



Affective Temperaments May Predict Postpartum Depression: A Preliminary Study

Afektif Mizaçlar Postpartum Depresyonu Öngörebilir: Bir Ön Çalışma

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ABSTRACT

Aim: Postpartum depression (PPD) is a serious clinical condition, which affects both mother and baby as well as partners. Although PPD is accepted as a mood disorder, there have been limited numbers of studies that investigated affective temperaments in PPD and pregnancy. Moreover, no study has been carried out on the subject of whether affective temperaments assessed during pregnancy can predict PPD.

Materials and Methods: One hundred-fourteen pregnant women were included in present study considering specific criteria. Patients were assessed with the Temperament Evaluation of Memphis, Pisa, Paris and San Diego auto-questionnaire and socio-demographic forms during the third trimester of pregnancy. In the following four weeks of delivery, patients were assessed with the Edinburgh Postpartum Depression Scale for evaluating the presence of tendency to PPD.

Results: The patients who had a tendency to PPD had significantly higher scores on all affective temperament scores except hyperthymic temperament. In logistic regression analysis, it was found that higher scores of cyclothymic temperament and anxious temperament (AT) were associated with tendency to PPD (Odds ratio: 1.26 and 1.47).

Conclusion: Cyclothymic and anxious temperaments are candidates for predicting tendency to PPD. Pregnant women, who have higher scores specifically for cyclothymic and ATs should be considered in terms of affective disorders.

Keywords: Postpartum, depression, affective, temperament

ÖZ

Amaç: Postpartum depresyon (PPD) anne, bebek ve eşleri etkileyen ciddi bir klinik durumdur. PPD, duygudurum bozukluğu olarak kabul edilmekle birlikte, PPD ve gebelikte afektif mizaçları araştıran sınırlı sayıda çalışma vardır. Ayrıca, gebelikte afektif mizaçların PPD'yi yordayıp yordayamayacağını araştıran herhangi bir çalışma bulunmamaktadır.

Gereç ve Yöntem: Alınma ve dışlanma kriterlerine göre 114 gebe çalışmaya dahil edildi. Hastalar, gebeliğin üçüncü trimesterinde Memphis, Pisa, Paris ve San Diego'nun Mizaç Değerlendirmesi anketi ile ve sosyo-demografik formlarla değerlendirildi. Doğumu takip eden ilk dört haftada, hastaların PPD'ye eğilimi olup olmadığını değerlendirmek için Edinburgh Doğum Sonrası Depresyon Ölçeği uygulandı.

Bulgular: PPD eğilimi olan hastaların hipertimik mizaç dışındaki tüm afektif mizaç puanlarında anlamlı olarak daha yüksek puanları vardı. Lojistik regresyon analizinde, yüksek siklotimik mizaç ve anksiyete mizaç (AT) puanlarının doğum sonrası depresyona yakınlıkla ilişkili olduğu bulunmuştur (Odds oranı: 1,26 ve 1,47).

Sonuç: Siklotimik ve AT, doğum sonrası depresyon eğilimini yordamak için aday olabilirler. Özellikle siklotimik ve AT puanları yüksek olan gebeler afektif bozukluklar açısından değerlendirilmelidir.

Anahtar Kelimeler: Postpartum, depresyon, afektif, mizaç

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INTRODUCTION

Depressive disorder is one of the most common cause of disability in women in the whole World and the prevalence of depression is twice the number in women compared to men¹. Postpartum phase is also an important time interval for developing depression among women. The Diagnostic and Statistical Manual of Mental Disorders-5th Edition (APA 20013) describes the postpartum depression (PPD) as a depressive state that has symptoms ranging from moderate to severe, which begins during four weeks after delivery²⁻⁴.

Postpartum psychiatric disorders consist of PPD, postpartum blues and postpartum psychosis⁵. PPD causes severe social and occupational functional impairments and is closely associated with problems in interactions with partner, family and baby⁶⁻⁸. The strongest risk factors for PPD have been identified as antenatal depression or anxiety, history of major depressive disorder, problems in marriage, poor social support and stressing life events^{9,10}. Furthermore patients with a history of PPD have been reported to have higher percentages of PPD subsequent to deliveries^{11,12}.

Currently, affective temperaments are considered to be predictors of some mood disorders¹³. Depressive temperament (DT) was reported to be related to depressive disorder, and irritable temperament (IT), hyperthymic temperament (HT) were considered to be associated with bipolar 1 disorder, and cyclothymic temperament (CT) was regarded as a tendency to bipolar 2 disorder^{13,14}. However, there have been limited numbers of studies that investigated affective temperaments during pregnancy and postpartum period. Yazici et al.¹⁵ reported that affective temperament scores of pregnant women were different from those of healthy control group. Another current study reported that pregnancy and postpartum periods correlated with HT in women without psychiatric diagnosis¹⁵. There has been only one study that assessed affective temperaments in patients with PPD¹⁶. However, no study assessing whether affective temperaments evaluated during pregnancy may predict PPD has been carried out.

In the present study, we aimed to investigate whether there would be associations between affective temperaments assessed during pregnancy and PPD. We hypothesized that some affective temperaments could predict PPD.

MATERIALS AND METHODS

The present study was conducted at Tekirdağ Namık Kemal University Faculty of Medicine, Departments of Gynecology and Obstetrics and Psychiatry. It was approved by Tekirdağ Namık Kemal University Non-Invasive Clinic Research Ethical Committee (date and approval number: 2018/124/08/15).

Inclusion criteria were defined as being at the third period of pregnancy, having no previous or current psychiatric diagnosis, having enough education for being able to complete the self-

assessment tests that were used in the present study, and being willing to be participate in the study. Patients who had previous or current psychiatric diagnosis, who had insufficient knowledge for understanding the aim of the study as well as tests that were used in the study, and who were unwilling to participate in the study were excluded. According to inclusion and exclusion criteria, 170 female patients, who were at the 3rd trimester of their pregnancy, were initially involved in the present study. All of the patients completed the Temperament Evaluation of Memphis, Pisa, Paris and San Diego Auto-questionnaire (TEMPS-A) form and socio-demographic form during pregnancy. After delivery, all patients, who completed TEMPS-A, were evaluated by the Edinburgh Postpartum Depression Scale (EPDS) at the routine controls in the four weeks after delivery. As 114 patients completed the second round, 114 patients were finally included in the study. All patients signed written informed consent form before participating in the study.

Assessment Tools

Socio-demographic Form

This form was created by authors in the light of the literature. This form consists of the data on age, duration of marriage, having a child, education and occupation status, family structure, income rate, place of birth, status of cigarette, and alcohol use.

Temperament evaluation of Memphis, Pisa, Paris and San Diego Auto-questionnaire

The TEMPS-A is a scale that was originally designed by Vahip et al.¹⁷ and then adopted into Turkish by Vahip et al.¹⁷. In the present study, this scale was used to evaluate the scores of subdimensions. It is a self-assessment scale, involving "true" or "false" indications that ask about mood and temperament properties of the entire life of the individual. The subdimensions consist of depressive, cyclothymic, hyperthymic, irritable (DT, CT, HT, IT), and anxious temperaments (AT).

The Edinburgh Postpartum Depression Scale

EPDS was created by Cox et al., and translated and adapted to Turkish by Engindeniz et al.¹⁸ (1997). The purpose of the scale is to evaluate women's PPD levels and it consists of ten items rated on a four-point Likert scale ranging from 0 to 3. The lowest total score that can be obtained is 0, and the highest is 30. Individuals, who score 13 or more, are considered to be at risk of depression.

Statistical Analysis

Statistical analyses were conducted with R 3.5.3, SPSS 23.0., STATA 14.0 and G * Power 3.1. Power analysis was performed to determine the power of the study. We defined a new variable by using EPDS score with its cut-off point. According to that, we

tried to predict the redefined EPDS variable by using the Binary Outcome Logistic Regression. This new variable was also used to determine whether the mean of EPDS dimensions differed. For the assumptions of parametric tests, the Kolmogorov-Smirnov test was used to test for data normality and the box plot was also used. The Levine test was used for the variance homogeneity.

Power Analysis

The Mann-Whitney U test statistic with allocation ratio 0.29 was used as a test statistic. A sample size of 20 achieves 70% power to detect an effect size (d) of 1.3978 using the Mann-Whitney U test with a significance level (alpha) of 0.05. When the sample size is n=45, the power of the test has already achieved 95%. However, the sample size of the study was determined as 114. For the given parameters, for an alpha of 0.05 and a sample size of 114 observations, the type 2 error is 0.0003 and the power is \cong 1.0 (Figure 1).

RESULTS

One hundred fourteen patients were included in the present study. The mean age of participants was 29.72 ± 5.73 years. The median scores of DT, CT, HT, IT and AT were 4, 6, 10, 2 and 7, respectively. The numbers of patients, who scored 13 and higher on EPDS, were 26 (22.8%). The data of demographical and clinical variables of patients were demonstrated in Table 1.

The Kolmogorov-Smirnov test was used to examine the normality of the presence-absence of tendency to PPD distributions. None of them distributed normally. Both the Kolmogorov-Smirnov test and the box-plots showed that presence-absence of tendency to PPD distributions were skewed (Figure 2). For two independent samples comparison, the Mann-Whitney U test was applied when the assumption of normal distribution did not fit. According to the presence-absence of tendency to PPD based on EPDS, there were statistically significant differences between DT scores (absence: 4.34 ± 2.83 , presence: 6.35 ± 2.91), CT scores (absence: 6.64 ± 5.16 , presence: 8.96 ± 4.86), IT scores (absence: 2.80 ± 2.85 , presence: 5.27 ± 4.31) and AT scores (absence: 6.12 ± 6.00 , presence: 14.35 ± 5.76) (Table 2).

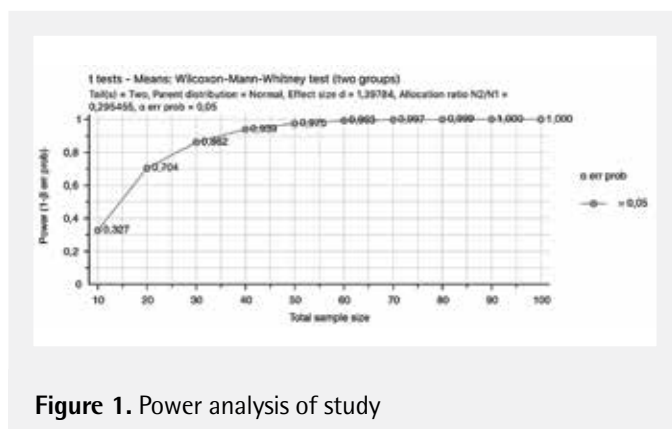


Figure 1. Power analysis of study

The general form of the logistic regression model is:

$$\text{logit}(P) = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_kx_k$$

where $\text{logit}(P)=Y$ is a dependent variable and $x_1, x_2, x_3, \dots, x_k$ are independent variables.

The parameters of $b_1, b_2, b_3, \dots, b_k$ are the logistic regression coefficients. The binary response variable is taken as 0 or 1. The value 1 means the presence of PPD and value 0 indicates the absence of PPD. The P is denoted as the probability of presences of tendency to PPD. A pseudo R^2 greater than 2 indicates a relatively good fit; equals to 1 indicates a perfect fit and equal to 0 means no relationship. According to Table 3, the model has a relatively good fit (pseudo $R^2=0.48$). The Cox and Snell's R^2 and Nagelkerke R^2 indicates that the independent variables can explain the dependent variables with the values of approximately 40% and 61%. For all that, the predicted accuracy was 94% for the absence of depression, the predicted accuracy was 73% for the presence of tendency to PPD and the overall predicted accuracy was 89%. The model was significant at 5% significance level. CT, AT, having a child, and place of birth had a statistically significant effect on the presence of tendency to PPD (Table 3).

DISCUSSION

In the present study, our main findings were as follows; except HT, all subdimensions of TEMPS-A were significantly higher in the patient group who scored ≥ 13 at the EPDS, which reflects tendency to PPD. Moreover, we found that higher scores of CT and AT were associated with tendency to PPD.

PPD is a severe mental disorder which affects both mother and child¹⁹⁻²¹. The exact etiology of PPD is considered unclear;

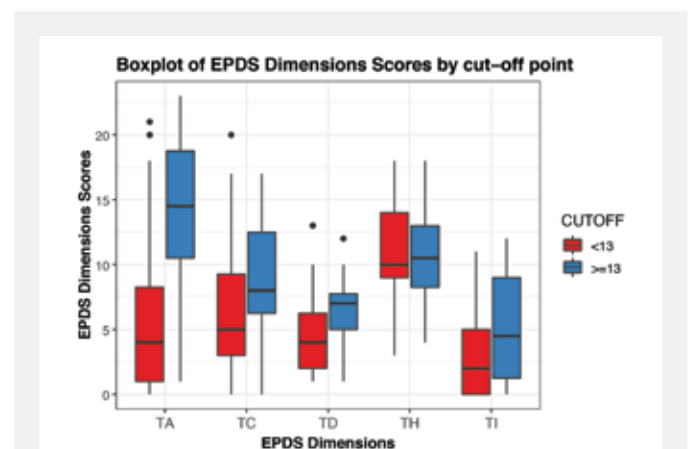


Figure 2. Demonstration of Boxplot of Edinburg Postpartum Depression Scale dimensions by cut-off point

EPDS: Edinburg Postpartum Depression Scale

The blue color indicated depression group, red color indicated non-depressed group

however, biological factors such as ovarian steroids, oxytocin and glucocorticoids as well as other neurotransmitters, which are also associated with mood disorders, have been reported to be etiological factors⁶. Affective temperaments are among well-established factors for the development of affective disorders^{22,23}. Akiskal ve Akiskal²⁴ created the modern concept of affective temperaments for identifying all spectrum of affective situations from healthy reactions to major affective disorders.

There have been two studies that investigated affective temperaments in pregnant women. In the first study, Yazici et al.¹⁵ compared affective temperaments between pregnant women and healthy women and reported that cyclothymic, irritable and AT scores of the pregnant women were significantly lower in pregnant women, and they concluded that differences of affective temperaments could be associated with trimesters of pregnancy. Yazici et al.¹⁶ investigated affective temperaments between pregnant women in different trimesters, women who were at prenatal period and postpartum period, and

age-matched healthy women. The researchers concluded that pregnancy and postpartum periods correlated with HT characteristics in women without active psychiatric diagnosis.

In our study, we compared affective temperaments, which were obtained at third trimester between pregnant women with and without tendency to PPD, based on EPDS. We found that except HT, all subdimensions of TEMPS-A were significantly higher in the patient group who scored ≥ 13 at the EPDS. These temperaments were reported more frequently in affective patients with mixed episodes indicating a relationship between mixed affective episodes and simultaneous presence of inverse temperamental types²⁵.

From this perspective, we can say that affective temperaments differed in pregnant women with and without the risk for postpartum depressive disorder. However, our main purpose was to provide predictive roles of affective temperaments for developing postpartum depressive disorder. We performed

Table 1. Socio-demographical and clinical characteristics of participants

	n	%	±	Median	Standard deviation	Minimum	Maximum	
Age	114		29.72	30.00	5.731	16.0	41.0	
Period of marriage	114		7.33	6.50	5.111	1.0	20.0	
Have a child	Yes	88	77.2	-	1.00	-	1.0	2.0
	No	26	22.8	-		-		
Education	Primary	19	16.7	-	2.00	-	1.0	3.0
	Middle/high	73	64.0	-		-		
	Higher	22	19.3	-		-		
Occupation	No	82	71.9	-	1.00	-	1.0	2.0
	Yes	32	28.1	-		-		
Family Structure	Core	88	77.2	-	1.00	-	1.0	2.0
	Broad	26	22.8	-		-		
Income Rate	High	2	1.8	-	2.00	-	1.0	3.0
	Mid	95	83.3	-		-		
	Low	17	14.9	-		-		
Place of birth	Metropolis	11	9.6	-	2.00	-	1.0	3.0
	Other city	69	60.5	-		-		
	Village/town	34	29.8	-		-		
Use of alcohol substance	No	114	100.0	-	1.00	-	1.0	1.0
Use of cigarette	Yes	14	12.3	-	2.00	-	1.0	2.0
	No	100	87.7	-		-		
EPDS	114	-	7.28	5.00	6.507	1.0	24.0	
DT	114	-	4.79	4.00	2.957	1.0	13.0	
CT	114	-	7.17	6.00	5.166	0.0	20.0	
HT	114	-	10.91	10.00	4.088	3.0	18.0	
IT	114	-	3.36	2.00	3.387	0.0	12.0	
AT	114	-	8.00	7.00	6.864	0.0	23.0	
EPDS	Cut-off <13	88	77.2	-	1.00	-	1.0	2.0
	Cut-off ≥ 13	26	22.8	-		-		

EPDS: Edinburgh Postpartum Depression Scale, AT: Anxious temperament, CT: Cyclothymic temperament, DT: Depressive temperament, HT: Hyperthymic temperament, IT: Irritable temperament

logistic regression analysis and found that higher scores of CT and AT were associated with tendency to PPD (respectively Odds ratio; 1.26 and 1.47). There has been only one study that investigated affective temperaments in patients, who were diagnosed with PPD. In this study, affective temperament and the presence of postpartum depressive disorder were assessed simultaneously and it was reported that cyclothymic and AT were among the significant risk factors independently from

psychosocial factors¹⁷. The methodology of our study differed from Masmoudi et al.'s²⁶ research. Firstly, we assessed affective temperaments in women at third trimester of pregnancy, who had no present or previous psychiatric disorder. Secondly, our study is a follow-up study that investigated the patients in both pregnancy and postpartum periods. Our results are first to show cyclothymic and AT as candidates for developing tendency for postpartum depressive disorder. Additionally,

Table 2. Comparison of affective temperaments between the groups that were separated according to the Edinburg Postpartum Depression Scale

EDSDO		n	Mean rank	Sum of ranks	Mann-Whitney U	p value
DT	Cut-off <13	88	52.28	4600.50	684.500	0.002
	Cut-off ≥13	26	75.17	1954.50		
CT	Cut-off <13	88	53.60	4716.50	800.500	0.020
	Cut-off ≥13	26	70.71	1838.50		
HT	Cut-off <13	88	58.20	5121.50	1082.500	0.676
	Cut-off ≥13	26	55.13	1433.50		
IT	Cut-off <13	88	53.13	4675.00	759.000	0.008
	Cut-off ≥13	26	72.31	1880.00		
AT	Cut-off <13	88	48.85	4298.50	382.500	p<0.001
	Cut-off ≥13	26	86.79	2256.50		
Age	Cut-off <13	88	57.52	5062.00	1142.000	0.989
	Cut-off ≥13	26	57,42	1493,00		

AT: Anxious temperament, CT: Cyclothymic temperament, DT: Depressive temperament, HT: Hyperthymic temperament, IT: Irritable temperament

Table 3. The predictors of tendency to postpartum depression according to the Edinburg Postpartum Depression Scale

Model	B	Standard deviation	Wald	df	p value	Exp (B)	95% CI for Exp (B)
DT	-0.006	0.166	0.002	1	0.969	0.994	0.716-1.376
CT	-0.261	0.128	4.144	1	0.042	1.264	0.599-0.990
HT	-0.127	0.110	1.338	1	0.247	0.881	0.710-1.092
IT	0.235	0.157	2.230	1	0.135	0.771	0.929-1.720
AT	0.385	0.092	17.658	1	p<0.001	1.470	1.228-1.759
Age	0.046	0.069	0.438	1	0.508	1.047	0.914-1.197
Period of marriage	-0.129	0.108	1.409	1	0.235	0.879	0.710-1.087
Have a child	3.401	1.517	5.025	1	0.025	2.990	1.533-5.55
Education	0.177	0.660	0.072	1	0.788	1.194	0.327-4.349
Occupation	-0.861	0.898	0.920	1	0.337	0.423	0.072-2.455
Family structure	-2.474	1.170	4.474	1	0.054	0.084	0.008-0.833
Income rate	-0.590	0.861	0.469	1	0.493	0.555	0.102-2.997
Place of birth	1.797	0.721	6.217	1	0.013	6.033	1.468-24.78
Constant	-8.947	4.232	4.469	1	0.035	0.000	0.000-0.520
Pseudo R ²	0.479						
Cox and Snell's R ²	0.402						
Nagelkerke R ²	0.611						
x ²	58.66						
p value							p<0.001

Binary outcome logistic-regression.

EPDS: Edinburgh Postpartum Depression Scale, AT: Anxious temperament, CT: Cyclothymic temperament, DT: Depressive temperament, HT: Hyperthymic temperament, IT: Irritable temperament, CI: Confidence interval

having a child and place of birth were found to be other risk factors for postpartum depressive disorder.

Study Limitations

Although we performed power analysis for the present study, the numbers of patients can be considered small for making a general conclusion in terms of identifying predictors for postpartum depressive disorder. This is the major limitation of our study. Including the pregnant women without psychiatric disorder, assessing the patients at the same trimester, evaluating the PPD in the first four weeks and prospective design of our study can be regarded as the strengths of our study.

CONCLUSION

In conclusion, we argue that cyclothymic and AT can be considered candidates for predicting tendency to PPD beside other risk factors. Pregnant women who have higher scores specifically for cyclothymic and AT should be evaluated in terms of affective disorders.

Ethics

Ethics Committee Approval: It was approved by Tekirdağ Namık Kemal University Non-Invasive Clinic Research Ethical Committee (date and approval number: 2018/124/08/15).

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.A., E.B., Concept: E.A., E.B., Design: E.A., E.B., Data Collection or Processing: E.A., E.B., Analysis or Interpretation: E.A., E.B., Literature Search: E.A., E.B., Writing: E.A., E.B.

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References

- Kessler RC. Epidemiology of women and depression. *J Affect Disord.* 2003;74:5-13.
- American Psychiatric Association: Diagnostic and Statistical Manual of Mental Health Disorders: DSM-5 Vol. American Psychiatric Publishing. 2013, Washington, DC.
- Brummelte S, Galea LA. Postpartum depression: Etiology, treatment and consequences for maternal care. *Horm Behav.* 2016;77:153-66.
- Patel M, Bailey RK, Jabeen S, Ali S, Barker NC, Osiezagha K. Postpartum depression: a review. *J Health Care Poor Underserved.* 2012;23:534-42.
- Cohen LS, Wang B, Nonacs R, Viguera AC, Lemon EL, Freeman MP. Treatment of mood disorders during pregnancy and postpartum. *Psychiatr Clin North Am.* 2010;33:273-93.
- Norhayati MN, Hazlina NH, Asrenee AR, Emilin WM. Magnitude and risk factors for postpartum symptoms: a literature review. *J Affect Disord.* 2015;175:34-52.
- Dubber S, Reck C, Müller M, Gawlik S. Postpartum bonding: the role of perinatal depression, anxiety and maternal-fetal bonding during pregnancy. *Arch Womens Ment Health.* 2014;18:187-95.
- Darcy JM, Grzywacz JG, Stephens RL, Leng I, Clinch CR, Arcury TA. Maternal depressive symptomatology: 16-month follow-up of infant and maternal health-related quality of life. *J Am Board Fam Med.* 2011;24:249-57.
- Beck CT. Predictors of postpartumdepression: An Update. *Nurs Res.* 2001;50:275-85.
- Rubertsson C, Wickberg B, Gustavsson P, Rådestad I. Depressive symptoms in early pregnancy, two months and one year postpartum-prevalence and psychosocial risk factors in a national Swedish sample. *Arch Womens Ment Health.* 2005;8:97-104.
- Banti S, Mauri M, Oppo A, Borri C, Rambelli C, Ramacciotti D, et al. From the third month of pregnancy to 1 year postpartum. Prevalence, incidence, recurrence, and new onset of depression. Results from the perinatal depression-research & screening unit study. *Compr Psychiatry.* 2011;52:343-51.
- Rasmussen MH, Strøm M, Wohlfahrt J, Videbech P, Melbye M. Risk, treatment duration, and recurrence risk of postpartum affective disorder in women with no prior psychiatric history: A population-based cohort study. *PLoS Med.* 2017;14:e1002392.
- Rihmer Z, Akiskal KK, Rihmer A, Akiskal HS. Current research on affective temperaments. *Curr Opin Psychiatry.* 2010;23:12-8.
- Vázquez GH, Tondo L, Mazzarini L, Gonda X. Affective temperaments in general population: a review and combined analysis from national studies. *J Affect Disord.* 2012;139:18-22.
- Yazici E, Terzi H, Bosgelmez S, Yazici AB, Zincir SB, Kale A. Affective temperaments in pregnancy. *Gynecol Endocrinol.* 2014;30:894-8.
- Yazici E, Uslu Yuvaci H, Yazici AB, Cevrioglu AS, Erol A. Affective temperaments during pregnancy and postpartum period: a clinic to hyperthymic temperament. *Gynecol Endocrinol.* 2018;34:265-9.
- Vahip S, Kesebir S, Alkan M, Yazici O, Akiskal KK, Akiskal HS. Affective temperaments in clinically-well subjects in Turkey: initial psychometric data on the TEMPS-A. *J Affect Disord.* 2005;85:113-25.
- Engindeniz AN, Küey L, Kültür S. Edinburgh doğum sonrası depresyon ölçeği Türkçe formu geçerlilik ve güvenilirlik çalışması. Bahar Sempozyumları 1. Kitabı, Psikiyatri Derneği Yayınları, Ankara 1997. p. 51-2.
- Giallo R, Cooklin A, Wade C, D'Esposito F, Nicholson JM. Maternal postnatal mental health and later emotional-behavioural development of children: the mediating role of parenting behaviour. *Child Care Health Dev.* 2014;40:327-36.
- Goodman SH, Rouse MH, Connell AM, Broth MR, Hall CM, Heyward D. Maternal depression and child psychopathology: a meta-analytic review. *Clin Child Fam Psychol Rev.* 2011;14:1-27.
- McMahon CA, Barnett B, Kowalenko NM, Tennant CC. Maternal attachment state of mind moderates the impact of postnatal depression on infant attachment. *J Child Psychol Psychiatry.* 2006;47:660-9.
- Akiskal HS. [The depressive patient before depression]. *Encephale.* 1992;4:485-9.
- Kelsoe JR. Arguments for the genetic basis of the bipolar spectrum. *J Affect Disord.* 2003;73:183-97.
- Akiskal KK, Akiskal HS. The theoretical underpinnings of affective temperaments: implications for evolutionary foundations of bipolar disorder and human nature. *J Affect Disord.* 2005;85:231-9.
- Röttig D, Röttig S, Brieger P, Marneros A. Temperament and personality in bipolar I patients with and without mixed episodes. *J Affect Disord.* 2007;104:97-102.
- Masmoudi J, Trabelsi S, Charfeddine F, Ben Ayed B, Guermazi M, Jaoua A, et al. Evaluation des tempéraments affectifs dans la symptomatologie dépressive du post-partum [Evaluation of affective temperaments in the postpartum depressive symptomatology]. *Encephale.* 2010;36:14-21.