



Obstetric and neonatal outcomes in pregnant women with anxiety disorders

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■ MAIN POINTS

- Psychological distress in the mother has a negative effect on the fetus.
- There has been a marked increase in the prevalence of anxiety disorders in Turkey in recent years.
- Anxiety disorders are associated with adverse obstetric outcomes.

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■ ABSTRACT

Aim: To examine the obstetric and neonatal prognoses of women with pregestational anxiety and contribute to maternal and neonatal health for pregnant women managing anxiety.

Materials and Methods: This retrospective study included 60 women with singleton pregnancies aged between 18 and 45 years who presented to the Perinatology Clinic of Ankara City Hospital between January 1, 2021, and December 1, 2024, and were diagnosed with anxiety disorders in the psychiatry department of the same hospital during the prenatal period. We evaluated the demographic characteristics such as age and gravidity, and clinical factors such as obstetric complications, birth weight, first- and fifth-minute Apgar scores, and neonatal intensive care requirements.

Results: The median age of pregnant women monitored for anxiety disorders was 31 years. Generalized anxiety disorder was the most common diagnosis among the anxiety disorders. Medical treatment was administered to 60% of the pregnant women. Of the patients diagnosed with anxiety disorders, 12 experienced preterm delivery. Five patients were diagnosed with hypertensive disorders of pregnancy, and one patient with substance-induced anxiety disorder underwent emergency delivery due to placental abruption. Fetal anomalies observed in the study group included cataract (n=1), microcephaly (n=1), ileal atresia (n=1), and agenesis of the corpus callosum (n=1). Among newborns delivered by mothers with anxiety disorders, the median gestational age at birth was 38 weeks, and the median birth weight was 3000 grams.

Conclusion: Anxiety disorders are associated with adverse obstetric outcomes, particularly preterm delivery.

Keywords: Anxiety, Panic disorder, Maternal factors, Fetal factors, Obstetrics, Fetal anomaly

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■ INTRODUCTION

According to the World Health Organization, the prevalence of anxiety disorders (AD) is approximately 4%; however, only one in four individuals suffering from this condition receives treatment [1]. In Turkey, the Ministry of Health reports a 22.9% increase in anxiety disorders in recent years, with a higher prevalence among women [2]. The chronic stress environment created by this psychiatric condition, along with neurochemical changes in the central nervous system, eating disorders, and coagulation abnormalities caused by elevated cortisol levels, may lead to adverse maternal and fetal outcomes during pregnancy [3]. This study aimed to investigate the obstetric and neonatal prognoses of women with pregestational anxiety and contribute to maternal and neonatal health

among pregnant women managing anxiety.

■ MATERIALS AND METHODS

This retrospective study was approved by the institutional review board (IRB) for scientific ethical conduct (IRB approval number: TABED 2-24-644). The study included women aged 18-45 with singleton pregnancies who visited Ankara City Hospital's Perinatology Clinic between January 2021 and December 2024 and were diagnosed with anxiety disorders during the prenatal period.

Anxiety, as defined in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) by the American Psychiatric Association, is characterized by persistent and excessive worry or anxiety about various activities for

at least six months. AD symptoms include restlessness, difficulty concentrating, fatigue, irritability, muscle tension, and sleep disturbances, with at least three of these six symptoms being present. Subcategories of anxiety disorders include generalized anxiety disorder, social phobia, panic disorder, separation anxiety disorder, mutism, and substance-induced anxiety.

The exclusion criteria for this study were pregnant women who were not evaluated by the department of psychiatry, those with confirmed fetal structural or chromosomal anomalies, who underwent high-risk prenatal screening tests and invasive procedures, and multiple pregnancies. We evaluated demographic characteristics such as age and gravidity and clinical characteristics such as obstetric complications, birth weight, first- and fifth-minute Apgar scores, and neonatal intensive care unit (NICU) admissions were evaluated.

Statistical analysis

The data were analyzed using IBM Statistical software Package for Social Sciences (SPSS)for Windows, Version 23.0 (Armonk, NY: IBM Corp.). The Shapiro-Wilk test was used to evaluate normality. Continuous variables are expressed as medians and range (minimum-maximum values). The categorical variables were expressed as number of affected individuals and the percentage of the study population. This retrospective study included all patients diagnosed with anxiety disorder over the past four years, reflecting the entire eligible population rather than a sample size determined by a priori power analysis.

RESULTS

This study included 60 pregnancies diagnosed with AD based on DSM-IV criteria and followed up during pregnancy. The demographic characteristics of the study population are summarized in Table 1. The median age of the pregnant women evaluated for AD was 31 (range: 19–45) years. Among the participants, 19 (31.6%) were nulliparous, and 14 (23.3%) were single mothers. A total of 20 participants (33.3%) had chronic illnesses, with the most common being asthma in seven patients (11.6%) and chronic hypertension in six (10%).

Table 1. Demographic data of the participants.

	n = 60
Maternal age (years)	31 (19–45)
Gravidity	2 (1-6)
Parity	1 (0-5)
Nulliparity (n, %)	19 (31.6)
Single mothers (n, %)	14 (23.3)
Chronic disease (n, %)	20 (33.3)
Mental disorder (n, %)	3 (0.05)
Smoking (n, %)	7 (11.6)

Note: Data given as median (Range: minimum–maximum) or number of affected individuals (percentage of the study populations).

Table 2. Psychiatric and medical history of the study group.

	n = 60
Generalized anxiety disorder	36 (0.60)
Panic disorder	19 (31.6)
Substance/medication-induced anxiety disorders	5 (0.08)
Medical treatment medication	36 (0.60)
Suicidal intentios	7 (11.6)

Note: Data given as number of affected individuals (percentage of the study population).

Table 3. Outcomes of the patients regrading pregnancy and birth outcomes of in the study group.

	n = 60
Obstetric complications (n, %)	
Preterm labor	12 (20)
High blood pressure	5 (0.08)
Diabetes	2 (0.03)
Fetal growth restriction	1 (0.01)
Gestational age at birth (week)	38 (31-40)
Emergency cesarean delivery (n, %)	18 (30)
Apgar score, first minute	7 (4-8)
Apgar score, fifth minute	9 (5-10)
Birth weight (g)	3000 (1710–4100)
Neonatal intensive care unit (n, %)	19 (31.6)
Refusal to take care of the neonate (n, %)	6 (10)
Breastfeeding (n, %)	48 (80)

Note: Data given as median (Range: minimum–maximum) or number (percentage of the study population).

Three pregnant women had concomitant mental disorders along with AD.

The subtypes of AD observed in our study groups are shown in Table 2. Generalized anxiety disorder (GAD) was the most common diagnosis in the study group. Nineteen participants had panic disorder (PD), while five had substance-induced anxiety disorder. Thirty-six (60%) of the pregnant women were receiving medical treatment, and seven (11.6%) were under close psychiatric monitoring due to suicidal intentions. In total 28 patients were receiving medications for the treatment of SD which included, selective serotonin reuptake inhibitors (SSRIs) (n=20), a combination of SSRIs and atypical antipsychotics (n=5), and serotonin-norepinephrine reuptake inhibitors (n=3).

The outcomes regarding the pregnancy and delivery are of the patients are summarized in Table 3. Twelve patients delivered before 37 weeks of gestation. Five were diagnosed with hypertensive disorders of pregnancy, and one participant with substance-induced anxiety disorder underwent an emergency delivery due to placental abruption. Fetal anomalies observed in the neonates in our study werecongenital cataracts (n=1), microcephaly (n=1), ileal atresia (n=1), and agenesis of the corpus callosum (n=1). The median gestational age of newborns was 38 (range: 31–40) weeks, and the median birth weight was 3000 (range: 1710–4100) grams. Among the neonates requiring NICU care, 13 were monitored for respi-

ratory distress, two for sepsis, and one died due to prematurity. Six newborns were given to social services by the family.

■ DISCUSSION

Maternal adaptation during pregnancy and the establishment of a suitable intrauterine environment are essential for both maternal and fetal health. It is well known that pregnancy affects the hypothalamic-pituitary-adrenal axis. Corticotropin-releasing hormone, produced in large amounts by the placenta, a dynamic organ facilitating fetomaternal exchanges, significantly increases during pregnancy. Maternal adrenocorticotrophic hormone levels rise, leading to physiological hypercortisolemia [4]. In the fetus, adrenal glands become prominent by the seventh week of gestation, and cortisol production begins in the early weeks [5]. However, mechanisms functioning harmoniously in utero can lose their homeostatic balance due to exogenous factors such as chronic stress. Chronic stress disrupts the normal circadian of placental corticotropin-releasing hormone, potentially altering the timing of delivery [6].

Numerous studies have investigated prenatal and postnatal outcomes in mothers with chronic stress factors such as AD and their offspring. Although the results vary, maternal psychological distress is generally believed to have an adverse effect on the fetus. Prenatal stress has been associated with changes in the placental transcriptome and impaired gene expression in trophoblasts [7]. Poor trophoblast development, widely recognized in literature as linked to various pregnancy complications, may contribute to the adverse fetal effects of anxiety by inducing gene changes due to stress. Another study found that mothers with high anxiety levels showed hypermethylation of placental genes, which was linked to hypotonia in their infants [8].

Maternal anxiety and anxiety disorders lead to epigenetic differences that result in adverse postnatal neurodevelopmental outcomes. Additionally, chronic anxiety was shown to enhance various neurotransmitter stimulations, increase maternal procoagulant mediators, induce vasoconstriction, and disrupt fibrinolytic activity, ultimately tipping the coagulation balance toward a prothrombotic state [9]. Similarly, maternal stress elevates interleukin-6 and tumor necrosis factor- α , creating a hyperinflammatory environment [10]. Recent research has demonstrated that prenatal stress and anxiety are associated with altered postnatal microbiome diversity in the neonates, that correlates with abnormal neurodevelopmental outcomes [11].

In a study comparing maternal psychometric scores with amniotic glucocorticoid and brain-derived neurotrophic factor (BDNF) levels, high glucocorticoid levels and elevated amniotic BDNF were associated with low birth weight and smaller head circumference. There was no correlation between psychometric scores and BDNF levels [12]. In a similar study on the same subject, childhood trauma scores in mothers were

found to be associated with higher amniotic BDNF levels during pregnancy, but this was independent of glucocorticoid levels [13]. The increased presence of this mediator in the amniotic fluid during maternal anxiety is notable and it has a critical role in neuronal development and differentiation.

A national cohort study in the UK involving over two million participants found poor mental health to be associated with neonatal mortality and low birth weight [14]. Similarly, a national study in Hungary reported higher preterm birth rates among mothers with PD; however, no significant differences in average birth weights were noted compared to the general population [15]. Interestingly, anemia and polyhydramnios were more common among mothers with PD. A comprehensive study examining pregnancy outcomes with GAD, PD, and medication use found no significant association between GAD or PD and adverse outcomes. However, preterm birth and preeclampsia were more frequent among mothers using SSRIs, while low birth weight and increased cesarean delivery rates were linked to benzodiazepine use [16]. A retrospective cohort study in Australia involving over 50,000 pregnancies observed higher risks of preterm birth, low birth weight, and stillbirth in women hospitalized for psychiatric reasons within five years before pregnancy [17]. Community studies focusing solely on panic disorder have yielded similar findings [18,19]. In the current study, while the median birth weight of neonates from mothers with AD was within normal limits, preterm labor and hypertensive disorders of pregnancy were the most frequently observed complications.

A study conducted in Turkey reported NICU admission rates of 9.1% for treated PD cases and 25% for untreated cases [20]. In the current study, the number of newborns requiring NICU admission was 19. Excluding six infants given to social services and four admitted due to anomalies, the NICU rate dropped to 16.6%. Four infants born with structural anomalies had mothers who received medical treatment during the prenatal period. Meta-analyses have demonstrated a relationship between SSRI and antidepressant use, particularly during the first trimester, and an increased risk of fetal anomalies [21-23]. However, given the limited sample size of our study, these anomalies may be incidental. It is also noteworthy that we did not classify participants based on pharmacological treatment. All pregnant women in our study group were closely monitored by specialists for pharmacological or psychotherapeutic interventions. The current study indicates that 10% of mothers diagnosed with anxiety placed their infants into social services. Existing literature shows that Howard LM. et al. found that 70% of women with psychotic disorders discharged from mother and baby units were released with their mothers without formal supervision. The remaining 30% of infants were taken under supervision [24]. The study by Salmon et al. [25] found that 18% of mothers admitted with a psychiatric diagnosis had their babies taken into care by social services. Future nationwide research on maternal mental health and neonatal care is likely to offer more

definitive insights into this matter. Despite preterm birth being the most frequent complication, as reported in other studies, the median birth weight and gestational age in our study were within normal ranges. This outcome may reflect the benefits of multidisciplinary follow-up and efforts by healthcare professionals to manage maternal anxiety effectively with or without medication. Despite these findings, it is essential to note that some publications report no effect of anxiety diagnosed before pregnancy or mental health conditions on neonatal outcomes [26,27]. Proper monitoring of anxiety disorders is essential to protect mothers and their babies from adverse pregnancy outcomes and future developmental issues. More research is needed to understand the effects of anxiety and panic disorders on maternal and fetal health.

Limitations

Our study has several limitations. These include the lack of postnatal follow-up for the developmental outcomes of infants born from the patients in our study, and the absence of subgroup classification for AD. Furthermore, we did not establish a control group from gravid individuals who did not have AD.

CONCLUSION

Anxiety disorders are associated with adverse obstetric outcomes, particularly preterm birth.

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Ethics Committee Approval: This retrospective study was approved by the Ethics Committee of the Ankara City Hospital (TABED 2-24-644).

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author (BAA) upon request.

Informed Consent: The requirement for signed informed consent was waived as the data were anonymized and collected retrospectively from existing medical records.

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