Prevalence and Risk Factors of Prenatal and Postnatal Depressive Symptoms in Babol Pregnancy Mental Health Registry: A Cross-Sectional Study

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Abstract

Background: Prenatal and postnatal depression (PND) is associated with adverse outcomes for mother, fetus, and child. The aim of study was to examine the prevalence and risk factors of prenatal and postnatal depressive symptoms.

Materials and Methods: This was a cross-sectional and hospital-based survey of 2305 pregnant women and post-partum women (18-48 years) that was registered in the Babol Pregnancy Mental Health Registry (BPMHR) database from June 2020 to March 2021. Two questionnaires, including demographics and depression, were analyzed in this study. Also, the Edinburg Postnatal Depression Scale (EPDS) was used to assess the depressive symptoms. Independent t test and the analysis of variance were used to compare the means. Multiple logistic regressions were used to determine risk factors for depressive symptoms.

Results: According to the EPDS scale, the prevalence of depressive symptoms was 19.8% in the pregnant woman group in comparison with the postpartum period (11.6%). Risk factors for antenatal depressive symptoms were parity (women with parity $\geq$ 4 vs. 1 parity, ß=1.808, P=0.020), two groups of gestational age (gestational age $\leq$12 weeks vs. 28 weeks, ß=1.562 P=0.030) as well as (gestational age 21-27 weeks vs. 28 weeks (ß=1.586, P=0.033), and high-risk pregnancy (high-risk vs. low-risk pregnancy, ß=1.457, P=0.003). For postnatal depressive symptoms, none of the factors were a significant risk.

Conclusion: Prenatal and postnatal depressive symptoms should be screened, particularly for women in the first and second trimesters, with high parity, and those with a high-risk pregnancy, as recommended by the present study.

Keywords: Depression, Postnatal, Prenatal, Prevalence, Risk Factors

Introduction

Depression, most common mental disorder, will be the second largest disease in the world (1, 2). The prevalence of depression in different societies has been mentioned differently (2). About one in five pregnant women experience clinically significant symptoms of depression (3). Some studies have indicated that the prevalence of depression is as high as 6-15% in pregnant women (4). Also, 25-30% of postpartum mothers experience depression in low- and middle-income countries (5). The prevalence of prenatal depressive symptoms is reported 15-25% in North of Iran (6). The results of a meta-analysis in Iran showed that the prevalence of depression was estimated at 41.22%. The prevalence of mild, moderate and severe depression was estimated to be 23.71, 10.67 and 4.30%, respectively (7). In another article, the prevalence of antenatal anxiety/depressive symptoms, in a general hospital of Iran reported 25% (8). American College of Obstetricians and Gynecologists (2015) recommended that clinicians should screen pregnant women for depression with a validated tool at least once during their pregnancy (9). Evidence advocated that depressed pregnant women often declined the treatment because of concerns regarding their fetus health (10).

Prenatal depression is associated with adverse outcomes for mother, fetus, and child (11). Maternal depression is related to preterm birth, low birth weight, fetal growth restriction, and postnatal cognitive and emotional complications (6). Prenatal depression increased the risk of cesarean section (12). Preterm babies can have some problems, such as irregular feeding, extended crying, stomach ache, and insomnia (13, 14). There is an association between maternal depression and a slight increase in criminal behaviors in adolescent period (15). A study reported that depression during pregnancy is a strong predictor of postnatal depression (PND) (16).

PND can be accompanied by a sense of helplessness in mothers with depression, so much so that some mothers with postpartum depression view life as a death swamp (17). Postpartum depression can decrease the quality of life of mothers and the workforce within the economy (18). A recent review reported that the risk of adverse infant health outcomes, including malnutrition, non-exclusive breastfeeding, infant illness, was 31% higher among depressed mothers in comparison with the non-depressed postnatal mothers (5).

A number of predisposing factors for antenatal/PND have been described. Some associated factors with antenatal depression include maternal age (19), previous psychiatric diagnosis (15), living place, perceived stress, antenatal attachment, abortion thoughts, smoking, diabetes, parity, number of pregnancies, gestational age, and high risk pregnancy (20). Previous studies reported some risk factors for PND including age (21), domestic violence, low socio-economic status, characteristic of neuroticism, substance misuse, high parity, multiple births, and chronic or medical illness (22).

There is insufficient evidence of depressive symptom prevalence in the Iranian population. A systematic review reported that the prevalence of perinatal depression in women from low and middle income countries was 1.8 more [95% confidence interval of the difference (CI): 1.4-2.2] than women from high income countries (23). Identifying and treating women, who suffer from depression during pregnancy and after delivery not only has a positive effect on pregnancy outcomes, but also prevents the postpartum period from causing or aggravating psychological problems. In addition, by timely identification and treatment of these patients, long-term hospitalization complications and treatment costs and maternal and neonatal complications may be reduced. Therefore, our study aimed to investigate the prevalence of depression in prenatal and postnatal women who refers to our clinic (Babol, Iran) over a 9 month time period (June 2020 to March 2021).

Materials and Methods

Participants and study design

This study reports part of Babol Pregnancy Mental Health Registry (BPMHR) database. BPMHR database is registry of mental health of pregnant women in Babol. This project was approved by the Ethic Committee of Babol University of Medical Sciences, Mazandaran, Iran (IR. MUBABOL.HRI.REC.1398.253) and Ministry of Health and Medical Education (Iran). Informed written consent was obtained from each participant before participating in the study.

This program encompasses all pregnant and postpartum women who referred to outpatient clinics or inpatients Obstetrics departments of different hospitals, including Rohani, Yahanejad, Marzikola, of Babol University of Medical Sciences. Data collection was done by trained mental health care providers that comprised demographic and medical information. Paper-and-pencil and Internet administered versions of self-report questionnaires were completed. Also, healthcare providers connected with patients by phone and sent the online questionnaires during postpartum period (4 to 6 weeks after a baby birth) to evaluate mothers mental and physical health.

This is a cross-sectional and hospital-based survey of 2305 pregnant women registered in the BPMHR database from June 2020 to March 2021. In the present study, we included women above 18 years old, who completed the Edinburg Postnatal Depression Scale (EPDS) in pregnancy or postpartum periods (immediately after their baby birth), and those continued the pregnancy until the delivery of a viable baby (at least 28 weeks). Women who terminated spontaneously or medically the pregnancy before 28 weeks of gestational age such as miscarriage, ectopic pregnancy, hydatidiform mole, stillbirth, severe

fetal abnormality, etc., were excluded from analysis for this paper.

In this research, we used only these two questionnaires (demographic and Edinburgh questionnaire). Demographic information included the patient's age, education, place of residence, number of pregnancies, gestational age, pregnancy risk (low risk/high risk), and history of mental health problems. Women with history of medical diseases (such as cardiovascular, pulmonary, renal, and thyroid diseases) or current status of maternal pregnancy risk (gestational diabetes, hypertension, preterm labor, preterm ruptures of membranes, multiple pregnancies, placenta previa, and placenta abruption) or fetal distress (like intrauterine growth restriction) considered as high-risk pregnancy. The EPDS is a widely used tool to identify prenatal and postpartum depression in research worldwide. It consists of 10 items with response categories from 0 (never) to 3 (always) (Likers at 0 to 4 points). The total score ranges from 0 to 30. Higher EPDS scores reflect greater depressive symptoms. The most common threshold for screening for depressive symptoms is ≥10 (23). We used validated Persian EPDS in this study. The alpha coefficient of the reported Persian EPDS is 0.83 (24).

Statistical analysis

Data were analyzed using SPSS software (SPSS 21, SPSS Inc., Chicago, IL, USA). The Kolmogorov Smirnov test was used to evaluate the normal distribution of continuous variables. Descriptive statistics were used to check the frequency distribution, mean and standard deviation. In order to compare depression scores according to the desired characteristics, an independent t test was used for binary groups (place of residence, history of medical illness and high-risk pregnancy) and the analysis of variance (ANOVA) for more than two categories (gestational age, education, and number of pregnancies). Also, Tukey's post hoc test was used for post hoc comparisons. Finally, we used multiple logistic regressions to determine risk factors for depressive symptoms with EPDS≥10 as the dependent variable and five factors as independents (age, gestational age, education, pregnancy risk, and residential status). P<0.05 was considered statistically significant.

Results

Table 1 shows the demographic characteristics of prenatal and postnatal women. Of 2305, 1639 persons (71.1%) were in pregnancy phase and 666 persons (28.9%) were during the postpartum period. The average age of the total population was 30.5 ± 6.17 years. Also, 596 people (36.4%) had a high-risk pregnancy. Seventeen of the women (4.3%) had a history of taking psychiatric drugs for example antidepressants, anti-anxiety drugs, and antipsychotics. According to cut-off score of depression above 10 (EPDS>10), the prevalence of depressive symptoms was 19.8% for pregnant women and 11.6% for postpartum period.

Table 1: Characteristics of the population

Variables	Antenatal (n=1639)	Postnatal (n=666)
Age (Y)	30.45 ± 6.17	30.40 ± 6.47
18-25	399 (24.3)	163 (24.4)
26-30	402 (24.5)	172 (25.8)
31-35	473 (28.9)	175 (26.3)
36-48	365 (22.3)	156 (23.4)
Education		
Primary school	80 (5.0)	50 (7.8)
High school	1034 (64.5)	406 (62.9)
University	489 (30.5)	189 (29.3)
Living place		
Rural	686 (41.9)	309 (46.4)
Urban	953 (58.1)	357 (53.6)
Gravid		
1	574 (35.0)	243 (36.5)
2	570 (34.8)	212 (31.8)
3	297 (18.1)	139 (20.9)
≥4	198 (12.1)	72 (10.8)
Gestational age (weeks)		
<12	212 (13.5)	-
13-20	197 (12.6)	-
21-27	187 (11.9)	-
≥28	969 (61.9)	-
Risk of pregnancy		
Low risk	1043 (63.6)	427 (64.1)
High-risk	596 (36.4)	239 (35.9)
Past history of using psychiatric drugs		
No	1569 (95.7)	632 (94.9)
Yes	70 (4.3)	34 (5.1)

Data are presented as mean ± SD or n (%).

Table 2 reports antenatal and postnatal depressive symptoms, according to different classes of demographic characteristics of women. The analysis of variance (ANOVA) showed that the mean of depressive symptoms was differed significantly regarding to levels of education (F=4.33, P=0.013), number of pregnancies (F=3.23, P=0.022) and gestational age (F=3.88, P=0.009). The results of Tukey's Post-hoc test showed that the mean of depression in people with university level education was significantly lower than that of women with elementary education (P=0.017), in women with gestational age of 21-27 weeks was significantly higher than that of 28 weeks (P=0.013). In people with the first pregnancy was significantly higher than the fourth pregnancy (P=0.037). Regarding the postpartum period, the mean of depression in postpartum women who experienced a high-risk pregnancy was significantly higher than those who had a low-risk pregnancy (P=0.039)

Table 3 compares the mean of depression based on pregnancy- risk during pregnancy and postpartum. The analysis of variance (ANOVA) showed that women with low risk pregnancies had a significant difference in the average depression according to gestational age groups (F=3.15, P=0.024) which women with a gestational age of 21-27 weeks had significantly higher depression score than those >28 weeks of gestation (P=0.026). Also, ANOVA tests regarding the postpartum period revealed that the mean of depression in postpartum women who experienced high-risk pregnancy was significantly different with different levels of education (F=4.91, P=0.008) and the number of pregnancies

(F=2.98, P=0.032). The results of Tukey's Post-hoc test showed women who experienced a high-risk pregnancy and had primary education had a higher average depression than those with high school education (P=0.019). Also, women with their first pregnancy who had a high-risk pregnancy had a higher average level of depression than women who had 4 or more pregnancies (P=0.021).

Risk factors for antenatal depressive symptoms were women with parity ≥ 4 vs. 1 parity (ß=1.808, P=0.020), gestational age ≤12 weeks vs. 28 weeks (ß=1.562, P=0.030), gestational age 21-27 weeks vs. 28 weeks (ß=1.586, P=0.033), and high-risk vs. low-risk pregnancy (ß=1.457, P=0.003). For postnatal depressive symptoms, none of the factors were not significant risk (Table 4).

Table 2: Comparisons of depressive symptoms based on characteristics of the population

Variables	Antenatal		Postnatal	
	Mean ± SD	P value	Mean ± SD	P value
Age (Y)		0.283		0.725
18-30	6.28 ± 4.82		4.70 ± 4.39	
31-35	6.59 ± 4.59		5.03 ± 4.25	
≥36	5.27 ± 4.66		5.03 ± 4.15	
Education		0.013		0.082
Primary	7.03 ± 5.47		6.07 ± 5.03	
High school	6.64 ± 4.90		4.58 ± 4.15	
University	5.87 ± 4.25		5.06 ± 4.47	
Living place		4.70		0.344
Rural	6.20 ± 4.70		4.50 ± 4.42	
Urban	6.59 ± 4.79		5.24 ± 4.35	
Gravid		0.022		0.347
1	5.98 ± 4.43		4.68 ± 4.01	
2	6.42 ± 4.77		4.76 ± 4.50	
3	6.82 ± 5.14		5.01 ± 4.72	
≥4	7.10 ± 4.91		5.77 ± 4.67	
Gestational age		0.009	-	-
<12	6.82 ± 4.90		-	
13-20	6.6 ± (5.00)		-	
21-27	7.30 ± 4.73			
28-41	6.09 ± 4.61			
Risk of pregnancy		<0.001		0.039
Low risk	6.0 ± 4.46		4.97 ± 4.65	
High risk	7.03 ± 5.16		4.76 ± 3.89	

Data are presented as mean ± SD and P value and results of one-way analysis of variance (ANOVA).

Table 3: Comparisons of depression symptoms based on risk of pregnancy during antenatal and postnatal periods

Postnatal	Antenatal				Variables			
	Low risk		High risk		Low risk		High risk	
	Mean ± SD	P value	Mean ± SD	P value	Mean ± SD	P value	Mean ± SD	P value
Age (Y)		0.492		0.150		0.891		0.628
18-30	5.81 ± 4.46		7.20 ± 5.36		4.83 ± 4.72		4.42 ± 3.63	
31-35	6.23 ± 4.29		7.17 ± 4.98		5.10 ± 4.39		4.88 ± 3.97	
≥36	6.02 ± 5.42		5.30 ± 3.42		4.81 ± 5.01		5.31 ± 2.95	
Education		0.060		0.370		0.780		0.008
Primary	7.2 ± 5.12		6.93 ± 5.72		5.50 ± 4.74		6.88 ± 5.45	
High school	6.24 ± 4.61		7.24 ± 5.26		4.81 ± 4.58		4.18 ± 3.23	
university	5.60 ± 4.03		6.48 ± 4.69		4.86 ± 4.52		5.42 ± 4.41	
Living place		0.123		0.917		0.321		0.886
Rural	5.95 ± 4.30		6.58 ± 5.26		4.54 ± 4.62		4.42 ± 4.04	
Urban	6.14 ± 4.57		7.39 ± 5.06		5.34 ± 4.66		5.07 ± 3.74	
Gravid		0.431		0.173		0.992		0.032
1	5.58 ± 4.33		6.29 ± 4.65		4.99 ± 4.34		4.00 ± 3.06	
2	6.01 ± 4.43		7.21 ± 5.29		4.89 ± 4.98		4.54 ± 3.56	
3	6.46 ± 4.89		7.24 ± 5.41		4.97 ± 4.95		5.07 ± 4.33	
≥4	6.50 ± 4.38		7.68 ± 5.34		5.17 ± 4.34		6.47 ± 5.00	
Gestational age		0.024		0.132	-	-	-	-
<12	6.48 ± 4.53		7.37 ± 5.44		-		-	
13-20	6.01 ± 4.76		8.22 ± 5.30		-		-	
21-27	7.05 ± 4.37		7.67 ± 5.22		-		-	
28-41	5.70 ± 4.23		6.66 ± 5.08		-		-	

Depressive symptoms defined as Edinburg depression score≥10, No depressive symptoms: Edinburg depression score<10. The values are expressed as mean ± SD. One-way ANOVA test. P<0.05 was considered to indicate statistically significance.

Table 4: Result of adjusted and non-adjusted multivariable logistic regression for risk factors of depression

Predictors	Coding	Adjust model				Non-adjust model			
		Antenatal		Postnatal		Antenatal		Postnatal	
		OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Age (Y)	31-35 (ref=18-30)	0.947 (0.68-1.31)	0.743	1.119 (0.56-2.23)	0.750	1.073 (0.80-1.43)	0.632	1.109 (0.61-2.0)	0.733
	36 (ref=18-30)≤	0.588 (0.29-1.17)	0.134	1.144 (0.35-3.69)	0.823	0.728 (0.38-1.38)	0.335	1.153 (0.37-3.51)	0.802
Education	Primary school (ref=university)	1.302 (0.56-2.98)	0.532	0.826 (0.20-3.29)	0.787	0.945 (0.53-1.67)	0.847	0.434 (0.19-0.97)	0.044
	High school (ref=university)	1.370 (0.97-1.91)	0.067	0.904 (0.46-1.76)	0.768	0.719 (0.39-1.31)	0.281	0.615 (0.26-1.45)	0.269
Living place	Rural (ref=urban)	0.811 (0.60-1.09)	0.168	0.544 (0.28-1.03)	0.064	1.264 (0.96-1.60)	0.90	1.698 (1.02-2.80)	0.038
Gravid	2 (ref= Gravid1)	1.236 (0.87-1.76)	0.242	1.169 (0.56-2.40)	0.671	1.300 (0.95-1.76)	0.091	0.822 (0.44-1.51)	0.529
	3 (ref= Gravid1)	1.148 (0.72-1.81)	0.552	0.849 (0.31-2.27)	0.745	1.429 (0.99-2.04)	0.052	0.84 (0.26-166)	0.625
	4 (ref= Gravid1)≤	1.808 (1.09-2.97)	0.020	1.908 (0.68-5.32)	0.217	1.514 (1.01-2.26)	0.043	1.704 (0.83-3.46)	0.141
Gestational age (Y)	<20w (ref≥28w)	1.562 (1.04-2.33)	0.030	-	-	0.796 (0.49-1.27)	0.341	-	-
	13-27(ref≥28w)	1.315 (0.83-2.06)	0.233	-		0.931 (0.58-1.48)	0.762	-	
	21-27 (ref≥28w)	1.586 (0.48-0.83)	0.033	-		0.581 (0.40-0.83)	0.003	-	
Risk of pregnancy	Low risk (ref=high risk)	0.650 (0.48-0.87)	0.004	1.175 (0.62-2.20)	0.615	1.209 (0.93-1.55)	0.165	0.815 (0.49-1.33)	0.419

Dependent variable: EPDS>10

EPDS; Edinburgh postnatal depression scale, w; week, OR; Odds ratio, and CI; Confidence interval of the difference.

Discussion

The results showed that according to the cut-off point of the Edinburgh Depression Scale above 10 (EPDS≥10), about one fifth of these pregnant women have depressive symptoms. The prevalence of depression symptoms in America (20%) and Brazil (19.6%) is also similar to this finding (25, 26). In contrast to our results, in some countries such as in China, Korea and Hungary, the prevalence of depression is lower than this study reported, (7.5, 8.1 and 17.9%, respectively). In some countries, like Canada (30%), the prevalence is higher than our findings (27). Also, the results of a meta-analysis in Iran estimated the prevalence of depression at 41.22%, which is higher than our study (7). The reason for this difference in prevalence may be due to the different societies, different cultures, different tools for measuring depression, and different cut-off points for defining depression. One of the reasons for the high prevalence of depression symptoms in this study was the sampling from level 3 hospitals, where 36.4% of the population had high-risk pregnancies. In some studies, the high-risk pregnancy rated between 15 and 20% (28). Also, in a cohort study conducted by Rajbanshi et al, the rate of high-risk pregnancy was reported as 14.4% (29).

In our finding, prevalence of postnatal depressive symptoms was 11.6%. This was almost lower than other studies that were conducted in Ethiopia (15.6%) (30) and Middle East (27%) (31). However, the prevalence rates of our study were higher than some countries like Denmark (6.4%) (32). The differences in rate of postpartum depression might be due to the use of different questionnaires, socio-economic level, assessment period, and social support level of the women.

Based on our findings, the number of pregnancies is the risk factors of antenatal depression and women with the number of pregnancies ≤ 4 had a higher risk of depressive symptoms than those of the first pregnancy. Contrary to these findings, some studies reported that first pregnancy is a risk factor for depression (33). In explaining the relationship between depression and high parity, it can be assumed that as the number of the pregnancy increases, the age of the woman also increases. Therefore, the possibility of pregnancy problems such as blood pressure and diabetes will be increased.

In this study, education, place of residence, and age were not risk factors for antenatal depression. Contrary to our results, in some studies higher education has been reported as a protective factor against depression and in others as a risk factor (34).

Interestingly, our findings contrary with previous studies (35) showed that the prevalence of depressive symptoms in the first trimester (less than 12 weeks) and mid-pregnancy (21 to 27 weeks) was higher than those in the third trimester. Truijens et al. (35) reported that the prevalence of depression symptoms ranged from 10 to 15% in different weeks. While, Mikšić et al. (36) reported that the highest prevalence of depression was in the third trimester. Also, according Okagbue et al. (37) report, the third trimester is associated with the highest and the second trimester showed the lowest of trimesters prevalence of depression in a pregnancy duration.

Based on our findings, the prevalence of antenatal depression in women with high-risk pregnancies was about 1.5 times higher than those in the low-risk pregnancies. Consistent with our findings, in a meta-analysis risk of depression in women with high-risk pregnancy was 1.65 times (95% CI 1.09-2.21) higher than those of normal pregnancy (31). For an explanation of this finding, two reasons are proposed: First, pregnancy stress is higher in women with high-risk pregnancies. A review article (2016) reported that women with high-risk pregnancies have significantly higher stress levels and

have more negative emotions than women with normal pregnancies (38). Second, in a high-risk pregnancy situation, the chances of adapting to pregnancy problems are lower. A study has shown that in pregnant women who are less psychologically adapted to pregnancy problems, the manifestations of depression are higher (39).

However, there were some limitations. Here, we chose our population of three public hospitals in a city. It is suggested, the general population of pregnant women who are referred to both public and private clinics will be included in future studies. In future studies, it is suggested to add a clinical interview to diagnose as mental disorders. Due to the low number of postpartum depressed population (77 people), none of the risk factors of postpartum depression were significant. It is suggested that further studies be conducted with a larger number of postpartum populations.

Our results highlighted that the screening for depression in the first and second trimesters of pregnancy is not only as important, but perhaps more important than in the third trimester. The obstetricians should pay attention to the psychological problems of women with high-risk pregnancies along with treatment of the medical problems. However, for future research, large cohort studies are needed to determine more risk factors of antenatal and postnatal depressive symptoms and other mental disorders.

Conclusion

The study emphasized that one-fifth of pregnant women are exposed to depression symptoms, that women with high-risk pregnancy, high number of pregnancies (4 or more), early and mid-pregnancy are at high risk of depression. These findings recommend to obstetricians and healthcare providers to start the depression screening and treatment for pregnant women in the early months of pregnancy.

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Authors' Contributions

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