

Depression and anxiety in pregnancy and postpartum in women with mild and severe preeclampsia

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ABSTRACT

Background: Risk for anxiety and depression is increased in women with high-risk pregnancy. The aim of this study was to evaluate anxiety and depression in women with mild and severe preeclampsia at admission and 6 weeks postpartum.

Materials and Methods: In this cohort study, 122 preeclamptic women who were admitted to the Public hospital and Tamin Ejtemaee hospital of Mashhad were included. Selection was done by convenience sampling method. Beck Depression Inventory II (BDI-II) and Spielberger State-Trait Anxiety Inventory (STAI) were completed at admission and 6 weeks after delivery. Data were analyzed by SPSS 16 using Chi-square, Fisher's exact test, Mann-Whitney U test, and Repeated measurement.

Results: The mean depression score was 4.81 ± 4.09 at admission and 11.17 ± 5.5 at 6 weeks postpartum. The mean of trait anxiety was 42.5 ± 10.5 at admission and 32.3 ± 6.5 at 6 weeks postpartum, and the mean of state anxiety score at admission was 43.09 ± 9.5 and at 6 weeks postpartum was 31.99 ± 5.9 . There was a significant difference between the scores of depression ($F = 3.8, P < 0.001$), state anxiety ($F = 1.52, P < 0.001$), and trait anxiety ($F = 1.5, P < 0.001$) at admission and 6 weeks postpartum. No significant differences were found between severity of preeclampsia and the scores of depression, state anxiety, and trait anxiety at admission and 6 weeks postpartum.

Conclusions: The mean score of state and trait anxiety decreased significantly in preeclamptic women from admission to 6 weeks postpartum, but the mean score of depression increased. Severity of preeclampsia was not an independent risk factor of depression and anxiety.

Key words: Anxiety, depression, postpartum depression, preeclampsia

INTRODUCTION

Pregnancy could be regarded as the period of well-being and a joyful phase in a female's life.^[1] Anxiety and depression are common disorders in pregnancy and postpartum, and the psychological changes negatively influence both mother and fetus.^[2,3] The severity of depression increases during the third trimester and can continue in the postpartum period.^[4] Gestational depression is the risk factor for postpartum depression.^[5] Prevalence of gestational depression was found to be 27.7% in a study.^[6]

The prevalence of anxiety disorder in pregnancy is found to be high.^[7,8] Terrible experiences of labor due to unexpected medical interventions, severe pain, and sometimes fear of death could cause severe fear and anxiety in mothers.^[9] The rate of antenatal anxiety disorder has been reported to be 12.5%.^[10] Stress intensity is higher in the third trimester.^[2] Postpartum anxiety has been observed in 5-20% of women. Postpartum anxiety is less diagnosed and could occur either alone or is accompanied with depression symptoms.^[9]

Mood disorders are more likely to develop in the postpartum period, such that 50% of women during the first 2 weeks^[11] experience sadness, the blues, and depression.^[5] Prevalence of postpartum depression has been reported as 16-31% in Iran.^[5] Postpartum depression can lead to ineffective coping of the mother with the neonate,^[9] spouse, and family,

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consequently making her unable to perform maternal and marital tasks and responsibilities. The final outcome will be suicide tragedy of the mother or neonate.^[12]

Preeclampsia is a major contributor to maternal and neonatal morbidity and mortality^[13] and occurs in 2-4.5% of all pregnancies.^[14] It is diagnosed by the presence of both hypertension and proteinuria.^[11] Most often, it is necessary to terminate pregnancy by cesarean section which leads to birth of a neonate who is at risk of death or having complications.^[15] Preeclampsia threatens the health and well-being of the mother and the fetus.^[16] Women experience depression and anxiety during pregnancy and postpartum, when expectations are high for illness.^[17] Rubertsson *et al.* reported depression and anxiety in early pregnancy to be associated with the risk for preeclampsia.^[18] Somatic symptoms of preeclampsia like hypertension and proteinuria recover after delivery; however, preeclamptic women most often experience complications of mood disorders in comparison with females with uncomplicated pregnancy.^[19] Kharaghani *et al.* reported the prevalence of moderate to severe depression in preeclamptic women as 31.2% during pregnancy.^[20] Mounira reported that depression and anxiety had developed (32% and 26%, respectively) in subsequent pregnancy, 5 years after hemolysis, elevated liver enzymes, and low platelets (HELLP) syndrome.^[21] Major depression was more prevalent in high-risk pregnancy. If it is not diagnosed or remains untreated during pregnancy, it causes negative effects on maternal-infant attachment and increases the risk of postpartum depression.^[10]

It seems that there is an association between the severity of preeclampsia with occurrence of postpartum depression, because the maternal and fetal problems are higher in severe preeclampsia than in mild preeclampsia.^[22] A strong significant difference has not been reported, although studies indicated more severe depression symptoms in mothers with preeclampsia in comparison with healthy mothers.^[19] It is not clear if there are any differences between postpartum depression symptom in mothers with severe preeclampsia and mothers with mild preeclampsia. Besides, it does not seem to be clear whether the severity of preeclampsia could increase the risk of postpartum depression or preeclampsia which is induced by maternal-neonatal problems could increase this risk.^[22]

It is not clear if women with severe preeclampsia experience higher anxiety and depression than the women with mild preeclampsia. In order to find how postpartum depression occurrences are independent of post-preeclampsia complications, we conducted a longitudinal study on preeclamptic women who did not experience high-risk obstetric complications such as preterm birth, hospitalization of neonate in NICU for more than 24 h, stressful event

during the study, history of medical conditions and mental disorders. The aim of this study was to evaluate anxiety and depression in women with mild and severe preeclampsia at admission and 6 weeks postpartum.

MATERIALS AND METHODS

This cohort study was conducted on 122 women aged 18-44 years (mean: 27 ± 6 years) from 4 June 2012 till 6 Nov 2012 and then continued from 22 June 2013 to 16 Oct 2013. They had referred to one of the Public hospitals or Tamin Ejtemaee Hospital of Mashhad in order to terminate their pregnancy as they were suffering from severe and mild preeclampsia. The preliminary sample size was calculated as 130; however, due to dropouts, data of 122 mothers were gathered in a total of four times.

The inclusion criteria were: ≤ 18 years of age (mean: 27 ± 6 years), gestational age ≥ 36 weeks (mean: 37.9 ± 1 weeks), singleton pregnancy, and diagnosed preeclampsia (at least hypertension 140/90 mmHg and proteinuria ≥ 30 mg/dl should be present) in the recent week based on ACOG classification,^[11] and their neonates should be alive and normal. The exclusion criteria were: history of medical conditions except preeclampsia, history of mental health hospitalization and history of visit a psychiatrist, taking psychiatric drugs, infertility, history of hospitalization during pregnancy, prenatal death, hospitalization of neonate in NICU for more than 24 h, stressful event during the study, and unhealthy birth.

The researcher went to Mashhad Public and Tamin Ejtemaee hospitals and selected from the mothers hospitalized in antepartum, labor, and delivery wards according to the inclusion and exclusion criteria. Participants gave written informed consent and completed the questionnaires of demographic data, Beck-II Depression test, and State-Trait Anxiety questionnaire of Spielberger. Demographic data of mother and neonate were collected in the first 24 h after delivery. Mothers were asked to come to hospital 2 and 6 weeks after delivery for monitoring their blood pressure. We remind them their appointment by calling. They were also observed for the exclusion criteria. If they did not refer, the researcher went to their home and completed the questionnaires. Depression and anxiety tests were completed 6 weeks after Delivery. The demographic data questionnaire included several questions such as: Personal information, Information about obstetrics, Maternal and Neonatal details at the first 24 h, Mode of delivery, Pain score at admission, Whether neonate admitted at NICU or not.

Content validity index was applied for confirming the validity of the questionnaires. Approval was obtained from

the medical ethics committee of Mashhad University of Medical Sciences.

The questionnaire for State-Trait Anxiety of Spielberger included 20 questions in each part, which were scored based on a 4-point Likert scale as follows: never (1), sometimes (2), moderately (3), and very much (4). We defined anxiety as a score of ≥ 43 . A score of less than 43 represented normal. The score ranged 20-80. The total score was 20-31 for mild, 32-42 for moderate to low, 43-53 for moderate to high, 54-64 for relatively severe, 65-75 for severe, and more than 76 for extremely severe anxiety. The Beck Depression Inventory (BDI, BDI-II) is a revised Beck questionnaire which is in agreement with the depression criteria of DSM-IV. It contains 21 questions scored 0-3; the minimum score is 0 and the maximum score is 63. A cut-off score ≥ 13 is considered as depression, with a lower score considered as normal. The score ranged 20-80. A total score of 0-13 indicated slight, 14-19 low to moderate, 20-28 moderate, and 29-63 indicated severe depression. Anxiety Spielberger test for testing State-Trait anxiety is a standard test whose validity was confirmed by Mahram in Iran.^[23] Its reliability was also confirmed by Alpha Cronbach's value ($\alpha = 0.87$, $\alpha = 0.82$). The validity of Beck-II test was confirmed by Karjo Kasmai in Iran.^[24] Its reliability was also confirmed by Alpha Cronbach's value ($\alpha = 0.84$). Data were analyzed by SPSS 16 using Chi-square, Fisher's exact test, Mann-Whitney U test, and Repeated measurement. Anxiety and depression measured at admission and 6 weeks postpartum were used as within-subject factors. Severe and mild preeclampsia was considered as between-subjects factors. Maximum error was considered as 5%.

Ethical considerations

The recent study was confirmed by Mashhad University of Medical Science Ethics Committee. Participant's written informed consent. They were reminded that the participation would be voluntary and they would be able to leave any time during the study.

RESULTS

Kolmogorov-Smirnov test showed that the data were not normally distributed. So, after logarithmic transformation,

to compare the two groups, the parametric repeated measurement was used.

The results showed the declining trend of mean of systolic and diastolic blood pressure in various stages. Bonferroni test showed that there were significant differences ($P < 0.05$) between the mean blood pressure measured 2 weeks after delivery and the blood pressure at admission, between the values 2 weeks after delivery and immediately after delivery, and also between the values immediately after delivery and at admission [Table 1].

No significant difference was found between the two groups (mild and severe preeclamptic women) in terms of age of mother ($P = 0.364$), level of education ($P = 0.683$) and job of mother ($P = 0.564$), level of education ($P = 0.801$) and job of husband ($P = 0.485$), desire to pregnancy ($P = 0.228$), participation in courses for labor preparation ($P = 0.457$), and place of pregnancy care ($P = 0.278$), neonatal sex ($P = 0.336$), and method of newborn feeding ($P = 0.663$). However, the two groups showed significant difference in the mode of delivery ($P = 0.01$).

There was no significant difference between mean of family income, parity, and duration of labor in mild and severe preeclampsia, but duration of hospitalization in NICU and birth weight showed significant difference in mild and severe preeclampsia [Table 2]. Most of the females with mild preeclampsia had vaginal delivery with heavier neonates and lower duration of hospitalization in NICU, while females with severe preeclampsia experienced emergency cesarean section and their neonates had lower weights and their neonates had higher duration of hospitalization in NICU.

Test of within-subject effect showed a significant difference within the scores of depression ($F = 3.8$, $P < 0.001$), state anxiety ($F = 1.52$, $P < 0.001$), and trait anxiety ($F = 1.5$, $P < 0.001$) at admission and 6 weeks postpartum. In mild and severe preeclampsia, the mean score of state and trait anxiety significantly decreased, but the mean score of depression increased.

Table 1: Mean blood pressure at admission, after delivery, and 2 weeks after delivery according to the severity of preeclampsia

Variable	Severity of preeclampsia	Mean±SD			Within-subject effect
		At admission	After delivery	Two weeks after delivery	
Systolic	Mild	144.2±7.9	118.4±9.3	111.3±9.8	F=327
	Severe	152.1±15.9	128.7±12.5	114.1±13.2	$P < 0.001^*$
Diastolic	Mild	91.03±12.1	75.09±6.8	71.03±6.9	F=843
	Severe	95.4±12.5	91.3±80.8	72.8±7.4	$P < 0.001^*$

* $P < 0.05$ considered as significant

Table 2: Comparison of means in terms of age, parity, family income, hospitalization in NICU, and birth weight

	Mean±SD		Mann-Whitney U
	Preeclampsia mild	Preeclampsia severe	
Age of mother (years)	27.2±6.06	27.2±6.39	0.882
Parity	1.9±1.41	2.0±1.37	0.64
Family income	5.59±2.5	5.1±2.43	0.213
Duration of labor (hours)	7.28±3.17	7.15±4.25	0.053
Duration of hospitalization of newborn in NICU (hours)	6.8±6.29	18.8±8.06	0.003*
Birth weight (grams)	3055.3±459.2	2870.3±479.6	0.034*

*P<0.05 considered significant and obtained from Mann-Whitney U

Test of within-subject contrasts showed no significant interaction differences between time and depression ($F = 0.096, P = 0.758$), time and state anxiety ($F = 0.452, P = 0.503$), and time and trait anxiety ($F = 0.452, P = 0.503$) with the severity of preeclampsia.

Test of between-subjects effect showed that the severity of preeclampsia was not significantly associated with the state anxiety, trait anxiety, and depression [Table 3].

Birth weight, mode of delivery, and duration of hospitalization in NICU were adjusted as covariates. Interactive effects of mode of delivery and severity of preeclampsia with state anxiety ($F = 4.7, P = 0.04$) and trait anxiety ($F = 4.7, P = 0.04$) were significant.

DISCUSSION

This study was conducted to examine the impact of severity of preeclampsia on the mean score of depression and state-trait anxiety at admission and postpartum depressive symptoms. Against our expectations, we found preeclapmtic women with no other complications did not report high score of depression and state-trait anxiety at admission and postpartum.

In our study, women with severe preeclampsia more often reported depressive symptom at admission and postpartum than did the women with mild preeclampsia. Although the mean depression scores of both groups at admission were at a slight level (mild: 4.6 ± 3.7 , severe: 4.9 ± 4.3) of Beck-II (0-13 slight) and there were no significant differences between them, over time, the depression scores at 6 weeks postpartum were increased.

There was no significant difference in the severity of depression between the groups. Hoedjets *et al.* reported that women with severe preeclampsia [odds ratio (OR) 2.65, 95% confidence interval (CI) 1.16-6.05] had more depressive symptoms at 6 weeks postpartum than those with mild preeclampsia. The mean score of depression at 6 weeks

Table 3: Mean state-trait anxiety and depression at admission and 6 weeks postpartum according to the severity of preeclampsia

Variable	Severity of preeclampsia	Mean±SD		Between-subjects effect
		Admission	6 weeks postpartum	
Trait anxiety	Mild	42.79±10.92	31.84±7.6	F=0.03
	Severe	42.37±10.39	32.17±5.6	P=0.847
State anxiety	Mild	43.22±10.58	30.75±6.04	F=0.03
	Severe	43.00±8.70	32.94±5.7	P=0.847
Depression	Mild	4.6±3.7	11.16±5.59	F=0.539
	Severe	4.9±4.3	11.17±5.61	P=0.464

*P<0.05 considered significant

postpartum in severe preeclampsia (7.8 ± 5.8) was more than in mild preeclampsia (4.5 ± 5). Our finding was comparable to the result of Hoedjets because the mean score is was at the lower point cut-off of Edinburgh Postnatal Depression Scale and Beck-II. But our study was superior in that the women with complicated pregnancy (history of life event, history of depression, preterm preeclampsia, HELLP syndrome, perinatal death) except preeclampsia were excluded.^[22]

Our results agreed with those of Baecke *et al.* where they reported the mean depression among term preeclapmtic women to be 1.3 ± 1.5 (BDI-PC, score range 0-21 vs. uneventful pregnancy 1.8 ± 3.4) and there was no significant difference between them, but participants in their study were selected from women who had more severe preeclampsia.^[25] Kim *et al.* reported mean depression in preeclapmtic women to be 11 ± 5.3 and in women without preeclampsia to be 7.6 ± 5.9 (EPDS, score range 0-30, score ≥ 10 was considered with clinical depression).^[26] Brusse reported the median score of depression in severe preeclapmtic women to be 7.5 with the range 0-32 and was similar with normotensive pregnancies.^[19]

In our study, state-trait anxiety in pregnancy and 6 weeks postpartum did not show significant differences between mild and severe preeclampsia. A score of > 43 was obtained in 106 and 101 women (state 86%, trait 82%). The mean

of trait anxiety at admission was 42.5 ± 1.05 and the mean of state anxiety at admission was 43.09 ± 9.5 . Baecke *et al.* reported the mean score of trait anxiety symptoms in term preeclapmtic women to be 39.6 ± 10 , which is similar to the results of the present study.^[25] Teixeira *et al.* reported the mean score of anxiety symptoms in third trimester to be 36.33 ± 9.12 . Dayan *et al.* reported the values as 36.4 ± 12.2 and 38.8 ± 9.1 , respectively. As to the data, the mean scores of trait and state anxiety in the present study were higher and were not in agreement with their study.^[27,28] Azizi *et al.* also reported that the mean score of anxiety at the end of third trimester was 7.9 ± 3.8 , which is not similar to the results of the present study.^[9] The difference could be due to differences in population structure and inclusion criteria, as well as the time of testing. These three studies have tested anxiety in normal pregnancies, while the present study was conducted on preeclapmtia females who had undergone higher level of stress due to their medical conditions.

In the present study, the mean values of state-trait anxiety 6 weeks postpartum were 31.9 ± 5.9 and 32.03 ± 6.5 , respectively, which were not consistent with the results of Azizi *et al.* Azizi reported the mean score of anxiety as 7.0 ± 3.3 , 4–6 weeks after delivery. The difference could be due to application of different assessment tools and different research populations used. Participants in Azizi's study were pregnant women who experienced traumatic childbirth and had posttraumatic stress disorder based on A criteria of DSM-IV.^[9]

Compared with the analysis at admission and 6 weeks postpartum, the results showed the mode of delivery contributes to differences in the prevalence of postpartum psychological distress after mild and severe preeclapmtia, which is similar to the report of Blom; however, it is not in agreement with the result of Hoedjes.^[22,29] Delahaije reported that mode of delivery is a risk factor forming the link between preeclapmtia and anxiety and depression.^[1]

The limitations of this study were as follows. First, the present study did not include a control group. Second, the results are based on self-reports. The diagnosis of depression requires a full interview. Strengths of our study include longitudinal study design, and the control confounders such as socioeconomic status, history of medical illness, age, and history of depression.

CONCLUSION

There was a significant difference between anxiety and depression at admission and 6 weeks after delivery in preeclapmtic women. Severity of depression increased and that of anxiety decreased from admission to 6 weeks

postpartum in preeclapmtic women as a function of time after delivery. Severity of preeclapmtia was not an independent risk factor of subsequent depression and anxiety.

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