	0.323	0.747	-0.642–0.894
Low economic status (vs. Medium–High)	1.349	0.279	4.841	0<0.001	0.802–1.896
Planned pregnancy (vs. Unplanned)	0.037	0.240	0.155	0.877	-0.433–0.507
Satisfied with baby gender					
Yes (vs. Does not matter)	-0.610	0.301	-2.027	0.043	-1.200–-0.019
No (vs. Does not matter)	-0.742	0.437	-1.699	0.090	-1.600–0.115
Social support					
High (vs. Low)	-2.564	0.568	-4.519	0<0.001	-3.678–-1.451
Medium (vs. Low)	-1.209	0.570	-2.121	0.034	-2.327–-0.090
No regular follow-up (vs. Yes)	0.112	0.327	0.344	0.731	-0.529–0.754
No OGTT (vs. Yes)	0.433	0.256	1.692	0.091	-0.069–0.935
Age	0.027	0.022	1.227	0.220	-0.016–0.071
Number of living children	-0.023	0.093	-0.245	0.806	-0.205–0.159
Week of pregnancy	0.012	0.012	1.032	0.302	-0.011–0.035

Bold values in the tables indicate statistically significant differences ($p < 0.05$)

The values in parentheses in the table represent the reference categories. t Independent t-test, SE Standard Error, GH : Ghana, TR Turkey

Model $F(16, 1004) = 7.067$; $p = 0.000$; Adj. $R^2 = 0.087$; $R^2 = 0.101$

reduce depressive symptoms. Social support emerged as the most important protective factor for anxiety. Both moderate and high levels of perceived social support significantly reduced anxiety scores, highlighting the stress-buffering role of social support during pregnancy. Planned pregnancy was also associated with lower anxiety levels, which may be explained by psychological preparedness, perceived control, and positive attitudes toward pregnancy. Furthermore, the increase in anxiety levels with advancing gestational week may be related to approaching childbirth, health-related concerns, and adaptation to the maternal role. Interestingly, lower

anxiety scores among women without regular pregnancy follow-up may indicate possible reverse causality, suggesting that women experiencing higher anxiety may seek healthcare services more frequently. The results indicate that social support and community networks may significantly affect anxiety levels. The risk of depression is influenced by socioeconomic and cultural variables, highlighting the need for customized local health strategies to prevent and treat prenatal depression in both nations. The literature reports that low education, unplanned pregnancy, low income, previous pregnancy loss, lack of social support, living with family, pregnancy symptoms, and high perceived stress are risk factors associated with both prenatal depression and anxiety [55, 56]. While unplanned pregnancy is associated with anxiety due to uncertainty and lack of support, regular prenatal care stands out as a protective factor that reduces anxiety by empowering mothers with knowledge and a sense of confidence. The risk of depression is increased by economic uncertainty, low income, and difficulties accessing healthcare, while support from a spouse, family, and community reduces the risk by providing both emotional and practical assistance [57]. Finally, the relatively low explanatory power of the regression model suggests that prenatal anxiety and depression are multifactorial and complex conditions influenced by psychological, biological, social, and cultural determinants beyond the variables included in this study.

Strengths and limitations of the study

This study used a substantial sample from two distinct nations, with data gathered by local researchers proficient in the culture and language of each nation. Its importance is in offering insights into prenatal anxiety and depression across various cultural settings. The research concentrated on prenatal women without problems, facilitating a greater comprehension of anxiety and sadness in this particular demographic. A primary drawback is the inconsistency of assessment instruments used in the literature to assess anxiety and depression in prenatal women. The measure adopted for this research was intended to guarantee validity and reliability in both cultural contexts. Nevertheless, reliance on self-reported metrics may introduce bias, especially given participants' perceptions of stigma. A further issue is that the research was conducted solely in urban hospital settings, thereby limiting the generalizability of the results. The cross-sectional research design limits the evaluation of temporality and causal linkages, hindering the inference of directionality. Future research using bigger, more representative samples, particularly include women in rural regions, is essential for accurately estimating anxiety and depression prevalence across various contexts.

Conclusion

This study revealed that perinatal women living in both Diyarbakir, Turkey, and Accra, Ghana experience considerable levels of anxiety and depressive symptoms during pregnancy, confirming that maternal mental health represents an important public health concern across different cultural settings. Women living in Diyarbakir reported higher anxiety levels, whereas women living in Accra demonstrated higher depression scores, indicating cross-cultural differences in psychological responses during the perinatal period. Consistent with the regression findings, pregnancy planning, gestational week, social support, and regular prenatal follow-up were identified as significant predictors of anxiety. In particular, social support emerged as a key protective factor, highlighting its stress-buffering role during pregnancy. Planned pregnancy was associated with lower anxiety levels, suggesting that psychological preparedness and perceived control may positively influence maternal emotional well-being. Regarding depression, country of residence, economic status, satisfaction with the baby's gender, and social support were found to be significant predictors. Lower economic status was associated with higher depression scores, emphasizing the impact of socioeconomic vulnerability on maternal mental health. Differences between countries further suggest that cultural context, family structures, and available social support mechanisms may influence depressive symptoms during the perinatal period. Overall, the findings demonstrate that perinatal mental health is shaped by interacting individual, social, and cultural determinants rather than medical factors alone. These results underline the importance of integrating routine psychological assessment into prenatal care services alongside physical monitoring. Particular attention should be directed toward women experiencing unplanned pregnancies, limited social support, or economic disadvantage. Strengthening culturally sensitive psychosocial support systems and promoting comprehensive prenatal follow-up programs may contribute to reducing anxiety and depression during pregnancy in diverse healthcare settings.

Abbreviations

TR	Turkey
GH	Ghana
HADS	Hospital Anxiety and Depression Scale
WHO	World Health Organization
ICD-10	International Statistical Classification of Diseases and Related Health Problems
BMI	Body Mass Index
OGTT	Oral Glucose Tolerance Test
GDHS	Ghana Demographic and Health Survey
TDHS	Demographic and Health Survey
TURKSTAT	Turkish Statistical Institute

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Authors' contributions

All authors meet the criteria for authorship and have approved the final article, and all those entitled to authorship are listed as authors. Study conception and design: FG, FN. Data collection: FG, SA. Data analysis and interpretation: FG. Drafting of the article: FG, FN, SA, EAA. Critical revision of the article: FG, FN, SA, EAA.

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Data availability

The data used in this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. This study was approved by both the Dicle University Social and Human Sciences Ethics Committee (10.12.2023/613628) and the Ghana Health Service Ethics Review Committee (GHS-ERC 023/10/24-GA-050-3303-251134-25 March 2025). Also, written permission was obtained from all institutions where the study was conducted (02/07/2024-735252, 24/06/2024-728738, GR-076-0430, 3/06/2025). The purpose of the study was to provide participants with detailed explanations, and participation was voluntary. Written informed consent was obtained from the women who agreed to participate in the study.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

Conflict of interest

The authors declare that they have no conflicts of interest.

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